ATTACHMENT B
COPYRIGHTED LITERATURE SEARCH RESULTS

PsycINFO

TY - JOUR
ID - 2001-00614-004
T1 - Double hearing protection and speech intelligibility--Room for improvement.
A1 - Wagstaff, Anthony S.
A1 - Woxen, Ole J.
Y1 - Apr 2001
N2 - Investigated different types of ear plugs and their effect on speech intelligibility in helicopter noise. Nine male normal-hearing pilots (aged 25-38 yrs) were placed in an environment of recorded helicopter noise from a BO-105 helicopter. Speech audiometry was performed under 4 different conditions: headset only, and 3 different ear plugs worn under the headset. Fitting of the ear plugs was performed by an ear, nose and throat specialist to ensure similar conditions. The sequence of test conditions was randomized and double-blind. In addition, a subjective rating scale was used. Wearing foam ear plugs under the headset decreased speech intelligibility dramatically. The "hi-fi" plug was somewhat better than foam plugs, and the custom made ear plug provided a speech intelligibility close to the headset-only situation. Subjective rating scores coincided with these findings. In helicopter noise, custom made ear plugs may provide a much improved speech intelligibility over conventional plugs when worn under a headset, while maintaining improved noise protection over the headset-alone situation. Custom made ear plugs might therefore be a good alternative to other forms of enhanced noise protection in helicopters. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Auditory Perception
KW - Noise Levels (Work Areas)
KW - Speech Perception
KW - Military Personnel
KW - double-hearing protection with ear plugs, speech intelligibility in helicopter noise, male 25-38 yr old aviation pilots
JF - Aviation, Space, & Environmental Medicine
VL - 72
IS - 4
SP - 400-404
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Royal Norwegian Air Force Inst of Aviation Medicine, Section for Health, Environment & Safety, Oslo, Norway

TY - JOUR
ID - 2001-03087-002
T1 - Vertical navigation displays: Pilot performance and workload during simulated constant angle of descent GPS approaches.
A1 - Oman, Charles M.
A1 - Kendra, Andrew J.
A1 - Hayashi, Miwa
A1 - Stearns, Mary J.
A1 - Buerki-Cohen, Judith
Y1 - 2001
N2 - Compared the effect of alternative graphic or numeric vertical navigation aircraft cockpit displays on horizontal and vertical flight technical error, workload, and subjective preference. Displays included (1) a moving map with altitude range arc; (2) the same format, supplemented with a push-to-see profile view, including a vector flight-path predictor; (3) an equivalent numeric display; and (4) a numeric nonvertical navigation display. 16 pilots each flew 4 different approaches with each format in a Frasca 242 simulator. The vertical navigation

displays reduced vertical flight technical error by as much as a factor of 2 without increasing workload. Relative advantages of the graphics formats are discussed. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Errors
KW - Flight Instrumentation
KW - Performance
KW - Spatial Orientation (Perception)
KW - Work Load
KW - Preferences
KW - Visual Perception
KW - alternative graphic vs numeric vertical navigation aircraft cockpit displays, horizontal & vertical flight technical error & workload & subjective preference, pilots
JF - International Journal of Aviation Psychology
VL - 11
IS - 1
SP - 15-31
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - Massachusetts Inst of Technology, Man-Vehicle Lab, Cambridge, MA, US

TY - RPRT
ID - 2001-16222-001
T1 - The relationship between aviators' home-based stress to work stress and self-perceived performance.
A1 - Fiedler, Edna R.
A1 - Della Rocco, Pam
A1 - Schroeder, David J.
A1 - Nguyen, Kiet T.
Y1 - Oct 2000
N2 - Studied relationships between pilot family life, workplace stress, and performance in US coast guard pilots. 19 US coast guard helicopter pilots (aged 26-47 yrs) at 2 air stations completed a stress questionnaire, rated the importance of various coping strategies, and evaluated their own flying performance. Data were collected as part of a larger study on crew rest. Results indicate that effects of domestic stress carry over to the pilots' work world, directly influencing work stress and indirectly affecting pilots' perceptions of their flying performance. Pilots rated 3 aspects of home life as the most "important" factors in helping them cope with problems of stress. Management needs to maintain awareness of how the quality of home life may affect the work environment and overall performance. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Home Environment
KW - Job Performance
KW - Occupational Stress
KW - Stress
KW - Coast Guard Personnel
KW - Aircraft Pilots
KW - home stress, work stress & self-perceived flying performance, 26-47 yr old US Coast Guard pilots
JF - FAA Office of Aviation Medicine Reports
IS - 00-32
PB - Aviation Medicine, US
AD - Federal Aviation Administration, Office of Aviation Medicine, Washington, DC, US

TY - JOUR
ID - 2000-07701-001
T1 - Head roll compensation in a visually coupled HMD: Considerations for helicopter operations.
A1 - Craig, Gregory L.
A1 - Jennings, Sion A.
A1 - Swail, Carl P.
Y1 - May 2000
N2 - The helmet-mounted display (HMD) research program at the Flight Research Laboratory of the National Research Council of Canada examined the effects of HMD camera platform dynamics on pilot workload. Many currently fielded visually coupled HMD systems do not reproduce head movements in the roll axis which can lead to the presentation of visual information that is not consistent with vestibular and proprioceptive information. The hypothesis was that this sensory conflict can induce motion sickness and increase pilot workload. To examine this premise, three pilots (aged 35-62 yrs) flew a series of standardized maneuvers with or without roll compensation in the camera platform of a visually coupled HMD system. Increases in motion sickness symptoms and pilot workload were noted during complex, high-workload maneuvers when no roll compensation was present in the camera platform. During the most demanding maneuvers, the lack of roll compensation in the camera platform made it difficult for the evaluation pilot to control the helicopter. Conclusions. Roll compensation in visually coupled HMD systems reduces pilot

workload and motion sickness during critical flight periods where pilot workload may already be considerable. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Human Machine Systems
KW - Intersensory Processes
KW - Motion Sickness
KW - Work Load
KW - Aircraft Pilots
KW - Aviation Safety
KW - Helicopters
KW - Visual Displays
KW - Visual Tracking
KW - head mounted display & sensory conflict, motion sickness & pilot workload, 35-62 yr old experienced helicopter pilots
JF - Aviation, Space, & Environmental Medicine
VL - 71
IS - 5
SP - 476-484
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - National Research Council of Canada, Flight Research Lab, Ottawa, ON, Canada

TY - CHAP
ID - 2000-05286-013
T1 - Does human cognition allow human factors (HF) certification of advanced aircrew systems?
T2 - Human factors in certification.
T3 - Human factors in transportation.
A1 - MacLeod, Iain S.
A1 - Taylor, Robert M.
A2 - Wise, John A., (Ed)
A2 - Hopkin, V. David, (Ed)
Y1 - 2000
N2 - Human factors certification is concerned with how efficiently the human elements of a system can perform through use of the system and how human performance affects that system's performance capabilities and the safe achievement of goals. The human factors specification and certification of human-machine interactions through complex systems requires knowledge of the contribution of human cognition to system performance. The authors contend that a viable approach to the consideration of cognition within system design is system cognitive functionality (SCF), which refers to system goal-related properties of work concerned with system direction and control, situation analysis, management and supervision, system-wide knowledge application, and performance-associated team work. This chapter first considers conceptual issues associated with any use of cognition within system design. Problems inherent in traditional human-machine interface design processes are then discussed, followed by consideration of human factors as applied during the UK Merlin military helicopter program. Finally, the importance of encapsulating SCF within system specification is discussed with relation to its necessary contribution to both system performance and certification. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation Safety
KW - Cognition
KW - Human Factors Engineering
KW - Human Machine Systems Design
KW - Systems Analysis
KW - use of human cognition in human factors certification of human-machine interface in advanced aircraft systems design & performance
SP - 183-220
PB - Lawrence Erlbaum Associates, Inc., Publishers, Mahwah, NJ, US
SN - 0805831134 (hardcover)
AD - Aerosystems International, Ltd., England

TY - CHAP
ID - 2000-05286-008
T1 - Quality assurance and risk management: Perspectives on human factors certification of advanced aviation systems.
T2 - Human factors in certification.
T3 - Human factors in transportation.
A1 - Taylor, Robert M.
A1 - MacLeod, Iain S.
A2 - Wise, John A., (Ed)
A2 - Hopkin, V. David, (Ed)
Y1 - 2000
N2 - Based on the experience of engineering psychologists advising the UK Ministry of Defense on the procurement of advanced aviation systems conforming to good human factors engineering practice, this chapter describes quality assurance and risk management perspectives on complex design requirements for human functional integration, information processing, and cognitive task

performance effectiveness. A new approach to the application of human engineering is discussed that provides more systematic ordering and control of these processes and activities to meet the challenges of advanced aircrew systems design. An example of the procurement of the mission systems for the UK Royal Navy Merlin helicopter is described to illustrate how test and evaluation, quality assurance, and risk management approaches are applied to certification and procurement decisions. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation Safety
KW - Human Factors Engineering
KW - Human Machine Systems Design
KW - Quality Control
KW - Risk Management
KW - Helicopters
KW - human factors test & evaluation & quality assurance & risk management approaches, certification & procurement decisions related to advanced aviation systems
SP - 105-129
PB - Lawrence Erlbaum Associates, Inc., Publishers, Mahwah, NJ, US
SN - 0805831134 (hardcover)
AD - DERA Ctr for Human Sciences, England

TY - JOUR
ID - 2000-02506-001
T1 - Underwater disorientation as induced by two helicopter ditching devices.
A1 - Cheung, Bob
A1 - Hofer, Kevin
A1 - Brooks, Chris J.
A1 - Gibbs, Peter
Y1 - Sep 2000
N2 - Examined the relative degree of underwater disorientation induced by the Modular Egress Training Simulator (METS-super(TM)) and the Shallow Water Egress Trainer (SWET). 36 healthy Ss (28 males and 8 females, aged 19-39 yrs) were recruited from local universities and the local business community--a sample representative of the age of military and civilian personnel working offshore. Underwater disorientation was quantified by measuring the deviation of subjective vertical-pointing from the gravitational vertical, time to egress, and subjective reports of disorientation and ease of egress. A repeated measure design was employed with seat position (SWET chair, METS-super(TM) window, and METS-super(TM) aisle) as the sole factor. Subjective response data indicated that the degree of disorientation is rated significantly higher, and the ease of egress is rated worse from the 2 METS-super(TM) seat positions than from the SWET. Findings support that subjective vertical-pointing accuracy is worse in the METS-super(TM) seat positions than in the SWET. The time to egress is longer from the 2 METS-super(TM) seat positions than from SWET. The authors conclude that the METS-super(TM) device is effective for inducing underwater disorientation as provoked by simulated helicopter ditching. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Helicopters
KW - Simulation
KW - Spatial Orientation (Perception)
KW - Underwater Effects
KW - Aerospace Personnel
KW - underwater disorientation from simulated helicopter ditching devices, 19-39 yr olds
JF - Aviation, Space, & Environmental Medicine
VL - 71
IS - 9,Sect1
SP - 879-888
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Defence & Civil Inst of Environmental Medicine, Toronto, ON, Canada

TY - JOUR
ID - 2000-13555-012
T1 - Distance estimation with night vision goggles: A little feedback goes a long way.
A1 - Niall, Keith K.
A1 - Reising, Jack D.
A1 - Martin, Elizabeth L.
Y1 - Sep 1999
N2 - Immediate feedback was given to correct 9 male and 3 female Os' (aged 21-40 yrs) estimates of distance in an experiment in which those estimates were made outdoors at night while Os wore night vision goggles (NVGs). Initially Os made unguided estimates of distances between marked positions in an open field. Those distances ranged from 7.6 m (25 ft) to 64 m (210 ft). Later the same Os made more estimates. After each of these they were told the measured distance between the positions. During this

training, the Os' height from the ground plane was either at a standing position or at an elevated position raised 2.3 m (7 ft 7 in) from standing position. After the training--either immediately after, a week later, or at both times--Os made unguided estimates of distance for a 2nd time. These latter estimates of ground distance made with the NVGs were improved. Average improvement of the Os' estimates persisted for at least 1 week after training. This training can be applied to improve clearance estimates and estimates of hover height for pilots of rotary-wing aircraft. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Distance Perception
KW - Feedback
KW - feedback, distance estimation, 21-40 yr old males and females
JF - Human Factors
VL - 41
IS - 3
SP - 495-506
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - Defence & Civil Inst of Environmental Medicine, Simulator Technologies Group, Toronto, ON, Canada

TY - JOUR
ID - 1999-95024-311
T1 - Human factors error in a cue and symbol-saturated environment. (rotary wing mishaps).
A1 - Fleming, Edward Liam
Y1 - Jan 1999
N2 - The purpose of this study was to increase the understanding of rotary wing flight mishaps by investigating classes of ambiguity in the human factors mishap environment. Human factors failings are often coupled with the interference of the interpretation of information, and a deterioration of situational awareness. The researcher's interest was spurred by the relatively high percentage of catastrophic mishaps attributed to human failings. The mishap environments were treated as complex systems and subsystems, rather than as discrete phenomena in isolation. A multiple case study combined with hypothesis testing of data accumulated through content analysis was conducted on five rotary wing mishaps. Chi-square was utilized to analyze the prevalence of specific categories of noise factors in the five mishap environments. Noise for the purpose of this research was defined as any intervening variable that degraded the ability to receive or interpret critical situational information. The multiple case study and data analysis demonstrated that, in general, noise was a pervasive feature in all five of the selected mishap environments. In addition, this study suggested that the distribution of the sources of noise perceived by aircrews was appreciably different from that of the managers and supervisors. It was further suggested that the conflicting perceptual differences between supervisors and crews were the most significant noise factors to interfere with the processing of critical situational information. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Air Traffic Accidents
KW - Errors
KW - Perception
KW - perception of noise & human factors errors in rotary wing mishaps
JF - Dissertation Abstracts International: Section B: The Sciences & Engineering
VL - 60
IS - 6-B
SP - 2996
PB - Univ. Microfilms International, US
SN - 0419-4217
AD - Walden U., US

TY - JOUR
ID - 1999-13769-004
T1 - Back pain in helicopter pilots.
A1 - Borrillo, Donato J.
Y1 - May 1999
N2 - Comments on the examination by M. K. Thomae et al (see record 1998-02296-003) of the prevalence of back pain among 200 male Australian military pilots (aged 25-32 yrs). In their paper, Thomae et al concluded that the prevalence of back pain in Australian military helicopter pilots is unacceptably high and may be limiting operational readiness, pilot performance, flying safety, and pilot health. The current authors distributed the same questionnaire used by Thomae et al to 19 US Air Force base active duty pilots in order to assess and/or discover any previously unreported underlying back disease. Results indicate no need for concern in the surveyed population. It is the current author's purpose to demonstrate the usefulness of a classically simple questionnaire to assess underreported illness. (PsycINFO

Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Back Pain
KW - Epidemiology
KW - Job Performance
KW - Military Personnel
KW - Aircraft Pilots
KW - prevalence of back pain, military helicopter pilots, commentary
JF - Aviation, Space, & Environmental Medicine
VL - 70
IS - 5
SP - 533-534
PB - Aerospace Medical Assn, US
SN - 0095-6562

TY - JOUR
ID - 1999-13329-005
T1 - The development of specifications for an automated monitoring system interface associated with aircraft condition.
A1 - Deaton, John E.
A1 - Glenn, Floyd A.
Y1 - 1999
N2 - Investigated the information requirements for using new automated diagnostic systems to predict and mitigate in-flight mechanical system emergencies. A motion-based simulator was used to gather performance data associated with 24 aircrew responses to a variety of mechanical faults using current cockpit instrumentation. Participants were then interviewed regarding their information requirements for using the automated monitoring interface system. Results give initial support for a taxonomy of aircrew cognitive activities. This classification scheme is being used in ongoing work to design and evaluate information aids for rotorcraft aircrews. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Automation
KW - Aviation
KW - Flight Instrumentation
KW - Human Machine Systems
KW - Information
KW - Aerospace Personnel
KW - Prediction
KW - information requirements for use of automated diagnostic systems for prediction & mitigation of in-flight mechanical system emergencies, air crew personnel
JF - International Journal of Aviation Psychology
VL - 9
IS - 2
SP - 175-187
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - CHI Systems, Orlando, FL, US

TY - BOOK
ID - 1999-08006-000
T1 - Handbook of aviation human factors.
T3 - Human factors in transportation.
A1 - Garland, Daniel J., (Ed)
A1 - Wise, John A., (Ed)
A1 - Hopkin, V. David, (Ed)
Y1 - 1999
N2 - Examines applications of human factors to aviation systems and operations. Specifically, the text emphasizes human-centered automation in the specification of human-machine relationships, the international nature of aviation as reflected in cultural differences in preferred practices and procedures, and the increased concern with such activities as maintenance, certification, verification, and validation in the quest for better system reliability. The book offers the reader recent developments in aviation and in human factors, and mentions the future development of this field. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Air Transportation
KW - Aviation
KW - Human Factors Engineering
KW - Air Traffic Control
KW - human factors & capabilities & performance in air traffic control & other aviation operations & designs
PB - Lawrence Erlbaum Associates, Inc., Publishers, Mahwah, NJ, US
SN - 0805816801 (hardcover)
AD - Embry-Riddle Aeronautical U, Daytona Beach, FL, US

TY - JOUR
ID - 1999-05758-001
T1 - Use of virtual environments for the acquisition of spatial knowledge: Comparison among different visual displays.

A1 - Johnson, David M.
A1 - Stewart, John E.Jr.
Y1 - 1999
N2 - Investigated, using 30 27-30 yr old soldiers, the effects of three visual display systems differing in immersiveness: A wide field of view (FOV) 3-D helmet-mounted display (HMD); a 3-D HMD with a narrow FOV; and a stationary, rear-projection, wide screen display (WSD). Soldiers explored a virtual environment (VE) representing an actual, unfamiliar heliport. Measures of spatial knowledge of the heliport and presence were recorded. Pretest-posttest differences showed that exploration of the VE transferred to the actual heliport. Visual display had no effect on spatial knowledge of the heliport or on presence. Measures of susceptibility to presence correlated with reported presence only in the WSD condition. Results question popular notions about VEs, which assume that visual-spatial learning is more effective the more immersive the visual display. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Military Personnel
KW - Spatial Learning
KW - Spatial Perception
KW - narrow vs wide field of view 3-D helmet vs stationary wide screen display, acquisition of spatial knowledge, 22-30 yr old soldiers
JF - Military Psychology
VL - 11
IS - 2
SP - 129-148
PB - Lawrence Erlbaum Associates, US
SN - 0899-5605
AD - US Army Research Inst, Rotary Wing Aviation Research Unit, Fort Rucker, AL, US

TY - JOUR
ID - 1999-05369-003
T1 - Reduce risk of inducing spatial disorientation using physiological compatible ground lighting.
A1 - Schmidt, Reynold T.
Y1 - Jun 1999
N2 - Spatial disorientation (SD) that occurs while landing aircraft during night operations may result in accidents and fatalities which are often classified as secondary to pilot error. It has now been determined that the use of "expedient" lights, which include flares, flashlights, automobile headlights, etc., can induce SD in pilots. The element that contributes to induction of SD is the point source of light provided by these lights. Impingement on the retina of concentrated photon emissions, as supplied by incandescent (filament) lamps, flares, etc., produces an afterimage, such as occurs when one briefly looks into the sun. Pilots who develop afterimages during the final stage of landing a helicopter at night are predisposed to experiencing SD, leading to aircraft mishaps. In contrast to flares or incandescent light sources, cold cathode lamps lack a point source of light emission, do not create an afterimage, and are ideal to use in night landing operations. Cold cathode lights operating in the range of 512 nm (blue-green) are thought to be the most physiologically efficient color to use for night landing operations. Light sources in this nanometer range provide maximum visibility and safety for the pilot during landing operations under all environmental conditions. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Aviation Safety
KW - Illumination
KW - Risk Management
KW - Spatial Orientation (Perception)
KW - use of physiologically compatible ground lighting to reduce risk of inducing spatial disorientation, aircraft pilots
JF - Aviation, Space, & Environmental Medicine
VL - 70
IS - 6
SP - 598-603
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Litebeams Inc, Santa Monica, CA, US

TY - RPRT
ID - 1998-12417-001
T1 - Combat mission training research at the 58th special operations wing: A summary.
A1 - Spiker, V. Alan
A1 - Nullmeyer, Robert T.
A1 - Tourville, Steven J.
A1 - Silverman, Denise R.
Y1 - Jul 1998
N2 - Summarizes 3 behavioral research studies conducted at Kirtland Air Force Base. Study 1 measured crew resource management (CRM)

behaviors during combat mission training. Eleven MC-130P Special Operations Forces aircrews (67 crewmembers) were observed during Day 5 of annual refresher training. A strong, positive correlation was observed between CRM effectiveness at the crew-level and their performance. A strong association between the quality of a crew's mission planning activities and subsequent mission performance was also observed. Study 2 conducted a human factors evaluation of the Aerial Gunner Scanner Simulator (AGSS). Ss were 11 experienced rotary-wing instructors, 20 students, and 2 instructor gunners. The bulk of the information obtained came from a human factors survey. Results show that most features of AGSS are acceptable for training, but may benefit from improvement. Study 3 evaluated perceived benefits of integrated networked training (NT) using the Special Operations Forces Network. 99 crewmembers participating in 9 NT exercises were surveyed following training. Results strongly support the value of NT in such areas as multiship tactics, aerial refueling operations, formation flight, situation awareness, and mission team coordination. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Computer Assisted Instruction
KW - Computer Simulation
KW - Human Factors Engineering
KW - Military Training
KW - Air Force Personnel
KW - resource management behaviors & human factors evaluation of Aerial Gunner Scanner Simulator & integrated networked simulation in combat mission training research, aircrews & instructors & students
JF - USAF AMRL Technical Report (Brooks)
IS - 1997-0182
SP - iii-52
PB - Air Force Systems/Materiel Command, US
AD - Anacapa Sciences, Inc, Santa Barbara, CA, US

TY - JOUR
ID - 1998-12093-001
T1 - Flight crew fatigue I: Objectives and methods.
A1 - Gander, Philippa H.
A1 - Graeber, R. Curtis
A1 - Connell, Linda J.
A1 - Gregory, Kevin B.
A1 - Miller, Donna L.
A1 - Rosekind, Mark R.
Y1 - Sep 1998
N2 - Presents an overview of 4 studies (see records 1998-12093-002-005) that assessed flight crew fatigue and determined its potential operational consequences. 197 crewmembers were monitored before, during, and after commercial short-haul (fixed-wing and helicopter aircraft), overnight cargo, and long-haul operations. 94 trip patterns with 1,299 flight segments and 2,046 hrs of flying time were assessed. The NASA-Ames research program is outlined and common methodology used in these studies is described. Practical countermeasure suggestions are provided. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aerospace Personnel
KW - Fatigue
KW - Job Performance
KW - Work Load
KW - Work Scheduling
KW - Air Transportation
KW - Goals
KW - Methodology
KW - objectives & methodology in assessment of fatigue & operational consequences, flight crewmembers from short- vs long- haul & overnight operations
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 9, Sect 2
SP - B1-B7
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Otago U, Wellington School of MedicineDept of Public Health, Wellington South, New Zealand

TY - JOUR
ID - 1998-11726-004
T1 - The optokinetic cervico reflex during simulated helicopter flight.
A1 - Braithwaite, Malcom G.
A1 - Beal, Kathleen G.
A1 - Alvarez, Eduardo A.
A1 - Jones, Heber D.
A1 - Estrada, Arthur
Y1 - Dec 1998

N2 - Investigated the relationship between horizon position and the perception of orientation and, thus, generated information needed to assess whether optokinetic cervico reflex (OKCR) plays an important role in spatial disorientation. It was hypothesized that pilots of rotary-wing aircraft would exhibit the OKCR. A UH-60 flight simulator study, with 20 volunteer pilots (aged 23-50 yrs) participating, was performed to examine the effects of this reflex during day flight and during flight with night vision goggles (NVGs). The results confirm that the OKCR occurs during simulated helicopter flight, both with and without NVGs. As with previous studies, head roll increased during flight under visual meteorological conditions in relation to an increasing aircraft roll angle up to a maximum sustainable level and then remained constant. Head roll did not occur during flight under instrument meteorological conditions. The authors conclude that the presence of the OKCR will impact rotary-wing operations. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Flight Simulation
KW - Helicopters
KW - Orienting Responses
KW - Reflexes
KW - simulated helicopter flight & optokinetic cervico reflex, 23-50 yr old male military helicopter pilots
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 12
SP - 1166-1173
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Headquarters Director Army Aviation, Stockbridge, England

TY - JOUR
ID - 1998-11083-001
T1 - Spatial disorientation in U.S. Army rotary-wing operations.
A1 - Braithwaite, Malcolm G.
A1 - Durnford, Simon J.
A1 - Crowley, John S.
A1 - Rosado, Norberto R.
A1 - Albano, John P.
Y1 - Nov 1998
N2 - Describes 2 surveys concerning spatial disorientation (SD) in US Army rotary-wing operations that sought to assess the hazard and to identify recommendations to control it. One survey was of accident records, and the other was of aircrew experiences. The accident survey showed that 30% of class A to C accidents involved SD as a significant factor, while the aircrew survey showed that 78% of aircrews have been disoriented (8% to the extent that safety was threatened). Differences between the 2 surveys included: 90% of the reviewed accidents were thought to involve type I (unrecognized) SD compared with only 43% of the reported incidents; 62% of the accidents occurred at night compared to only 36% of the incidents. Both surveys showed a significant increase in SD associated with combat operations. Neither survey showed any association between SD and fatigue or other human factors. Results suggest that crew coordination, alerting devises, flight information displays, and autopilot functions would be good targets for improvement. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aerospace Personnel
KW - Air Traffic Accidents
KW - Army Personnel
KW - Spatial Distortion
KW - Spatial Orientation (Perception)
KW - factors in spatial disorientation in US Army rotary-wing operations incidents & accidents
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 11
SP - 1031-1037
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Headquarters Director Army Aviation, Stockbridge, England

TY - JOUR
ID - 1998-10488-002
T1 - Flight simulator evaluation of a novel flight instrument display to minimize the risks of spatial disorientation.
A1 - Braithwaite, Malcolm G.
A1 - Durnford, Simon J.
A1 - Groh, Shannon L.
A1 - Jones, Heber D.
A1 - Higdon, Alford A.
A1 - Estrada, Arthur
A1 - Alvarez, Eduardo A.
Y1 - Aug 1998
N2 - Spatial disorientation (SD) in flight remains a major source of

attrition. Many SD accidents would occur regardless of the instrument display in use, since the aircrew are simply not looking at the instruments. However, there are a number of accidents which might be amenable to improved instrument displays. In an attempt to improve maintenance and reattainment of correct orientation with a reduced cognitive workload, a novel instrument display has been developed. This paper describes an assessment of the display in a UH-60 helicopter flight simulator, and tested the hypothesis that during instrument flight and recovery from unusual attitudes, the novel display permits a more accurate maintenance and reestablishment of flight parameters than the standard flight instruments. 16 male aviators (aged 25-48 yrs) flew a simulated instrument flight profile and recovery from unusual attitudes using both the standard flight instruments and the novel display. When compared with the standard instruments, both control of flight parameters and recovery from unusual attitudes were significantly improved and cognitive workload was reduced when using the novel display. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Human Channel Capacity
KW - Instrument Controls
KW - Spatial Organization
KW - Spatial Orientation (Perception)
KW - Flight Simulation
KW - simulator evaluation of novel instrument display minimizing spatial disorientation, establishment of correct orientation with reduced cognitive workload, male 25-48 yr old Army aviators
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 8
SP - 733-742
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Headquarters Director Army Aviation, Hampshire, England

TY - JOUR
ID - 1998-10488-001
T1 - An evaluation of the British Army spatial disorientation sortie in U. S. Army aviation.
A1 - Braithwaite, Malcolm G.
A1 - Hudgens, Joe J.
A1 - Estrada, Arthur
A1 - Alvarez, Eduardo A.
Y1 - Aug 1998
N2 - Following didactic instruction, most aircrew are able to experience some of the disorienting illusions and limitations of the orientation senses in a variety of ground-based devices. To reinforce instruction in spatial disorientation (SD) within the environment in which they operate, British Army Air Corps helicopter pilots also receive an airborne demonstration of the limitations of their orientation senses prior to rotary-wing instrument flight training. The objective of this assessment was to determine whether the SD demonstration sortie would be an effective adjunct in training aircrew in SD in the US Army. 45 aviators and training personnel who experienced the sortie gave their opinion in questionnaires. Findings indicate that the maneuvers performed in the SD demonstration sortie, and the sortie overall, were extremely effective at demonstrating the limitations of the orientation senses; the SD sortie attracted a significantly higher rating in its effectiveness to train aviators in SD than all the currently available methods; and the introduction of the sortie into initial and refresher flight training would be a distinct enhancement to the SD training of aviators and associated personnel. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Army Personnel
KW - Aviation
KW - Evaluation
KW - Spatial Orientation (Perception)
KW - Teaching Methods
KW - evaluation of airborne demonstration of spatial disorientation, Army aviators, implications for training
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 8
SP - 727-732
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - US Army Aeromedical Research Lab, Aircrew Health & Performance Div, Ft Rucker, AL, US

TY - JOUR
ID - 1998-04128-003
T1 - Flight performance effects of thermal stress and two aviator

uniforms in a UH-60 helicopter simulator.
A1 - Reardon, Matthew J.
A1 - Fraser, Evie B.
A1 - Omer, Julia M.
Y1 - Jun 1998
N2 - The effects on flight performance of the 4 combinations of an unencumbered mission oriented protective posture (MOPP) aviator battle dress uniform (ABDU), and encumbered MOPP4 over ABDU flight ensemble in cool (70 deg.F or 21.1 deg.C, 50% relative humidity [RH]) and hot (100 deg.F or 37.8 deg.C, 50% RH) UH-60 simulator cockpit conditions were evaluated with a repeated measures, 2 * 2 factorial study using 9 military rotary-wing aviators (aged 27-44 yrs). The encumbered MOPP4 uniform had the most frequent adverse effect on flight performance followed by heat stress, with less frequent effects from the combination or interaction of these 2 factors. This study confirmed that heat stress and wearing an encumbered US Army MOPP4 flight uniform significantly reduced endurance and flight performance in a UH-60 simulator. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Clothing
KW - Flight Simulation
KW - Military Personnel
KW - Posture
KW - Temperature Effects
KW - Aircraft Pilots
KW - Helicopters
KW - unencumbered & encumbered mission oriented protective posture & aviator battle dress uniform in cool vs hot UH-60 simulator cockpit conditions, flight performance, 27-44 yr old helicopter aviators
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 6
SP - 569-576
PB - Aerospace Medical Assn, US
SN - 0095-6562

TY - JOUR
ID - 1998-02296-003
T1 - Back pain in Australian military helicopter pilots: A preliminary study.
A1 - Thomae, Merryn K.
A1 - Porteous, J. E.
A1 - Brock, J. R.
A1 - Allen, G. D.
A1 - Heller, R. F.
Y1 - May 1998
N2 - Examines the prevalence of back pain among among 200 male Australian military pilots (25-32 yr). The prevalence, risk factors, and consequences of low back pain were assessed in a cross-sectional survey of helicopter pilots by self-completion questionnaire. Responses were received from 131 (66%) of available pilots. The overall prevalence of reported back pain was 64%, with a further 28% of pilots describing back discomfort while flying. More than half the pilots (55%) indicated that back pain had interfered with their concentration while flying, with 16% reporting that they had hurried flying missions because of pain. We conclude that the prevalence of back pain in Australian military helicopter pilots is unacceptably high and may be limiting operational readiness, pilot performance, flying safety, and pilot health. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Back Pain
KW - Epidemiology
KW - Job Performance
KW - Aircraft Pilots
KW - Military Personnel
KW - prevalence of back pain, 25-32 yr old male military helicopter pilots, implications for operational readiness & flying performance
JF - Aviation, Space, & Environmental Medicine
VL - 69
IS - 5
SP - 468-473
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Health Sciences U of Newcastle, Faculty of MedicineCtr for Clinical Epidemiology & Biostatistics, Newcastle, NSW, Australia

TY - BOOK
ID - 1997-97487-000
T1 - Human-automation interaction: Research and practice.
A1 - Mouloua, Mustapha, (Ed)
A1 - Koonce, Jefferson M., (Ed)

Y1 - 1997
N2 - The present volume "Human-Automation Interaction: Research and Practice" represents a snapshot of a series of experimental and investigative studies concerned with the impact of automation technology on human performance. The book covers a wide variety of human factors issues across several domains of application. The papers presented in this volume are part of the proceedings of the 2nd Automation Technology and Human performance Conference held in Cocoa Beach, Florida, on March 7-9, 1996. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Automation
KW - Human Computer Interaction
KW - Human Factors Engineering
KW - Performance
KW - Technology
KW - Air Traffic Control
KW - Attention
KW - Aviation
KW - Medical Sciences
KW - Sociocultural Factors
KW - human-automation interaction & impact of automation technology on human performance, conference presentation
PB - Lawrence Erlbaum Associates, Inc, Hillsdale, NJ, US
SN - 0805828419 (hardcover)
AD - U Central Florida, Ctr for Applied Human Factors in Aviation, Orlando, FL, US

TY - JOUR
ID - 1997-95007-192
T1 - Practical drift: The friendly fire shootdown over northern Iraq.
A1 - Snook, Scott Andrew
Y1 - Apr 1997
N2 - Dramatic organizational failures and subsequent incident reviews open unique windows into the everyday lives of complex organizations. One such window opened on the 14th of April 1994, when two U.S. Air Force F-15 fighters accidentally shot down two U.S. Army Black Hawk helicopters in northern Iraq, killing all twenty-six people on board. After almost two years of extensive investigation, with virtually unlimited resources, no compelling explanation emerged. This thesis explores fundamental behavioral and organizational dynamics that contributed to the shootdown. Individual, group, and organizational links in the causal chain of events are explained by applying a variety of behavioral concepts and theories. Deeper insights come from looking across levels and across time. Grounded theory analysis yielded a dynamic, cross-level mechanism I call 'practical drift'--the slow, steady uncoupling of practice from written procedure. After extended periods of time, locally practical actions within subgroups gradually drift away from originally established procedures. Then, in one of those rare stochastic fits of nature, the system becomes tightly coupled. When drifting sub-units are lurched back into close proximity, the mismatch between locally determined logics of action and globally synchronized rules can be dramatic. In high-hazard organizations, it can be disastrous. Since its inception in 1991, substantial drift crept into Task Force Provide Comfort. Unfortunately, in 1994, a perverse combination of practical drift and situationally-induced tight coupling set the proximate conditions for the shootdown. There are many lessons here. Here is a summary of the most important ones: (1) Look beyond individual error by framing puzzling behavior in complex organizations as individuals struggling to make sense. (2) Follow the basic design principles of high performance teams and think twice about chasing the advantages of social redundancy. (3) Treat organizational states of integration and reliability with chronic suspicion. Recognize them for what they are: constant outcomes of dynamic systems, ongoing accomplishments that require active preventative maintenance. (4) To explain such complex events, move beyond linear, deterministic cause and effect models. Rather than asking what caused the accident, search instead for a general set of conditions that increased the likelihood of failure. (5) Move beyond intra-level accounts and search instead for underlying mechanisms that operate across levels of analysis and across time. (6) Recognize the inadequacy of purely rule-based solutions to address complex dynamic mechanisms such as practical drift. In sum, the fundamental question here is not how to fix pilot misidentification, crew inaction, organizational non-integration, or even practical drift. The more fundamental question raised by this study for both theory and practice is: What are the critical design features of a hyper-complex, multi-level, multi-task, organizational system that increase the likelihood of accomplishing the 'total task' consistently? As caring humans, we pray that such tragedies never occur. As pragmatic practitioners, we know that they will. As behavioral theorists, we must be ready to rush in and mine them for all they're worth. Building a library of such treasures, thick descriptions of complex untoward events, will move us a long way towards unlocking the fundamental

design mysteries of hyper-complex organizations. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Air Force Personnel
KW - Air Traffic Accidents
KW - Causal Analysis
KW - Organizational Characteristics
KW - War
KW - Cognitive Processes
KW - Experiences (Events)
KW - Systems Theory
KW - Practical drift: The friendly fire shootdown over northern Iraq (military, organizational failure)
JF - Dissertation Abstracts International Section A: Humanities & Social Sciences
VL - 57
IS - 10-A
SP - 4561
PB - University Microfilms International, US
SN - 0419-4209
AD - Harvard U, US

TY - JOUR
ID - 1997-42575-001
T1 - An in-flight investigation of the efficacy of dextroamphetamine for sustaining helicopter pilot performance.
A1 - Caldwell, John A.Jr.
A1 - Caldwell, J. Lynn
Y1 - Dec 1997
N2 - Flight performance, mood, and alertness (EEG activity) were assessed for 10 male UH-60 pilots (aged 28-36 yrs) during exposure to 2 40-hr sleep deprivation periods separated by a night of recovery sleep. Ss received 30mg Dexedrine(R) during 1 of the periods, and placebo during the other period. Results show that Dexedrine(R) improved flight performance during straight-and-levels, climbs, descents, right turns, and left-descending turns, with tendencies toward better performance during left turns and the instrument landing system approach. Dexedrine(R) markedly reduced feelings of fatigue, confusion, and depression, while increasing feelings of vigor, and enhanced CNS arousal. Treatment with Dexedrine(R) was associated with mild asymptomatic increases in heart rate and blood pressure. Findings indicate that Dexedrine(R) is effective for the short-term sustainment of aviator performance during sustained operations. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Dextroamphetamine
KW - Electrical Activity
KW - Emotional States
KW - Job Performance
KW - Sleep Deprivation
KW - Aircraft Pilots
KW - Electroencephalography
KW - Military Personnel
KW - sleep deprivation & treatment with dexedrine, flight performance & mood & EEG activity, 28-36 yr old male UH-60 pilots
JF - Aviation, Space, & Environmental Medicine
VL - 68
IS - 12
SP - 1073-1080
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - US Army Aeromedical Research Lab, Fort Rucker, AL, US

TY - JOUR
ID - 1997-42308-004
T1 - Effects of chemical protective clothing and heat stress on army helicopter pilot performance.
A1 - Caldwell, J. Lynn
A1 - Caldwell, John A.
A1 - Salter, Charles A.
Y1 - 1997
N2 - The US Army Aeromedical Research Laboratory investigated performance of helicopter pilots flying in both temperate and hot weather, with and without various types of chemical protective clothing (CPC) and pilot cooling systems. These studies were conducted in the field and in laboratory environments and evaluated aviator performance, physiological parameters, and psychological mood under conditions that increase thermal loading to explore heat stress in aviation operations. The investigations defined expected flying limits and examined flight performance under these conditions. The results of early studies prompted evaluations of personal cooling devices and their functional utility for aviators. These investigations provided critical information to the operational community about the effects of CPC and heat stress on aviators operating in varied environments, especially hot desert or tropical climates. (PsycINFO Database Record (c) 2000 APA, all rights reserved)

KW - Clothing
KW - Heat Effects
KW - Performance
KW - Physiological Stress
KW - Psychological Stress
KW - Aircraft Pilots
KW - Helicopters
KW - Military Personnel
KW - chemical protective clothing with vs without heat stress, flight performance & psychological parameters & psychological mood, army helicopter pilots
JF - Military Psychology
VL - 9
IS - 4
SP - 315-328
PB - Lawrence Erlbaum Associates, US
SN - 0899-5605
AD - U. S. Army Aeromedical Research Lab, Fort Rucker, AL, US

TY - JOUR
ID - 1997-07730-002
T1 - Sustaining female helicopter pilot performance with dexedrine during sleep deprivation.
A1 - Caldwell, John A.
A1 - Caldwell, J. Lynn
A1 - Crowley, John S.
Y1 - 1997
N2 - Conducted a replication of the study by J. A. Caldwell, et al (1995) to investigate the efficacy of dextroamphetamine (Dexedrine(R)) for maintaining the flight simulator performance of female aviators during moderate sleep deprivation. Six female UH-60 helicopter pilots (mean age of 29.5 yrs) were exposed to 2 40-hr sleep deprivation periods during which they alternately received Dexedrine(R) (3 10-mg doses) or placebo. Results of ANOVA show that Dexedrine(R) improved 6 of 9 UH-60 helicopter flight simulator maneuvers and enhanced general levels of alertness as measured by EEG and Profile of Mood States assessments. The results from a cognitive test were negligible and inconsistent, probably because of the short test duration. Overall results suggest that Dexedrine(R) effectively sustained the performance, alertness, and mood of female pilots despite short-term sleep loss. There were no problematic side effects. Generally, the flight performance effects were supportive of the 1995 Caldwell study in which male helicopter pilots were better able to maintain their performance using Dexedrine(R) during sleep deprivation. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Dextroamphetamine
KW - Flight Simulation
KW - Human Females
KW - Sleep Deprivation
KW - Cognitive Ability
KW - Electroencephalography
KW - Emotional States
KW - Experimental Replication
KW - Job Performance
KW - dextroamphetamine, flight simulator performance & EEG & mood & cognitive performance, sleep deprived female helicopter pilots, replication
JF - International Journal of Aviation Psychology
VL - 7
IS - 1
SP - 15-36
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - Aeromedical Research Lab, Aeromedical Factors Branch, Ft Rucker, AL, US

TY - JOUR
ID - 1997-06819-003
T1 - Large sample validations of three general predictors of pilot training success.
A1 - Burke, Eugene
A1 - Hobson, Christian
A1 - Linksy, Colin
Y1 - 1997
N2 - This article addresses problems related to obtaining an adequate sample size for reliable statistical analysis of predictive validity of tests used in pilot selection research. A meta-analysis of the results of three studies involving computerized tests of instrument comprehension (Instrument Comprehension Test) and psychomotor ability (Sensorimotor Apparatus test and Control of Velocity Test) and a composite Pilot Aptitude Index was conducted to determine whether the validities of these tests generalized across three contexts.

These were Royal Air Force and Turkish Air Force fixed-wing and British Army Air Corps rotary-wing pilot training applicants, selectees, and failed applicants. The criterion used for computing validities was first-time success in the initial stage of flight training. The adequacy of sample sizes for estimating the validity of the tests, the levels of predictive validity to later stages of training, and the need for tests of information processing in later stages are discussed. Reference is also made to data from a fourth independent study of Qantas pilot training. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Occupational Success Prediction
KW - Sample Size
KW - Selection Tests
KW - Statistical Validity
KW - Air Force Personnel
KW - Flight Instrumentation
KW - Meta Analysis
KW - Military Training
KW - Perceptual Motor Processes
KW - sample size & training stage, validity of instrument comprehension & psychomotor ability tests to predict training success, Royal & Turkish Air Force & British Army Air Corps pilot trainees
JF - International Journal of Aviation Psychology
VL - 7
IS - 3
SP - 225-234
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - People Technologies, Twickenham, England

TY - JOUR
ID - 1997-06819-001
T1 - Effects of the AH-64A Pilot-s Night Vision System on the performance of seven simulated maneuver tasks.
A1 - Stewart, John E.
Y1 - 1997
N2 - The Pilot's Night Vision System (PNVS) allows the AH-64A Apache attack helicopter pilot to fly and navigate effectively at night. The PNVS is a thermal imaging system in which imagery and symbology are presented through a helmet-mounted display. The PNVS restricts field of view (FOV) and degrades visual acuity, suggesting that PNVS performance degradation would be greatest for tasks relying on peripheral vision for motion and velocity cues and least for tasks not relying on peripheral cues. Participants, all AH-64A male instructor pilots, flew a mission profile in a high-fidelity simulation of the AH-64A. The profile consisted of seven routine maneuvers that were flown first under daytime (baseline) conditions (using a rear projection display with a 174- FOV) then under night conditions (with a simulated PNVS display with a 40- FOV). Significant performance degradations were found for all maneuver tasks, contrary to expectations. Possible explanations for performance differences are explored, and applications of the findings to training and pilot workload standards are discussed. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Apparatus
KW - Flight Instrumentation
KW - Helicopters
KW - Performance
KW - Peripheral Vision
KW - Aircraft Pilots
KW - Cues
KW - Flight Simulation
KW - Military Personnel
KW - Motion Perception
KW - Velocity
KW - Visual Acuity
KW - Pilot-s Night Vision System, effects of field of view & visual acuity degradation on use of peripheral cues & performance during simulation of AH-64A Apache helicopter flight, male pilots
JF - International Journal of Aviation Psychology
VL - 7
IS - 3
SP - 183-200
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - US Army Research Inst, Rotary Wing Aviation Research Unit, Fort Rucker, AL, US

TY - JOUR
ID - 1997-05607-001
T1 - Training head movement in visual scanning: An embedded approach to the development of piloting skills with helmet-mounted displays.

A1 - Seagull, F. Jacob
A1 - Gopher, Daniel
Y1 - Sep 1997
N2 - Pilots using a single-eye helmet-mounted display (HMD) for night vision have orientation problems that are strongly affected by head movement. However, it is precisely this behavior that is called upon to expand the limited field of view. The reported experiment trained pilots to use head movement in visual scanning. Participants piloted a simulated helicopter using either a single-eye HMD or a binocular through-the-window display. In training, participants piloted HMD flights while carrying out a secondary task that required systematic head movement. Results show that trained groups performed considerably better than control groups in subsequent HMD test flights. These groups learned to increase their head movement, whereas control groups spontaneously reduced theirs. Relatively short but directed training was hence highly effective in reshaping basic scanning behavior and improving performance in a complex, dynamic visual environment. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Dark Adaptation
KW - Motor Processes
KW - Optical Aids
KW - Visual Search
KW - Helicopters
KW - head movement training, visual scanning at night using helmet-mounted display, 19-26 yr old male helicopter pilots
JF - Journal of Experimental Psychology: Applied
VL - 3
IS - 3
SP - 163-180
PB - American Psychological Assn, US
SN - 1076-898X
AD - Technion-Israel Inst of Technology, Dept of Industrial Engineering & Management, Haifa, Israel

TY - JOUR
ID - 1996-04763-002
T1 - Application of a three-dimensional auditory display in a flight task.
A1 - Bronkhorst, Adelbert W.
A1 - Veltman, J. A. (Hans)
A1 - van Breda, Leo
Y1 - Mar 1996
N2 - Investigated the effectiveness of a 3-dimensional (3D) auditory display in conveying directional information in a flight simulation experiment. Eight 23-29 yr old male Dutch air force personnel flew a simulated fighter aircraft and attempted to locate and tail a target aircraft that suddenly disappeared and reemerged at an unknown position. Ss viewed a computer-generated outside image, on which they could spot the target only when it was at short range, and a 3D tactical display indicating the target position at all distances within a limited field of view. Additional displays were a bird's-eye-view radar display and a 3D auditory display which generated a warning sound from the relative direction of the target. The radar and auditory displays caused about the same significant reduction in search time in comparison with the tactical display only. Performance was optimal when the 2 additional displays were presented simultaneously. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Auditory Displays
KW - Auditory Localization
KW - Aviation
KW - Flight Simulation
KW - Aircraft Pilots
KW - 3 dimensional auditory display, simulated aircraft piloting ability & target location, 23-29 yr old male Air Force helicopter pilots, Netherlands
JF - Human Factors
VL - 38
IS - 1
SP - 23-33
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - TNO Human Factors Research Inst, Soesterberg, Netherlands

TY - JOUR
ID - 1996-21527-001
T1 - The semantic associations of acoustic parameters commonly used in the design of auditory information and warning signals.
A1 - Edworthy, Judy
A1 - Hellier, Elizabeth
A1 - Hards, Rachael
Y1 - Nov 1995

N2 - Investigated the potential meanings associated with simple sounds in order to provide a rationale for the design of a set of trend monitoring sounds for use in adverse conditions encountered in helicopter flight. Two experiments are described in which the effects of acoustic parameters, and changes in those acoustic parameters, on the salience of 42 pre-selected adjectives are explored. In Exp 1, 4 sets of 7 stimuli were scaled along the 42 adjectives. 16 undergraduates (aged 23-45 yrs) participated in the study. Three of the 4 parameters produced significant levels of both consistency and linear mapping for the adjective "urgent." In Exp 2, the overall meaning of complete within-parameter stimulus sets were explored by 16 Ss (aged 18-47 yrs) and differences both within and between parameters and adjectives were found. Results were used to design 5 trend monitoring sounds for helicopter flight, 3 of which are described. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Auditory Stimulation
KW - Human Factors Engineering
KW - Semantics
KW - semantic associations of & changes in acoustic parameters, design of auditory information & warning signals, 18-47 yr olds
JF - Ergonomics
VL - 38
IS - 11
SP - 2341-2361
PB - Taylor & Francis, US
SN - 0014-0139
AD - U Plymouth, Dept of Psychology, England

TY - JOUR
ID - 1995-39100-001
T1 - A survey of selected aviators' perceptions regarding army crew endurance guidelines.
A1 - Caldwell, John A.
A1 - Caldwell, J. Lynn
A1 - Hartnett, Timothy C.
Y1 - Jan 1995
N2 - Examined the thinking of Army aviators about the accuracy and comprehensiveness of the existing endurance guidance. Expert opinions were also sought concerning what (if any) changes should be considered, the perceived extent of these changes, and the manner in which future research on aircrew endurance should proceed. A 59-item questionnaire was administered to 653 Army helicopter pilots from a variety of Army units to assess crew endurance issues. Approximately 75% of Ss said that physical training was important to them personally, and 63% said that improved physical fitness reduces flight-related fatigue. With regard to the current crew endurance guide, only 1% of Ss thought that the guide was exceptional, and 65% said that they thought it should be rewritten. Most Ss indicated that data from either in-flight endurance evaluations or questionnaires administered to personnel in the field should be used to develop a new guide. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Army Personnel
KW - Employee Attitudes
KW - Endurance
KW - perceptions of endurance guidelines & issues, 20-51 yr old Army helicopter pilots
JF - Military Medicine
VL - 160
IS - 1
SP - 21-26
PB - Assn. of Military Surgeons of the U.S., US
SN - 0026-4075
AD - US Army Aeromedical Research Lab, Aircrew Health & Performance Div, Ft Rucker, AL, US

TY - JOUR
ID - 1994-35596-001
T1 - The ergonomics of jettisoning escape hatches in a ditched helicopter.
A1 - Brooks, C. J.
A1 - Bohemier, A. P.
A1 - Snelling, G. R.
Y1 - May 1994
N2 - Investigated the problem of location, operation, and jettison of escape windows and hatches of helicopters following ditching as performed in a modular egress training simulator. 48 aircrew attempted 298 escapes using a variety of 24 escape routes and 9 different types of escape hatches. Overall results, while superficially indicating that the task was easy, in fact revealed many unforeseen problems. There was no standardization of hatches and levers, there were problems with location and operation of levers principally due to poor design, and no ergonomics study

appears to have investigated the problems. It is suggested that underwater escape training with hatches in position must be mandatory for all who fly off-shore or over water. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Helicopters
KW - Human Factors Engineering
KW - Aerospace Personnel
KW - location & operation & jettison of escape windows & hatches of helicopters following ditching, aircrew
JF - Aviation, Space, & Environmental Medicine
VL - 65
IS - 5
SP - 387-395
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Dept of National Defence Air Command Headquarters, Westwin, MB, Canada

TY - JOUR
ID - 1994-35616-001
T1 - Supervisory control in a dynamic and uncertain environment: Laboratory task and crew performance.
A1 - Kirlik, Alex
A1 - Plamondon, Brian D.
A1 - Lytton, Lynn
A1 - Jagacinski, Richard J.
A1 - et al
Y1 - Jul-Aug 1993
N2 - Describes a research program using a microworld methodology for investigating human performance in a dynamic uncertain environment. One- and 2-person crews performed a supervisory control task that involved piloting a low-fidelity scout helicopter and supervising 4 additional helicopters. The simulated environment contained cargo and enemy craft that had to be discovered by searching a 100 mi-2 forested region. The task required planning, intervention, and several types of resource management. An expert 1-person crew performed comparably to novice 2-person crews, and both of these were superior to novice 1-person crews. More detailed analyses of performance revealed several types of limited adaptivity in the behavior of the novice crews. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Flight Simulation
KW - Human Machine Systems
KW - Experience Level
KW - interaction with dynamic uncertain environment in simulated supervisory control task, male expert vs novice 1 vs 2 person flight crews
JF - IEEE Transactions on Systems, Man, & Cybernetics
VL - 23
IS - 4
SP - 1130-1138
PB - Institute of Electrical & Electronics Engineers Inc, US
SN - 0018-9472
AD - Georgia Inst of Technology, School of Industrial & Systems Engineering, Ctr for Human-Machine Systems Research, Atlanta, US

TY - JOUR
ID - 1994-07852-001
T1 - Assessment of pilot performance and mental workload in rotary wing aircraft.
A1 - Sirevaag, Erik J.
A1 - Kramer, Arthur F.
A1 - Wickens, Christopher D.
A1 - Reisweber, Mark
A1 - et al
Y1 - Sep 1993
N2 - Examined the processing demands imposed on 6 experienced pilots by 2 different communication formats, digital and verbal, in a high fidelity simulation of an advanced multi-function helicopter. The mental workload imposed by the type and magnitude of communications was assessed by a battery of subjective, performance, secondary, and physiological measures. Performance data indicated that the pilots had difficulty adhering to the Nap of the Earth altitude criterion with high communication demands, particularly with the digital communication system. Ss were less prone to task shedding when they used the digital communication system, possibly due to the provision of a permanent list of queries that was unavailable with the verbal system. Incorrect responses occurred more often when the verbal system was used. Measures of heart rate variability and blink rate were larger with the verbal than with the digital system. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Communication
KW - Flight Simulation
KW - Human Channel Capacity

KW - Job Performance
KW - Work Load
KW - Aircraft Pilots
KW - digital vs verbal communications format in helicopter simulation, job performance & mental work load, pilots
JF - Ergonomics
VL - 36
IS - 9
SP - 1121-1140
PB - Taylor & Francis, US
SN - 0014-0139
AD - U Illinois Inst of Aviation, Aviation Research Lab, Urbana, US

TY - JOUR
ID - 1993-04756-001
T1 - Effects of 2 mg and 4 mg atropine sulfate on the performance of U.S. Army helicopter pilots.
A1 - Caldwell, John A.
A1 - Stephens, Robert L.
A1 - Carter, David J.
A1 - Jones, Heber D.
Y1 - Oct 1992
N2 - Assessed the effects of atropine sulfate (AS) on flight performance, vision, tracking, cognitive performance, and EEGs of 12 Army aviators during actual flight conditions. Ss were administered AS (2 mg or 4 mg, intramuscularly [im]) or a placebo on 3 alternate days and underwent laboratory evaluation and flight evaluation. Effects, in terms of aircraft control problems, vision disturbances, impaired tracking, reduced cortical activation, and decreased cognitive skill, were seen most often with the 4 mg dose, indicating that helicopter tactical flight is dangerous after a 4 mg dose and other types of flight should also be avoided for at least 12 hrs after AS. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Army Personnel
KW - Atropine
KW - Aviation
KW - Drug Dosages
KW - Cognitive Ability
KW - Electroencephalography
KW - Vision
KW - Visual Tracking
KW - atropine sulfate dosage, flight & cognitive performance & vision & tracking & EEG, 24-32 yr old male Army helicopter pilots
JF - Aviation, Space, & Environmental Medicine
VL - 63
IS - 10
SP - 857-864
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - US Army Aeromedical Research Lab Biomedical Applications Research Div, Crew Stress & Workload Branch, Ft Rucker, AL, US

TY - JOUR
ID - 1993-15763-001
T1 - Visual tasks in helicopter shipboard landing.
A1 - Berbaum, K. S.
A1 - Kennedy, R. S.
A1 - Hettinger, L. J.
Y1 - Aug 1991
N2 - Identified the visual scene content important in helicopter shipboard landings and illustrated the use of a methodology (protocol analysis) that may hold promise in human factors research. Two experienced helicopter pilots performed a simulator scenario involving flying dusk/night landing approaches. With each approach, the S dictated real-time verbal protocols of visual and control activities. These were subsequently partitioned into 9 phases defined in terms of range or altitude, and the visual tasks required in each segment were described, yielding a list of visual cue augmentations useful for providing augmented feedback in training. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Flight Simulation
KW - Helicopters
KW - Visual Perception
KW - Aircraft Pilots
KW - Methodology
KW - Navy Personnel
KW - shipboard landing helicopter simulator scenario with visual tasks & protocol analysis, Navy helicopter pilots
JF - Applied Ergonomics
VL - 22
IS - 4
SP - 231-239
PB - Elsevier Science Ltd, England

SN - 0003-6870
AD - U Iowa, Iowa City, US

TY - JOUR
ID - 1992-41299-001
T1 - Frames of reference for helicopter electronic maps: The relevance of spatial cognition and componential analysis.
A1 - Harwood, Kelly
A1 - Wickens, Christopher D.
Y1 - 1991
N2 - Computer-generated map displays for Nap-of-the-Earth and low-level helicopter flight were configured according to research on maps, navigational problem solving, and spatial cognition in large-scale environments. Interest centered on different frame-of-reference representations. The north-up map emphasized consistency of object location, characteristic of an earth-centered frame of reference. The track-up map emphasized map-terrain congruency, characteristic of an ego-centered frame of reference. 20 skilled male pilots used the maps to complete navigational tasks that occurred within a realistic simulation program. Findings reveal pattern of map-task dependencies. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Computer Applications
KW - Flight Instrumentation
KW - Flight Simulation
KW - Helicopters
KW - Visual Displays
KW - Aircraft Pilots
KW - computer generated north-up vs track-up electronic maps, spatial cognition & componential analysis in frame of reference representations used in helicopter flight simulation, male pilots
JF - International Journal of Aviation Psychology
VL - 1
IS - 1
SP - 5-23
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - CTA Inc, Rockville, MD, US

TY - JOUR
ID - 1992-41153-001
T1 - Pilot personality and crew coordination: Implications for training and selection.
A1 - Chidester, Thomas R.
A1 - Helmreich, Robert L.
A1 - Gregorich, Steven E.
A1 - Geis, Craig E.
Y1 - 1991
N2 - 531 military pilots who completed a recurrent training program in cockpit resource management and 139 helicoptor pilots in the military completed personality and attitude surveys to isolate subgroups of pilots along performance-related personality dimensions and to document limits on the impact of crew coordination training between the groups. A Positive Instrumental/Interpersonal cluster emerged, characterized by elevated levels of both instrumental and expressive traits. A Negative Instrumental cluster was characterized by elevated levels of positive and negative instrumental traits combined with low levels of positive expressive traits. A Low Motivation cluster, characterized by below-average scores on positive instrumental and expressive traits, also emerged. These clusters predicted attitude change following training in crew coordination. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Attitudes
KW - Job Performance
KW - Personality Traits
KW - Personnel Management
KW - Aerospace Personnel
KW - Military Personnel
KW - attitude & personality, cockpit resource management & crew coordination, military helicopter vs other aircraft pilots, training & selection implications
JF - International Journal of Aviation Psychology
VL - 1
IS - 1
SP - 25-44
PB - Lawrence Erlbaum Assoc, US
SN - 1050-8414
AD - American Airlines, US

TY - RPRT
ID - 1992-33439-001
T1 - An analysis of aircrew communication patterns and content.

A1 - Oser, Randall L.
A1 - Prince, Carolyn
A1 - Morgan, Ben B.
A1 - Simpson, Steven S.
Y1 - Sep 1991
N2 - Studied communication patterns of helicopter crewmembers, using analyses of transcripts produced by 14 tactical rotary-wing aircrews performing mission-oriented scenarios in a motion-based simulator. Results suggest that (1) each of the 2 crewmembers demonstrated specific types (e.g., commands, observations) of communications patterns and content; (2) crews' communication patterns varied according to flight conditions (routine vs nonroutine); (3) communications content was related to operational performance; (4) similarities were found between communication initiated by crewmembers in rotary-wing crews and those found in a study of fixed-wing crews (H. C. Foushee et al, 1986), and differences were found with regard to how communication content varied in routine and nonroutine flight conditions; and (5) results of this analysis can have an impact on aircrew coordination training. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aerospace Personnel
KW - Military Personnel
KW - Oral Communication
KW - Helicopters
KW - oral communication patterns & content, military helicopter aircrews in motion based simulator
JF - US Naval Training Systems Center Technical Reports
IS - 90-009
PB - US Naval Training Systems Center, US
AD - US Naval Training Systems Ctr, Human Factors Div, Orlando, FL, US

TY - JOUR
ID - 1992-04626-001
T1 - Heat stress on helicopter pilots during ground standby.
A1 - Froom, Paul
A1 - Shochat, Igal
A1 - Strichman, Liora
A1 - Cohen, Alex
A1 - et al
Y1 - Oct 1991
N2 - Used measurements of ambient thermal conditions to characterize and predict thermal conditions in the cockpit before takeoff and during a 1-hr standby period in 2 types of helicopters with a crew of 2 and the cockpit doors opened. It was found that there is a substantial increase in cockpit heat stress during a 1-hr standby period. However, the effect of such heat stress on pilot performance was not determined. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aerospace Personnel
KW - Heat Effects
KW - Helicopters
KW - Aircraft Pilots
KW - Performance
KW - cockpit heat & stress during ground standby, helicopter crews, implications for pilot performance
JF - Aviation, Space, & Environmental Medicine
VL - 62
IS - 10
SP - 978-981
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Israel Air Force Aeromedical Ctr, Israel

TY - JOUR
ID - 1991-34878-001
T1 - The effect of information display formats on helicopter pilots' target acquisition and flying performance.
A1 - Dominessy, Mary E.
A1 - Lukas, Jeffrey H.
A1 - Malkin, Frank J.
A1 - Monty, Richard A.
A1 - et al
Y1 - 1991
N2 - Compared 3 information display formats for presenting tactical instructions to 16 male helicopter pilots (aged 24-43 yrs) for locating targets on a situation diplay. Verbal (text), graphic (symbols), or numeric (digits) instructions were presented for a subsequent target acquisition search task (TAST) while Ss were either serving as copilot or simultaneously piloting the aircraft. The reaction times (RTs) to acknowledge the instructions were fastest for the numeric format and slowest for the text format. Once the instructions were understood, Ss searched and located the target in a situation display equally well regardless of format. For all formats, piloting performance was adversely affected and mental workload significantly

increased while simultaneously performing the TAST. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Flight Instrumentation
KW - National Guardsmen
KW - Perceptual Motor Processes
KW - Visual Displays
KW - Flight Simulation
KW - Graphical Displays
KW - Helicopters
KW - Performance
KW - tactical instructions information display formats, target location & flight simulation performance, 24-43 yr old male National Guard helicopter pilots
JF - Military Psychology
VL - 3
IS - 3
SP - 163-176
PB - Lawrence Erlbaum Associates, US
SN - 0899-5605
AD - US Army Human Engineering Lab, US

TY - JOUR
ID - 1991-06126-001
T1 - Back pain and exposure to whole body vibration in helicopter pilots.
A1 - Bongers, P. M.
A1 - Hulshof, C. T.
A1 - Dijkstra, L.
A1 - Boshuizen, H. C.
A1 - et al
Y1 - Aug 1990
N2 - Used a questionnaire survey to compare the prevalence of back pain in 163 helicopter pilots and 297 nonflying controls who underwent the same pre-employment medical examination. Vibration levels of the helicopters were measured, and an accumulative vibration dose was calculated for each pilot. Transient back pain was more frequent among pilots compared with controls, and the prevalence of chronic back pain was higher among pilots. Transient back pain seemed to be most strongly related to the average hours of flight per day, whereas chronic back pain was more closely related to total hours of flight or the accumulative vibration dose. The observed health effects may be due to vibration or constrained posture but are most likely due to concomitant exposure to both factors. (French, German & Japanese abstracts) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Back Pain
KW - Occupational Exposure
KW - Vibration
KW - Epidemiology
KW - exposure to whole body vibration & prevalence of back pain, helicopter pilots
JF - Ergonomics
VL - 33
IS - 8
SP - 1007-1026
PB - Taylor & Francis, US
SN - 0014-0139
AD - U Amsterdam, Coronel Lab, Netherlands

TY - CHAP
ID - 1990-98616-004
T1 - Auditory warning sounds in the work environment.
T2 - Human factors in hazardous situations.
A1 - Patterson, R. D.
A2 - Broadbent, D. E., (Ed)
A2 - Reason, J. T., (Ed)
A2 - et al
Y1 - 1990
N2 - the MRC [Medical Research Council] Applied Psychology Unit performed a series of auditory warning studies / the main conclusions of the research were that the number of immediate-action warning sounds should not exceed about six, and that each sound should have a distinct melody and temporal pattern /// the experiments also showed that it is possible to predict the optimum sound level for a warning sound in most noise environments /// subsequently, a set of guidelines for the production of ergonomic auditory warnings was developed / the guidelines have been used to analyse the environments in both fixed-wing and rotary-wing aircraft, and to design prototype warning systems for environments as diverse as helicopters, operating theatres and the railways
N2 - This chapter includes a discussion among R. D. Patterson and J. E. Mayfield. (PsycINFO Database Record (c) 2000 APA, all rights

reserved)
KW - Auditory Stimulation
KW - Hazards
KW - Occupational Safety
KW - Loudness
KW - discusses studies that looked at optimum number of warning sounds, melody & temporal pattern of warning sounds, & sound level for warning sounds in work environments
SP - 37-44
PB - Clarendon Press/Oxford University Press, New York, NY, US
SN - 019852191X (hardcover)
AD - Medical Research Council, Applied Psychology Unit, Cambridge, England

TY - JOUR
ID - 1990-59520-001
T1 - Frames of reference and electronic anchors: An investigation of map displays for helicopter flight.
A1 - Harwood, Kelly
Y1 - May 1990
KW - Aircraft Pilots
KW - Aviation
KW - Helicopters
KW - Human Machine Systems
KW - Pictorial Stimuli
KW - maps with ego vs world frame of reference & color & word electronic anchors, navigational task performance, helicopter pilots
JF - Dissertation Abstracts International
VL - 50
IS - 11-B
SP - 5354
PB - Univ. Microfilms International, US
SN - 0419-4217
AD - U Illinois, Urbana-Champaign, US

TY - BOOK
ID - 1990-97199-000
T1 - Aviation psychology.
A1 - Jensen, Richard S., (Ed)
Y1 - 1989
N2 - This book systematically covers the most salient features of four major disciplines contributing to the field of aviation psychology: engineering, psychology, education and physiology. Attention has been given to both in-flight and air traffic control issues. /// The authors are leading international experts, carefully chosen from professional, industrial, research and academic communities in both civil and military aviation. Many have also participated in the prestigious International Symposia on Aviation Psychology founded and organized biennially by the Editor at Columbus, Ohio. /// Each chapter gives a broad treatment of its subject, addressing topical issues and giving a general review of the literature. All are written to a careful plan in order to give a harmonious and integrated whole, conveying the essence of current research themes. /// Like the symposia, it brings together some of the major problems, and ways towards their practical solution for a wider professional audience. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Human Factors Engineering
KW - Psychology
KW - Education
KW - Physiology
PB - Gower Publishing Co, Brookfield, VT, US
SN - 0291397786 (hardcover)
SN - 0566090597 (paperback)
AD - Ohio State U, Dept of Aviation, Columbus, OH, US

TY - BOOK
ID - 1989-97592-000
T1 - Human performance models for computer-aided engineering.
A1 - Elkind, Jerome I., (Ed)
A1 - Card, Stuart K., (Ed)
A1 - Hochberg, Julian, (Ed)
A1 - Huey, Beverly Messick, (Ed)
Y1 - 1989
N2 - This report discusses a topic important to the field of computational human factors: models of human performance and their use in computer-based engineering facilities for the design of complex systems. It focuses on a particular human factors design problem--the design of a cockpit systems for advanced helicopters--and on a particular aspect of human performance--vision and related cognitive functions. /// The report is addressed to human factors professionals and others

interested in human performance models, human factors design methodology, and design tools. It describes some of the key vision-related problems of helicopter flight and cockpit design as a way of introducing the reader to the design domain on which the report is focused. It discusses issues in the integration of models into a computer-based human factors design facility and the use of such a facility in the design process, and it reviews existing models of vision and cognition with special attention to their use in a computer-based design facility. It concludes with a set of findings about the adequacy of existing models for a computational human factors facility and a related set of recommendations for research that is needed to provide a stronger foundation of models upon which to base such a facility.

N2 - The Panel on Pilot Performance Models for Computer-Aided Engineering was formed by the National Research Council (NRC) in response to a request from the Army Advanced Systems Research Office. The National Aeronautics and Space Administration (NASA) Ames Research Center asked the NRC to conduct a study that would provide advice and guidance in a number of areas important for the Army-NASA Aircrew/Aircraft Integration (A3[superscript]I) program which is developing a prototype of a human factors computer-aided engineering (CAE) facility for the design of helicopter cockpits. (PsycINFO Database Record (c) 2000 APA, all rights reserved)

KW - Human Factors Engineering
KW - Models
KW - Performance
KW - Cognitive Processes
KW - Helicopters
KW - Human Machine Systems Design
KW - Vision
PB - National Academy Press, Washington, DC, US
AD - Xerox Corp, Sunnyvale, CA, US

TY - CHAP
ID - 1988-98354-017
T1 - Helicopter human factors.
T2 - Human factors in aviation.
T3 - Academic Press series in cognition and perception.
A1 - Hart, Sandra G.
A2 - Wiener, Earl L., (Ed)
A2 - Nagel, David C., (Ed)
Y1 - 1988

N2 - the goal of this chapter is to review the many factors that affect the performance and workload of military and civilian helicopter pilots and to discuss significant deficiencies in research, design, and operational procedures /// typical helicopter flight tasks /// cockpit environment / vibration / noise / temperature /// helicopter controls /// information requirements / direct visual information / spatial disorientation (PsycINFO Database Record (c) 2000 APA, all rights reserved)

KW - Aircraft Pilots
KW - Helicopters
KW - Job Performance
KW - Human Machine Systems Design
SP - 591-638
PB - Academic Press, Inc, San Diego, CA, US
SN - 0127500308 (hardcover)
AD - NASA-Ames Research Ctr, Aerospace Human Factors Research DivCoordinator for Helicopter Research, Moffett Field, CA, US

TY - BOOK
ID - 1988-98354-000
T1 - Human factors in aviation.
T3 - Academic Press series in cognition and perception.
A1 - Wiener, Earl L., (Ed)
A1 - Nagel, David C., (Ed)
Y1 - 1988

N2 - "Human Factors in Aviation" is the first comprehensive review of contemporary applications of human factors research to aviation since the 1950s. Written for professionals, equipment and systems designers, trainers, pilots, and managers, it emphasizes the definition and solution of specific problems. General areas of human cognition and perception, systems theory, and safety are approached through specific topics in aviation such as: behavioral analysis of pilot performance; cockpit automation; advancing display and control technology; [and] training methods. /// Aerospace engineers, pilots, air traffic controllers, governmental regulatory personnel and investigators, as well as human factors researchers will find in this book a thorough review of human factors research in aviation and a guide to its future. (PsycINFO Database Record (c) 2000 APA, all rights reserved)

KW - Aviation
KW - Human Factors Engineering
KW - Human Information Storage

KW - Visual Perception
PB - Academic Press, Inc, San Diego, CA, US
SN - 0127500308 (hardcover)
AD - U of Miami, Dept of Management ScienceProfessor of Management Science & Industrial Engineering, Coral Gables, FL, US

TY - BOOK
ID - 1988-98215-000
T1 - Vision in vehicles--II.
A1 - Gale, A. G., (Ed)
A1 - Freeman, M. H., (Ed)
A1 - Haslegrave, C. M., (Ed)
A1 - Smith, P., (Ed)
A1 - Taylor, S. P., (Ed)
Y1 - 1988
N1 - Vision in Vehicles 2nd Sep 1987 U of Nottingham Nottingham England
N2 - The conference set out to provide an international forum for the exchange of information on current work on all aspects of vision and its relationship to vehicle design, including the internal and external design of the vehicle and its environmental displays, as well as the perceptual and cognitive capabilities and limitations of the controller of the vehicle. /// In calling for papers for the meeting we envisaged the scope of the conference as covering all vehicles where the visual task involves monitoring both the in-vehicle displays and the surrounding visual environment i. e. cars, heavy goods vehicles, trains, aircraft, helicopters, military vehicles or ships. As it turned out the majority of the papers dealt with the car driver. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Human Machine Systems Design
KW - Motor Vehicles
KW - Visual Perception
KW - Driving Behavior
KW - Human Factors Engineering
PB - North-Holland, Amsterdam
SN - 044470423X (hardcover)
AD - Queen's Medical Ctr, Nottingham, England

TY - JOUR
ID - 1987-23698-001
T1 - Flight trial of a helmet-mounted display image stabilisation system.
A1 - Wells, Maxwell J.
A1 - Griffin, M. J.
Y1 - Apr 1987
N2 - An image stabilization system for improving reading performance with a helmet-mounted display (HMD) during whole-body vibration was tested at night in a helicopter. Six Ss (aged 27-37 yrs) read arrays of 50 numerals as quickly and as accurately as possible while flying in 3 different flight conditions. Data from the flight trial suggest that HMD reading performance with vibration and night viewing conditions may be inferior to performance with daylight conditions. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Apparatus
KW - Flight Simulation
KW - Reading Skills
KW - Vibration
KW - Visual Displays
KW - helmet mounted display image stabilization system, reading performance during vibration from simulated flight, 27-37 yr olds
JF - Aviation, Space, & Environmental Medicine
VL - 58
IS - 4
SP - 319-322
PB - Aerospace Medical Assn, US
SN - 0095-6562

TY - JOUR
ID - 1987-23691-001
T1 - A qualitative model of human interaction with complex dynamic systems.
A1 - Hess, Ronald A.
Y1 - Jan-Feb 1987
N2 - Describes a hierarchical model of human interaction with complex dynamic systems that consists of 3 parts: a behavior generator that is responsible for action decomposition, turning higher level goals or missions into physical action at the human-machine interface; an internal representation of the environment; and a sensory information processor responsible for sensory composition. All 3 parts of the model act in consort to allow anticipatory behavior on the part of the human in goal-directed interaction with dynamic systems. Human workload and error are interpreted in this framework, and the example of an automobile

commute illustrates the nature of the activity in the 3 model elements. Verbal protocols from a manned simulation study of a helicopter instrument landing task are analyzed with emphasis on the effect of automation on human-machine performance. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Errors
KW - Flight Simulation
KW - Human Machine Systems
KW - Models
KW - Work Load
KW - Driving Behavior
KW - model of goal-directed human interaction with complex dynamic systems, human work load & error in automobile commute & helicopter instrument landing task simulation, pilots
JF - IEEE Transactions on Systems, Man, & Cybernetics
VL - 17
IS - 1
SP - 33-51
PB - Institute of Electrical & Electronics Engineers Inc, US
SN - 0018-9472
AD - U California, Div of Aeronautical Science & Engineering, Davis

TY - JOUR
ID - 1987-12210-001
T1 - Selecting colour codes for a computer-generated topographic map based on perception experiments and functional requirements.
A1 - Spiker, Alan
A1 - Rogers, Steven P.
A1 - Cicinelli, Joseph
Y1 - Nov 1986
N2 - Conducted a series of human factors analyses that guided the selection of chromaticities and luminances for a computer-generated topographic map. By virtue of its computational capabilities, this CRT-displayed digital map will facilitate the navigational accuracy and situational awareness of army helicopter aviators during low-level and nap-of-the-earth flight. Color codes were assigned to the digital map's point, linear and area features according to guidelines derived from 4 color-naming and 2 symbol-search experiments, in which 60 Ss were tested. The design of each study was structured around the map's functional requirements. Within these constraints, the results of the color-naming studies yielded an initial set of map color codes by identifying the most frequently occurring color confusions arising from the perceptual distortions of brightness contrast, color contrast, and Gaussian spread. The symbol search studies further refined color selection by identifying the specific foreground/background color combinations that hinder search and by quantifying the conditions under which a color monochrome map facilitates symbol search. (French & German abstracts) (29 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Color
KW - Helicopters
KW - Human Factors Engineering
KW - Luminance
KW - Army Personnel
KW - Computer Applications
KW - Job Performance
KW - Visual Displays
KW - perceptual & functional selection of chromatics & luminances for computer-generated topographic map, navigational accuracy & situational awareness during low level & nap-of-the-earth flight, Army helicopter pilots
JF - Ergonomics
VL - 29
IS - 11
SP - 1313-1328
PB - Taylor & Francis, US
SN - 0014-0139
AD - Anacapa Sciences Inc, Santa Barbara, CA

TY - JOUR
ID - 1987-12206-001
T1 - On the selection and evaluation of visual display symbology: Factors influencing search and identification times.
A1 - Remington, Roger
A1 - Williams, Douglas
Y1 - Aug 1986
N2 - Three single-target visual search tasks were used with 52 Ss to evaluate a set of CRT symbols for a helicopter situation display. The search tasks were representative of the information extraction required in practice, and reaction time (RT) was used to measure the efficiency with which symbols could be located and identified. Results indicate that familiar numeric symbols were responded to more quickly than graphic symbols. The addition of

modifier symbols, such as a nearby flashing dot or surrounding square, had a greater disruptive effect on the graphic symbols than did the numeric characters. It is suggested that a symbol set is, in some respects, like a list that must be learned. Factors that affect the time to identify items in a memory task, such as familiarity and visual discriminability, also affect the time to identify symbols. An attempt was made to model information access with this class of display. (19 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Human Factors Engineering
KW - Reaction Time
KW - Video Display Units
KW - Visual Displays
KW - Visual Search
KW - Helicopters
KW - numeric vs graphic CRT symbols for helicopter situation display, visual search & identification times, nonpilot college students & staff
JF - Human Factors
VL - 28
IS - 4
SP - 407-420
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - NASA-Ames Research Ctr, Aero-Space Human Factors Research Div, Moffett Field, CA

TY - JOUR
ID - 1986-29035-001
T1 - Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes.
A1 - Ribot, Edith
A1 - Roll, Jean P.
A1 - Gauthier, Gabriel M.
Y1 - Aug 1986
N2 - Assessed the performance of 6 right-handed Ss (aged 23-40 yrs) with normal vision in a target recentering task, performed under both normal and vibration conditions. A conventional helicopter stick and an arm-side controller were used in both position and force control modes. The task was designed to simulate instrument flying. Results show that in the no-vibration situation, the highest performance was achieved in the force control mode, and little difference was observed between the 2 sticks. Findings also indicate that vibration impaired the velocity control of the performance. It is suggested that the S might be switching over from a visual and arm afferent and efferent control in the no-vibration situation, to a visual control only under the vibration condition. It is concluded that the more efficient stick to execute the designed task is the mini-stick operating in the force control mode. (28 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Motor Performance
KW - Perceptual Motor Processes
KW - Vibration
KW - Aviation
KW - Human Factors Engineering
KW - Visual Perception
KW - whole-body vibration, sensorimotor performance with conventional helicopter stick vs arm-side controller in position vs force control modes, right handed 23-40 yr olds, implications for design of instrument flying controls
JF - Aviation, Space, & Environmental Medicine
VL - 57
IS - 8
SP - 792-799
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - CNRS, U d'Aix-Marseille I Lab de Psychophysiologie, Marseille, France

TY - JOUR
ID - 1986-23299-001
T1 - An integrated display for vertical and translational flight: Eight factors affecting pilot performance.
A1 - Tatro, Jon S.
A1 - Roscoe, Stanley N.
Y1 - Feb 1986
N2 - Tested the effects of 8 factors on pilot performance and derived a multiple regression model of vertical takeoff and landing (VTOL) pilot performance as a function of those 8 factors for each of 3 dependent performance measures. Ss were 3 male pilots with no helicopter or other VTOL experience. Findings show that factors having important effects were Position Error Magnification, Control Order, Prediction Time, Control Gain, Tracking Mode, and several of their interactions. The present

research represents the development and initial experimentation of the downward-looking portion of an overall display and control system for all-weather instrument flight in VTOL aircraft. (60 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Flight Simulation
KW - Human Factors Engineering
KW - Job Performance
KW - Performance
KW - factors affecting vertical & translational flight performance, pilots
JF - Human Factors
VL - 28
IS - 1
SP - 101-120
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - Bell Helicopter-Textron, Ft Worth, TX

TY - JOUR
ID - 1986-18783-001
T1 - Automation effects in a multiloop manual control system.
A1 - Hess, Ronald A.
A1 - McNally, B. David
Y1 - Jan-Feb 1986
N2 - Investigated human interaction with a simple multiloop manual control system in which the human's activity was systematically varied by changing the level of automation. The system simulated was the longitudinal dynamics of a hovering helicopter. The experimental study was complemented by an analytical modeling effort that utilized simple crossover models of the human operator. It is suggested that such models can be extended to the description of multiloop tasks involving preview and precognitive human operator behavior. (15 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Automation
KW - Human Machine Systems
KW - Task Complexity
KW - Aircraft Pilots
KW - level of automation, interaction with simple multiloop manual control system in hovering helicopter, pilots
JF - IEEE Transactions on Systems, Man, & Cybernetics
VL - SMC-16
IS - 1
SP - 111-121
PB - Institute of Electrical & Electronics Engineers Inc, US
SN - 0018-9472
AD - U California, Davis

TY - JOUR
ID - 1986-15970-001
T1 - Aviator performance in week-long extended flight operations in a helicopter simulator.
A1 - Krueger, Gerald P.
A1 - Armstrong, Richard N.
A1 - Cisco, Ronald R.
Y1 - Feb 1985
N2 - Measured psychological, physiological, and biochemical correlates of aviator crew performance, stress, and fatigue in a week-long flight schedule in a helicopter simulator. Three 2-person crews of rotary wing aviators (aged 21-28 yrs) performed 14 hrs of precision instrument flight on each of 4 successive days and 10 hrs on the 5th day. Missions involved repetitions of 2-hr standardized day and night flight profiles that were occasionally interrupted by simulated emergencies. Performance measures included meeting assigned airspeeds, altitudes, headings, turn rates, and navigation requirements. Ss slept 4 hrs each night. Baseline data were collected prior to, and recovery data after, the extended flight schedule. Ss maintained simulator flight parameters to within acceptable tolerances of assigned headings, airspeeds, and altitudes, even into the morning of the 4th day of the schedule. However, cognitive and judgmental errors were made. Even though flight surgeons deemed them unsafe to fly by the 3rd night, Ss continued to fly well to the 5th day. (28 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Fatigue
KW - Flight Simulation
KW - Job Performance
KW - Sleep Deprivation
KW - Stress
KW - Aerospace Personnel
KW - Army Personnel
KW - Judgment
KW - extended flight operations in helicopter simulator, performance & stress & fatigue, 21-28 yr old Army aviators
JF - Behavior Research Methods, Instruments & Computers

VL - 17
IS - 1
SP - 68-74
PB - Psychonomic Society Inc, US
SN - 0743-3808
AD - Walter Reed US Army Inst of Research, Div of Neuropsychiatry, Washington, DC

TY - JOUR
ID - 1986-13190-001
T1 - Age and pilot performance.
A1 - Eyraud, Micheline Y.
A1 - Borowsky, Michael S.
Y1 - Jun 1985
N2 - Analyzed aircraft mishap and exposure data for the fighter, attack, and helicopter communities to determine if there were differences in mishap rates and in the type of human error mishap causal factors as a function of pilot age. Flight records for US Navy pilots from 1977 to 1982 were categorized flight-by-flight by age and combined with mishap records to obtain mishap rates. Pilots were aged 22-47 yrs. Analysis showed that the mishap rate for pilots aged 26 yrs and under was high, while the rate for pilots aged 38 yrs and older did not differ significantly from the rate of pilots in the 23-37 yr age range. Younger pilots had mishaps as a result of improper response/poor landing technique, loss of control, failure to maintain flying speed, and improper use of flight controls. Older pilots had mishaps involving violation of existing regulations and instructions, offensive maneuvers, and inadequate flight preparation. It is suggested that mishap reduction may be effected by age-specific training. (7 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Accidents
KW - Age Differences
KW - Aircraft Pilots
KW - Errors
KW - Navy Personnel
KW - age, mishap rates & type of human error mishap causal factors, 22-47 yr old fighter & attack & helicopter Navy pilots
JF - Aviation, Space, & Environmental Medicine
VL - 56
IS - 6
SP - 553-558
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Old Dominion U

TY - JOUR
ID - 1985-21644-001
T1 - Helicopter copilot workload during nap-of-the-earth flight.
A1 - Cote, David O.
A1 - Krueger, Gerald P.
A1 - Simmons, Ronald R.
Y1 - Feb 1985
N2 - Examined 2 automatic navigation systems, a Doppler radar system and a projected map system, and a hand-held map for their effects on copilot/navigator workload and performance in 18 male US Army aviators (median age 25 yrs). It was found that the automatic navigation systems reduced the number of navigation errors and the size of deviations from intended track. The Doppler system reduced the time devoted to navigating and the number of verbal navigation messages exchanged between pilot and copilot. The projected map system reduced visual workload. However, with all 3 navigation systems, more than 80% of copilots' time was spent on navigation tasks, less than 10% of their time was visual free time that could be used for other tasks, and greater than 20% of the crew's time was occupied with navigation communications. Other advantages of automatic navigation systems, such as preventing errors and aiding recovery from disturbed flights, are outlined. (10 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Automation
KW - Helicopters
KW - Job Performance
KW - Work Load
KW - Aviation
KW - automatic vs hand-held navigation systems, workload & performance, US Army helicopter pilots & copilots
JF - Aviation, Space, & Environmental Medicine
VL - 56
IS - 2
SP - 153-157
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Defence & Civil Inst of Environmental Medicine, Canadian Forces

Base, Toronto

TY - JOUR
ID - 1986-02704-001
A1 - Takeuchi, Yoshinori
A1 - Fujiwara, Osamu
Y1 - Sep 1984
N2 - Measured helicopter pilots' scanning eye movements during 3 flight patterns of terrain flight: nap-of-the-earth (NOE), contour flight, and low-level flight. Findings indicate that the scanning pattern was properly characterized by flight patterns, with NOE showing the widest range of fixation points. Three categories of intervals of fixation time on instruments emerged: less than 300 msec, 400-700 msec, and more than 800 msec. It is suggested that these intervals correspond with involvement in corrective eye movements, checking meters, and reading meters, respectively. (16 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Aviation
KW - Eye Fixation
KW - Eye Movements
KW - nap-of-the-earth vs contour vs low-level flight patterns, scanning eye movements, helicopter pilots
JF - Reports of Aeromedical Laboratory
VL - 25
IS - 3
SP - 111-120
PB - Aeromedical Laboratory JASDF, Japan
SN - 0023-2858
AD - Japanese Air Self-Defense Force, Aeromedical Lab, Tokyo

TY - JOUR
ID - 1985-08248-001
T1 - Pilot differences and motion cuing effects on simulated helicopter hover.
A1 - Ricard, Gilbert L.
A1 - Parrish, Russell V.
Y1 - Jun 1984
N2 - Examined the effects that cues of aircraft motion, delays in visual scene, and movement of a ship model had on 12 Navy pilots' ability to hover a simulated helicopter near a destroyer-class ship. Ss were tested in a within-S factorial combination of fixed-base, moving-base, and G-seat conditions in which delays of 66 or 128 msec existed in the simulator's visual display; Ss were required to hover near a moving or stationary ship. Best control performance was seen under the moving-base conditions, whereas poorest control was associated with the fixed-base simulation. An intermediate level of performance was produced by the G-seat. In addition, visual delay affected control of the roll axis of the simulation, and interactions between Ss and motion cuing and visual delay were seen. Movement of the ship model had little effect. (26 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Cues
KW - Flight Simulation
KW - Motion Perception
KW - Navy Personnel
KW - cues of aircraft motion & delays in visual scene & movement of ship model, ability to hover simulated helicopter near ship, US Navy aircraft pilots
JF - Human Factors
VL - 26
IS - 3
SP - 249-256
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - US Naval Training Equipment Ctr, Human Factors Lab, Orlando, FL

TY - JOUR
ID - 1984-19186-001
T1 - La signalisation des alarmes sur helicoptere: etude comparative de l'entretien individuel et de l'entretien de groupe.
A1 - Gangloff, Par B.
A1 - Papin, J. P.
Y1 - Jan 1984
N2 - Describes the utility and complementarity of 2 investigative techniques for use in ergonomics research: the individual interview and the group interview. Both methods were used in a study of the emergency signal system on helicopters and how assignments of observing and interpreting the signals are divided among the crew members. Suggestions are made as to how to improve the signal system by modifying some of its physical characteristics. (English, German & Japanese abstracts) (13 ref)

(PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aerospace Personnel
KW - Apparatus
KW - Human Factors Engineering
KW - Interviews
KW - Job Analysis
KW - individual vs group interview, division of assignments in observation & interpretation of emergency signal system, helicopter crew members, human factors implications
JF - Ergonomics
VL - 27
IS - 1
SP - 81-87
PB - Taylor & Francis, US
SN - 0014-0139
AD - Ctr d'Etudes et de Recherches de Medecine Aeronautique, Paris, France

TY - JOUR
ID - 1984-19188-001
A1 - Okaue, Miyako
A1 - Aruga, Hisao
Y1 - Jun 1983
N2 - Administered a questionnaire in the form of a sentence completion test to Japanese Air Self-Defense Force (JASDF) pilots over 40 yrs of age in a pilot study investigating psychological states that pilots experience while flying. Most of the Ss were not assigned to flying duties but were under an obligation to fly for a given amount of hours per year. The questionnaire was revised and administered to 173 active duty pilots belonging to flight squadrons. 37 of them were jet aircraft instructor pilots, 51 were fighter pilots, 52 were rescue helicopter pilots and 33 were rescue search aircraft pilots. Results indicate that many Ss experienced agreeable affects such as joy and pleasure during their flights. Many Ss also felt that the more difficult missions were the most inspiring. Some problems cited by Ss included lost confidence in flying skill, anxiety due to an aircraft accident or an emergency, undesirable assignments, poor relations with a superior, a family problem, and a physical problem. About half of the Ss said they felt reluctant to fly occasionally because of physical problems. Bad weather, unstable mental states, and lack of confidence were reasons Ss gave for being unwilling to fly. A few pilots did not feel their lives as pilots were worthwhile, possibly because they were not satisfied with their current assignments or assigned aircraft. (8 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Emotional States
KW - Psychodynamics
KW - psychological states & moods & emotions during daily flying, air force pilots over 41 yrs of age & active duty pilots, Japan
JF - Reports of Aeromedical Laboratory
VL - 24
IS - 2
SP - 87-103
PB - Aeromedical Laboratory JASDF, Japan
SN - 0023-2858
AD - Japanese Air Self-Defense Force, Aeromedical Lab, Tokyo

TY - JOUR
ID - 1983-09184-001
T1 - Noise and the performance of a four-choice psychomotor task.
A1 - Wheale, John L.
A1 - O'Shea, Noreen M.
Y1 - Nov 1982
N2 - 20 19-39 yr old males were exposed to 4 noise conditions: teletype, intermittent, jet-cockpit, and helicopter-cockpit noise at approximately 100 dbA. The control or quiet condition was white noise at 66 dbA. A 4-choice psychomotor task previously shown to be sensitive to the effects of noise was used. Heart rate (HR), an indicator of arousal, was monitored in each 8-min trial session. No significant decrease in task performance was found in the 4 noise conditions. The intermittent noise condition produced a significantly higher total error score when compared with the jet and helicopter noise conditions. No significant increase in arousal level was observed, but as HR increased, misses decreased. Knowledge of results had a significant effect on arousal but not on performance. Extroverts scored significantly more errors than introverts. Ss who scored highly on the Neuroticism scale of the Eysenck Personality Inventory had significantly more misses than those Ss with a low score. The main factors that determine degradation of performance under noise are (a) whether the task involves short-term memory rehearsal processes and (b) the fact that arousal may increase when Ss perceive that noise is interfering with the completion of an important task. (French, German & Japanese abstracts) (16 ref)

(PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Errors
KW - Motor Performance
KW - Noise Effects
KW - Perceptual Motor Processes
KW - Physiological Arousal
KW - Personality Traits
KW - teletype vs intermittent vs jet vs helicopter cockpit noise & personality, arousal & performance on psychomotor task, 19-39 yr old males
JF - Ergonomics
VL - 25
IS - 11
SP - 1053-1064
PB - Taylor & Francis, US
SN - 0014-0139
AD - Royal Air Force Inst of Aviation Medicine, Farnborough, England

TY - JOUR
ID - 1983-09180-001
T1 - PAVE LOW III: Interior lighting reconfiguration for night lighting and night vision goggle compatibility.
A1 - Task, H. L.
A1 - Griffin, L. L.
Y1 - Dec 1982
N2 - Discusses a vision problem of pilots while flying low-altitude helicopters. The desired night flying configuration is for the pilot to wear night vision goggles (NVGs) to fly the aircraft while the copilot, without NVGs, observes the video display and monitors the aircraft instruments. The problems of NVG incompatibility in the cockpit were caused by reflected and scattered light. These were successfully countered using several light control techniques, including the use of colored filters and flat-black clothing. The modifications were evaluated on the ground, and the evaluation results were positive. (4 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft
KW - Apparatus
KW - Human Factors Engineering
KW - Illumination
KW - technique to make interior lighting system in aircraft compatible with use of night vision goggles
JF - Aviation, Space, & Environmental Medicine
VL - 53
IS - 12
SP - 1162-1165
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - US Air Force Aerospace Medical Research Lab, Human Engineering Div, Wright-Patterson Air Force Base, OH

TY - JOUR
ID - 1983-09089-001
A1 - Kamensky, Yu. N.
Y1 - Jul-Aug 1982
N2 - Examined about 300 crew members before and after flights of heavy transport helicopters using psychophysiological and integral methods. It was found that during a flight shift the health state of Ss varied across 3 stages: habituation, initial decline, and distinct lassitude, with the latter developing after 5 hrs in flight. In order to increase human reliability in the helicopter, it is advisable to limit flight time to 4 hrs. A maximally permissible spectrum of vibration velocity for a 4-hr exposure is described. (English abstract) (8 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Altitude Effects
KW - Health
KW - Job Performance
KW - Physiological Stress
KW - health state before vs after heavy transport helicopter flight, pilots, implications for performance
JF - Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina
VL - 16
IS - 4
SP - 30-32
PB - Publishing House Firm Slovo, Russia
SN - 0321-5040

TY - JOUR
ID - 1981-29473-001
T1 - Effects of whole-body vibrations on sensory motor system performance in man.
A1 - Gauthier, G. M.
A1 - Roll, J. P.

A1 - Martin, B.
A1 - Harlay, F.
Y1 - Aug 1981
N2 - 10 17-35 yr old right-handed Ss were trained to perform tasks involving blindfolded arm positioning (proprioceptive tasks), tracking of visual targets, and control of static and dynamic torques. It is concluded that the proprioceptive system through which vibration-induced afferents enter the neurological networks is the common denominator for the observed alterations of the position, velocity, and force controls. Observations suggest that particular care should be taken in helicopters and other vibrating vehicles to prevent vibration from reaching muscular masses, especially those involved in motor tasks. (28 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Helicopters
KW - Motor Skills
KW - Proprioceptors
KW - Vibration
KW - Visual Tracking
KW - whole body vibrations, proprioceptive tasks & visual tracking & control of static vs dynamic torques, right handed 17-35 yr olds, implications for helicopter & other vibrating vehicle operation
JF - Aviation, Space, & Environmental Medicine
VL - 52
IS - 8
SP - 473-479
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - U d'Aix-Marseille I, Lab de Psychophysiologie, France

TY - RPRT
ID - 1981-29200-001
T1 - Effects of fatigue from wearing the AN/PVS-5 night vision goggles on skills involved in helicopter operations.
A1 - Chastain, Garvin D.
A1 - Kubala, Albert L.
Y1 - Feb 1981
KW - Aircraft Pilots
KW - Employee Skills
KW - Fatigue
KW - Performance
KW - Vision
KW - Perceptual Motor Processes
KW - fatigue from wearing AN/PVS-5 night vision goggles, helicopter operation skills, aviators
JF - Catalog of Selected Documents in Psychology
VL - 11
SP - 22
SN - 0045-5938
AD - Human Resources Research Organization, Alexandria, VA

TY - JOUR
ID - 1981-04285-001
T1 - Predicting the effects of vibration frequency and axis, and seating conditions on the reading of numeric displays.
A1 - Lewis, Christopher H.
A1 - Griffin, Michael J.
Y1 - May 1980
N2 - To extend C. H. Lewis and M. J. Griffin's (1980) equal performance contour approach to the effects of horizontal seat motion on reading performance, 10 male university students, technicians, and research workers performed a numeral reading task under 5 levels of sinusoidal whole-body vibration (2.8-63 Hz), 3 translational axes, and 2 seating conditions (hard, flat seat with fixed footrest and simulated helicopter seat with moving footrest). Results, presented in the form of equal performance contours, show that seating conditions, as well as the use of personal equipment such as flying helmets, interact with the effects of vibration on reading performance by affecting the transmission of vibration to the head. The possibility that predictions about the relationship between seat motion and decrements in reading performance can be made from measures of rotational head motion and seat-to-head vibration transmission is noted, along with the need to extend the previous data to situations where both the body and the display vibrate. (French & German abstracts) (8 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Numbers (Numerals)
KW - Posture
KW - Reading
KW - Vibration
KW - Visual Displays
KW - Human Factors Engineering
KW - Stimulus Parameters
KW - vibration frequency & axis & horizontal seat motion & design, numeric display reading performance & role of seat-to-head

vibration transmission, males
JF - Ergonomics
VL - 23
IS - 5
SP - 485-499
PB - Taylor & Francis, US
SN - 0014-0139
AD - U Southampton, Inst of Sound & Vibration Research, England

TY - JOUR
ID - 1981-02572-001
T1 - Effects of whole-body vibration on spinal reflexes in man.
A1 - Roll, J. P.
A1 - Martin, B.
A1 - Gauthier, G. M.
A1 - Ivaldi, F. Mussa
Y1 - Nov 1980
N2 - Describes the effects produced at the myotatic loop level by long-term vibration. Results from 20 Ss aged 18-40 yrs indicate that the vibration acts mainly upon extero- and proprioceptive receptors rather than upon the vestibular organs. Implications for physiological and behavioral alterations to helicopter pilots and passengers are noted. (44 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Behavior
KW - Physiology
KW - Reflexes
KW - Vibration
KW - whole body long term vibration, myotatic loop spinal reflexes, 18-40 yr olds, physiological & behavioral change implications for helicopter pilots & passengers
JF - Aviation, Space, & Environmental Medicine
VL - 51
IS - 11
SP - 1227-1233
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - U d'Aix-Marseille I, France

TY - RPRT
ID - 1980-31295-001
T1 - Evaluation of a flight simulator (Device 2B24) for maintaining instrument proficiency among instrument-rated Army pilots.
A1 - Weitzman, Donald O.
A1 - Fineberg, Michael L.
A1 - Compton, George L.
Y1 - Feb 1980
KW - Aircraft Pilots
KW - Army Personnel
KW - Evaluation
KW - Flight Instrumentation
KW - Flight Simulation
KW - Military Training
KW - evaluation of flight simulator, maintaining & assessing instrument proficiency, US Army helicopter pilots
JF - Catalog of Selected Documents in Psychology
VL - 10
SP - 30
SN - 0045-5938

TY - RPRT
ID - 1981-06526-001
T1 - Effects of fatigue from wearing the AN/PVS-5 night vision goggles on skills involved in helicopter operations.
A1 - Chastain, Garvin D.
A1 - Kubala, Albert L.
Y1 - Jul 1979
N2 - A review of the literature on rotary wing flight and interviews with aviators were conducted to determine which helicopter tasks and maneuvers are performed most frequently and/or are the most critical. Those operations found to be most critical were categorized into perceptual and psychomotor components, and perceptual and psychomotor tests were selected to measure these factors. 10 male US Army aviators (mean age 26.4 yrs) were tested before and after flying with the AN/PVS-5 goggles. Eye-hand coordination was marginally affected following flight, and reaction time to lights was significantly affected. (13 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Apparatus
KW - Army Personnel
KW - Fatigue
KW - Perceptual Motor Processes
KW - Perceptual Motor Coordination

KW - Reaction Time
KW - fatigue resulting from wearing night vision goggles, perceptual motor performance, US Army male helicopter aviators
JF - US Army Research Institute for the Behavioral & Social Sciences
IS - 1217
AD - Human Resources Research Organization, Alexandria, VA

TY - JOUR
ID - 1981-06490-001
T1 - Proficiency maintenance and assessment in an instrument flight simulator.
A1 - Weitzman, Donald O.
A1 - Fineberg, Michael L.
A1 - Gade, Paul A.
A1 - Compton, George L.
Y1 - Dec 1979
N2 - Studied transfer effects to evaluate the suitability of a high fidelity flight simulator for maintaining and assessing instrument proficiency among 36 experienced US Army helicopter pilots. Results suggest that simulators of proven effectiveness can be used both to maintain and assess the proficiency of experienced pilots. (10 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Flight Instrumentation
KW - Flight Simulation
KW - Measurement
KW - Transfer (Learning)
KW - Army Personnel
KW - Helicopters
KW - Military Training
KW - flight simulator, maintenance of & measurement of proficiency in using flight instruments, US Army helicopter pilots
JF - Human Factors
VL - 21
IS - 6
SP - 701-710
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - US Army Research Inst, Alexandria, VA

TY - JOUR
ID - 1980-33513-001
T1 - The influence of low frequency vibration on pilot performance (as measured in a fixed base simulator).
A1 - Stave, Allan M.
Y1 - Jul 1979
N2 - Exposed army pilots to vibration stimuli while flying simulated helicopter missions in a realistic fixed base simulator environment. Missions involved transporting external loads in a simulated logistics environment. Performance was evaluated by measuring flight path deviations from prescribed en route, approach, and hover parameters. Performance tended to improve with increased stress. It was hypothesized that this trend was due to motivation, i.e., as Ss felt the onset of fatigue they compensated by working harder and so improved their performance. On 6% of their scores, Ss exhibited sudden lapses in their ability to respond to display indications. These lapses were of short duration (seconds in length) and occurred randomly. Previous studies (A. M. Stave, 1973; 1977) confirm these results, which are discussed in relation to "pilot error" accidents. (German summary) (11 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Flight Simulation
KW - Performance
KW - Stress
KW - Vibration
KW - Army Personnel
KW - Motivation
KW - low frequency vibration during simulated helicopter flight, role of stress in motivation of improved maneuver performance, army pilots
JF - Ergonomics
VL - 22
IS - 7
SP - 823-835
PB - Taylor & Francis, US
SN - 0014-0139
AD - Sikorsky Aircraft Corp, Stratford, CT

TY - JOUR
ID - 1980-29016-001
T1 - Methodological considerations of visual workloads of helicopter pilots.

A1 - Simmons, Ronald R.
Y1 - Jun 1979
N2 - Describes techniques and modifications developed for assessing visual performance/workload of pilots during helicopter operations. Although the corneal reflection technique for gathering eye movement data is not new, innovative modifications were developed to permit accurate data collection in this flight environment. (14 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Apparatus
KW - Eye Movements
KW - Human Factors Engineering
KW - Visual Perception
KW - Helicopters
KW - Performance
KW - modifications to apparatus used in corneal reflection technique, determination of visual performance of helicopter pilots
JF - Human Factors
VL - 21
IS - 3
SP - 353-367
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - US Aeromedical Research Lab, Aviation Psychology Div, Ft Rucker, AL

TY - JOUR
ID - 1980-29014-001
T1 - Visual workload of the copilot/navigator during terrain flight.
A1 - Sanders, Michael G.
A1 - Simmons, Ronald R.
A1 - Hofmann, Mark A.
Y1 - Jun 1979
N2 - A visual free time task was utilized to determine the amount of visual time 10 helicopter navigators had available, during flight over a prescribed course, for a nonflight-related task. Data indicate that the navigator's normal workload was demanding and that the duty of navigating required 92.2% of the copilot's total visual time, while the engine and flight instruments were utilized only 4% of the time. (8 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Helicopters
KW - Performance
KW - Visual Perception
KW - visual performance of navigator during terrain flight, helicopter pilots
JF - Human Factors
VL - 21
IS - 3
SP - 369-383
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208
AD - US Army Research Inst, Ft Rucker Field Unit, AL

TY - JOUR
ID - 1980-04328-001
T1 - Ride quality evaluation IV: Models of subjective reaction to aircraft motion.
A1 - Jacobson, Ira D.
A1 - Richards, Larry G.
Y1 - Jul 1978
N2 - With 10 highly trained test Ss, time motion histories and judgments of perceived comfort were obtained for regularly scheduled flights on 3 commercial planes--Nord, Twin Otter, Beech--and a helicopter, the Sikorsky S-61. Regression models were obtained predicting rated comfort from root-mean-square values for 6 degrees of freedom in motion. A model is proposed, which gives a good fit to the plane data (r = .75), but is less acceptable for the helicopter data (r = .49). (French & German summaries) (5 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft
KW - Evaluation
KW - Helicopters
KW - Human Factors Engineering
KW - Predictability (Measurement)
KW - passenger ride quality evaluation, implications for subjective reaction to aircraft motion & comfort, highly trained Ss
JF - Ergonomics
VL - 21
IS - 7
SP - 521-529
PB - Taylor & Francis, US
SN - 0014-0139

AD - U Virginia

TY - JOUR
ID - 1978-28460-001
T1 - The effects of cockpit environment on long-term pilot performance.
A1 - Stave, Allan M.
Y1 - Oct 1977
N2 - Used a fixed-base helicopter simulator to examine pilot performance as influenced by noise, vibration, and fatigue. 15 Ss flew the simulator for periods ranging between 3 and 8 hrs while exposed to vibrations (at 17 Hz) ranging from 0.1 to 0.3 g, and noise stimuli varying between 74 (ambient) and 100 db. Despite reports of extreme fatigue on these long flights, S performance did not degrade. Within the limits of this study, performance tended to improve as environmental stress increased. However, Ss did suffer from lapses resulting in abnormally poor performance. These lapses are probably of short duration (seconds) and occur at unpredictable times. If such lapses occur in actual flight, they could provide an explanation for many so-called "pilot error" accidents. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Fatigue
KW - Helicopters
KW - Noise Effects
KW - Vibration
KW - Flight Simulation
KW - cockpit environment using fixed-base helicopter simulator, long-term pilot performance
JF - Human Factors
VL - 19
IS - 5
SP - 503-514
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208

TY - JOUR
ID - 1978-28453-001
T1 - A design procedure for control/display systems.
A1 - Curry, Renwick E.
A1 - Kleinman, David L.
A1 - Hoffman, William C.
Y1 - Oct 1977
N2 - Proposes a design procedure for control and display systems in which levels of automation vary over a significant range. The elements of the primary analysis tool (the Optimal Control Model of the Human Operator) are briefly reviewed, and the use of the model at 3 levels of specification (information level, display-element level, and display-format level) is discussed. The design procedure is applied to the longitudinal control of a CH-47 helicopter. The procedure points out the need for performance-workload relations for control and performance-workload relations for monitoring. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Cognitive Processes
KW - Helicopters
KW - Human Machine Systems Design
KW - Mathematical Modeling
KW - Visual Displays
KW - Monitoring
KW - design procedure for control/display systems on optimal human operator model, application to longitudinal control of CH-47 helicopter
JF - Human Factors
VL - 19
IS - 5
SP - 421-436
PB - Human Factors & Ergonomics Society Inc, US
SN - 0018-7208

TY - JOUR
ID - 1977-24507-001
T1 - Effects of object distance, shape, closing velocity and aviator experience on obstacle avoidance-behavior.
A1 - Fineberg, Michael L.
Y1 - Aug 1975
KW - Aircraft Pilots
KW - Flight Simulation
KW - Form and Shape Perception
KW - Physiological Arousal
KW - Velocity
KW - Aviation Safety
KW - object distance & shape & closing velocity & experience, obstacle avoidance-behavior during helicopter flight simulation, US Army

aviators
JF - Dissertation Abstracts International
VL - 36
IS - 2-B
SP - 937
PB - Univ. Microfilms International, US
SN - 0419-4217
AD - Catholic U of America

TY - RPRT
ID - 1975-32756-001
T1 - Mission Suitability testing of an aircraft simulator.
A1 - Caro, Paul W.
A1 - Isley, Robert N.
A1 - Jolley, Oran B.
Y1 - Jun 1975
N2 - Evaluated Device 2B24 to determine its suitability for cost-effectively accomplishing the instrument phase of US Army rotary wing flight training and facilitating UH-1 helicopter transition training, aviator proficiency evaluation, standardization, and flight training quality control. The 3-phase mission suitability test involved examining the 2B24's advanced features in a training context, developing a new instrument training program for use with the device, and administering that training to 16 volunteer officers who had completed Army primary rotary wing training but had no helicopter or instrument flight experience. Results confirm the device's mission suitability regarding both cost and transfer of training. Findings also indicate that the standardization, evaluation, and quality control goals had been partially met and that the device's design is such that their fuller achievement is likely in the future. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft
KW - Costs and Cost Analysis
KW - Flight Instrumentation
KW - Flight Simulation
KW - Military Training
KW - mission suitability testing regarding cost & transfer of training, US Army aircraft simulator
JF - HumRRO Technical Report
IS - 75-12

TY - RPRT
ID - 1975-32696-001
T1 - Multivariate extrapolation of training performance.
A1 - Dees, James W.
A1 - Dufilho, L. Paul
Y1 - Jun 1975
N2 - Summarizes the techniques used in gathering and maintaining a data file on most of the Army aviator trainees who have been through the Officer/Warrant Officer Rotary Wing Aviator Course and the Warrant Officer Candidate Course during 1968-1969. Specific regression analyses dealing with the prediction of student performance in training are furnished, and the methods used to obtain them are described. The equations allow the extrapolation of current training performance to a prediction of (a) the probability that the individual will pass the course and (b) what his final end-of-course grade will be. A review of pertinent literature in the area is included as are frequency counts of a large volume of training data. (23 ref) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Army Personnel
KW - Military Training
KW - extrapolation of training performance, Army aviator trainees
JF - HumRRO Technical Report
IS - 75-16

TY - RPRT
ID - 1975-08523-001
T1 - Disorientation phenomena in naval helicopter pilots.
A1 - Tormes, Felix R.
A1 - Guedry, Fred E.
Y1 - Jul 1974
N2 - Investigated the special orientation problems of US Navy helicopter pilots engaged in operations at sea and landing on moving platforms. A questionnaire concerning disorientation was answered anonymously and individually by 104 pilots. 56% indicated one or more episodes of severe disorientation and 8.6% indicated having experienced severe disorientation 5 or more times while piloting helicopters. A number of factors conducive to disorientation were identified. Some precipitating factors appeared to be specific to operations over water or over a moving deck, although some of these may well have their counterparts in special operations over land. Other factors were common to land-

and sea-based operations, and some were common to fixed-wing as well as rotary-wing aircraft. Potential countermeasures for various precipitating factors are discussed. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Motion Sickness
KW - Place Disorientation
KW - operations at sea & land on moving platforms, disorientation phenomena, helicopter pilots
JF - USN AMRL Technical Report
VL - 1205
AD - Naval Aerospace Medical Research Lab, Pensacola, FL

TY - JOUR
ID - 1979-29945-001
T1 - Studies of pilot performance: III. Validation of objective performance measures for rotary-wing aircraft.
A1 - Billings, C. E.
A1 - Gerke, R. J.
A1 - Chase, R. C.
A1 - Eggspuehler, J. J.
Y1 - Sep 1973
N2 - Presents data from 9 trainees indicating that engine rpm variability is a valid index of pilot skill in helicopters in which the task of maintaining or varying engine speed is under the direct control of the pilot. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aircraft Pilots
KW - Helicopters
KW - Personnel Evaluation
KW - engine rpm variability, performance measurement, helicopter pilots
JF - Aviation, Space, & Environmental Medicine
VL - 44
SP - 1026-1030
PB - Aerospace Medical Assn, US
SN - 0095-6562
AD - Ohio State U, Columbus

TY - RPRT
ID - 1971-25883-001
T1 - Exploratory study of pilot performance during high ambient temperatures/humidity.
A1 - Moreland, Stephen
A1 - Barnes, John A.
Y1 - Mar 1970
N2 - Measured performance changes in 4 fully qualified Army pilots, wearing complete operational/combat flight clothing and equipment. Ss flew a light observation helicopter during periods of high ambient temperature and humidity. Important relationships were found between physiological changes and crew station environment. An equation is presented to quantify a hypothetical relationship between performance, environment, and physiological changes. (17 ref.) (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Environment
KW - Job Performance
KW - Military Personnel
KW - Temperature Effects
KW - helicopter pilot performance during high ambient temperature & humidity, Army personnel
JF - US Army Human Engineering Laboratories Technical Memorandum
IS - 6-70

TY - RPRT
ID - 1971-25845-001
T1 - Equipment-device task commonality analysis and transfer of training.
A1 - Caro, Paul W.
Y1 - Jun 1970
N2 - Developed procedures to enable training personnel systematically and objectively to determine the potential utility of training devices for teaching how to perform missions in operational equipment. The procedures allow comparison of operational task stimulus and response elements with corresponding elements in synthetic training equipment. On the basis of such information, training programs consistent with the psychological principles underlying transfer of training may be developed. The procedures may be applied to the potential use of training equipment in a training situation other than that for which it was designed, or in determining the applicability of "off-the-shelf" training devices to specific training requirements. The procedures, termed Task Commonality Analysis, were developed in connection with an Army rotary wing instrument flight training program. In an

application of the procedures in that program, transfer of training predictions were generally consistent with empirical evidence collected earlier. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Avoidance Conditioning
KW - Occupations
KW - Personnel Training
KW - Prediction
KW - transfer of flight training predictions, equipment-device task commonality analysis, military personnel
JF - HumRRO Technical Report
IS - 70-7
AD - HumRRO, Ft. Rucker, Ala

TY - RPRT
ID - 1971-05166-001
T1 - Tactical Utility Helicopter information transfer study.
A1 - Barnes, John A.
Y1 - Mar 1970
N2 - Enumerated the task requirements of the Tactical Utility Helicopter Mission and presented the instrumentation that experienced pilots feel is necessary to perform these tasks. Film of eye movement was taken for 2 Ss while they were flying missions that incorporated these tasks. The film and the Ss' replies provided the information transfer requirements for the Tactical Utility Helicopter flight instrumentation. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Engineering Psychology
KW - Film Strips
KW - Information
KW - Military Personnel
KW - Transfer (Learning)
KW - information transfer requirements for Tactical Utility Helicopter flight instrumentation, eye movement film & pilot replies
JF - US Army Human Engineering Laboratories Technical Memorandum
IS - 7-70

TY - RPRT
ID - 1970-09418-001
T1 - Evaluation of synthetic instrument flight training in the Officer/Warrant Officer Rotary Wing Aviator Course.
A1 - Isley, Robert N.
A1 - Caro, Paul W.Jr.
A1 - Jolley, Oran B.
Y1 - 1968
N2 - Describes research conducted to determine the value of synthetic training, using a modified fixed wing training device with 3 groups of trainees receiving 0, 10, or 20 hr. of the standard synthetic training program. No significant differences between the training groups appeared in flight performance grades or time to complete the course. Results indicate the synthetic training program using the modified fixed wing training device made no significant contribution to trainee helicopter flight proficiency in the areas of aircraft control and procedural skills. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Military Personnel
KW - Personnel Training
KW - synthetic instrument flight training in rotary wing aviator course, military trainees
JF - HumRRO Technical Report
IS - 68-14

TY - RPRT
ID - 1968-12876-001
T1 - HELICOPTER TRAINING DEVICES IN SUPPORT OF ARMY AVIATION.
A1 - Caro, Paul W.Jr.
Y1 - 1967
N2 - DEALS WITH THE EFFECTIVENESS OF THE SYNTHETIC HELICOPTER FLIGHT TRAINING DEVICES AND THEIR USEFULNESS FOR TRANSFER OF TRAINING FROM A ROTARY-WING INSTRUMENT FLIGHT QUALIFICATION COURSE TO PERFORMANCE ON THE ACTUAL HELICOPTER. (PsycINFO Database Record (c) 2000 APA, all rights reserved)
KW - Aviation
KW - Education
KW - Military Enlistment
KW - Military Psychology
KW - Military Recruitment
KW - Apparatus
KW - SYNTHETIC HELICOPTER FLIGHT TRAINING DEVICES, ARMY
JF - HumRRO Professional Paper
VL - 27
SP - 5-10, 15
PB - Human Resources Research Organization, US

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Murphy, DR
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EP 192
PG 10
JI J. Navig.
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PD MAY
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GA XB341
J9 J NAVIG
UT ISI:A1997XB34100003

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TI Hardly any errors
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BP 6
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PD MAR 31
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GA WQ311
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GA VU711
J9 AVIAT WEEK SPACE TECHNOL
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AU Castaldo, R
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Smith, A
TI Positive identification of aircraft on airport movement area - Results of FAA trials
SO IEEE AEROSPACE AND ELECTRONIC SYSTEMS MAGAZINE
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JI IEEE Aerosp. Electron. Syst. Mag.
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GA UN431
J9 IEEE AEROSP ELECT SYST MAG
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UT ISI:A1996UB19700001

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  Ball, MJ
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PD MAR
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UT ISI:A1995RW27800001

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SO HUMAN-COMPUTER INTERACTION
BP 319
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PG 25
JI Hum.-Comput. Interact.
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GA QC240
J9 HUMAN-COMPUTER INTERACTION
UT ISI:A1994QC24000003

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BP 15
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JI IEEE Aerosp. Electron. Syst. Mag.
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PD APR
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GA PA921
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TI INTRODUCTION TO THE 6TH INTERNATIONAL-CIVIL-AVIATION-SECURITY-CONFERENCE (AVSEC 93)
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GA NF333
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TI SUDDEN IN-FLIGHT INCAPACITATION IN GENERAL-AVIATION
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TI EARLY DETECTION OF PSYCHIATRIC-PROBLEMS - GENERAL PANEL DISCUSSION
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TI SUBJECTIVE PILOT WORKLOAD ASSESSMENT
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TI WIND SHEAR DETECTION WITH AN AIRPORT SURVEILLANCE
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AU Schulze, K
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TI On-scene helicopter transport at night
SO ANASTHESIOLOGIE INTENSIVMEDIZIN NOTFALLMEDIZIN SCHMERZTHERAPIE
NR 11
AB Air medical rescue services at night are associated with an increased risk for life and health of the helicopter crew. They are not allowed in all federal states of Germany and only a few bases provide this service. The advantage of short transportation times by air cannot be achieved at night due to a flight preparation phase of at least 30 minutes until lift-off. Two case reports demonstrate that requests for helicopters at night may even lead to a transportation associated delay of treatment because of the time until the helicopter arrives on-scene. Thus emergency physicians have to know the possibilities and limitations of helicopter emergency medical services at night.
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PT J
AU Tian, JR
Shubayev, I
Demer, JL
TI Dynamic visual acuity during transient and sinusoidal yaw rotation in normal and unilaterally vestibulopathic humans
SO EXPERIMENTAL BRAIN RESEARCH
NR 67
AB The vestibule-ocular reflex (VOR) stabilizes gaze to permit clear vision during head movements. It has been supposed that VOR function might be inferred from dynamic visual acuity (DVA), the acuity during imposed head motion. We sought to determine effectiveness of DVA for detection and lateralization of unilateral vestibulopathy, using rigorous psychophysical methods. Seventeen normal and 11 unilaterally vestibulopathic subjects underwent measurement of optically best corrected DVA during head motion. A variable size letter "E" 6 m distant was displayed in oblique random orientations to determine binocular DVA by a computer controlled, forced choice method. Three types of whole-body yaw rotation were delivered by a servo-controlled chair synchronized with optotype presentation. Two types of motion were predictable: (I) steady-state 2.0-Hz rotation at 10-130 degrees /s Peak velocity with repetitive optotype presentation only during head velocity exceeding 80% of peak; and (2) directionally predictable transients at peak accelerations of 1000, 1600 and 2800 degrees /s(2) with optotype presentation for 300 ms. For neither of these predictable motions did DVA in vestibulopathic subjects

significantly differ from normal, with Suggestions from search coil recordings that this was due to predictive slow and saccadic eye movements. Unilaterally vestibulopathic subjects experienced a significant decrease in DVA from the static condition during ipsilesional rotation for all three peak head accelerations. Only during directionally unpredictable transients with 75 ms or 300 ms optotype presentation was the sensitivity of DVA in unilaterally vestibulopathic 300 ms optotype presentation was the sensitivity of DVA in unilaterally vestibulopathic subjects significantly abnormal during ipsilesional rotation. The ipsilesional decrease in DVA with head motion was greater for 75 ms than 300 ms optotype presentation. Search coil recordings confirmed hypometric compensatory eye movements during DVA testing with unpredictable, ipsilesional rotation. Receiver-operator characteristic analysis indicated ideal detection and lateralization of unilateral vestibulopathy by DVA tested with a 75-ms optotype exposure for unpredictable transient rotations to a peak acceleration of 2800 degrees /s. DVA can reliably detect unilateral deafferentation only if precautions are taken to prevent compensation by predictive slow eye movements and saccades.

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PT J
AU Fielding, C
Lodge, M
TI Stability and control of STOVL aircraft: The design of longitudinal flight control laws
SO AERONAUTICAL JOURNAL
NR 12
AB Over the past three decades, the UK aerospace industry has carried out significant research into the development of short take-off and vertical landing (STOVL) technology, to enhance the performance and operation of the Homier aircraft, and for possible application to future aircraft such as those being developed under the Joint Strike Fighter (JSF) programme. Some of this research has focused on aircraft handling and flight control for the transition between wing-borne and jet-borne flight. Following on from internal research at British Aircraft Corporation/British Aerospace (now part of BAE Systems) in the mid to late 1970s, further development work has been carried out in the 1980s and 90s in support of the UK's Vectored thrust Advanced Aircraft flight Control (VAAC) Harrier and Integrated Flight and Propulsion Control System (IFPCS) programmes. This paper contains a short review of STOVL aircraft longitudinal flight control law design, and how basic feedback control schemes can be used to influence the aircraft's response and hence its handling qualities.
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PT J
AU Schroeder, JA
Chung, WWY
Hess, RA
TI Evaluation of a motion fidelity criterion with visual scene changes
SO JOURNAL OF AIRCRAFT
NR 26
AB An experiment examined how visual scene and platform motion variations affected a pilot's ability to perform altitude changes. pilots controlled a helicopter model in the vertical asis and moved between two points 32-ft apart in a specified time. Four hf tors were varied: visual-scene spatial frequency, visual-scene background, motion-filter gain, and motion-filt natural frequency. Drawing alternating black and white stripes of varying widths between the two extreme altitude points varied visual-scene spatial frequency. The visual-scene background varied by either drawing the stripes to fill the entire field of view or by placing the stripes on a narrow pole with a natural sky and ground plane behind the pole. Both the motion-filter gain and natural frequency were varied in the motion platform command software. Five pilots evaluated all combinations of the visual and motion variations. The results showed that only the motion-filter natural frequency and

visual-scene background affected pilot performance and their subjective ratings. No significant effects of spatial frequency or motion system gain were found For the values examined in this tracking task. A previous motion fidelity criterion was found to still be a reasonable predictor of motion fidelity.

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J9 J AIRCRAFT
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PT J
AU Zeyada, Y
Hess, RA
TI Modeling human pilot cue utilization with applications to simulator fidelity assessment
SO JOURNAL OF AIRCRAFT
NR 18

AB An analytical investigation to model the manner in which pilots perceive and utilize visual, proprioceptive, and vestibular cues in a ground-based flight simulator was undertaken. Data from a NASA Ames Research Center vertical motion simulator study of a simple, single-degree-of-freedom rotorcraft bob-up/down maneuver were employed in the investigation. The study was part of a larger research effort that has the creation of a methodology for determining flight simulator fidelity requirements as its ultimate goal. The study utilized a closed-loop feedback structure of the pilot/simulator system that included the pilot, the cockpit inceptor, the dynamics of the simulated vehicle, and the motion system. With the exception of time delays that accrued in visual scene production in the simulator, visual scene effects were not included in this study. Pilot/vehicle analysis and fuzzy-inference identification were employed to study the changes in fidelity that occurred as the characteristics of the motion system were varied over five configurations. The data from three of the five pilots who participated in the experimental study were analyzed in the fuzzy-inference identification. Results indicate that both the analytical pilot/vehicle analysis and the fuzzy-inference identification can be used to identify changes in simulator fidelity for the task examined.

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UT ISI:000088591000006

PT J
AU Han, Y
Westwater,
TI Analysis and improvement of tipping calibration for ground-based microwave radiometers
SO IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING
NR 29
AB The tipping-curve calibration method has been an important calibration technique for ground-based microwave radiometers that measure atmospheric emission at low optical depth. The method calibrates a radiometer system using data taken by the radiometer at two or more viewing angles in the atmosphere. In this method, the relationship between atmospheric opacity and viewing angle is used as a constraint for deriving the system calibration response. Because this method couples the system with radiative transfer theory and atmospheric conditions, evaluations of its performance have been difficult, In this paper, first a data-simulation approach is taken to isolate and analyze those influential factors in the calibration process and effective techniques are developed to reduce calibration uncertainties. Then, these techniques are applied to experimental data. The influential factors include radiomet antenna beam width, radiometer pointing error, mean radiating temperature error, and horizontal inhomogeneity in the atmosphere, as well as some other factors of minor importance. It is demonstrated that calibration uncertainties from these error sources can be large and unacceptable. Fortunately, it was found that by using the techniques reported here, the calibration uncertainties can be largely reduced or avoided. With the suggested corrections, the tipping calibration method can provide absolute accuracy of about or better than 0.5 K.
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UT ISI:000087388900012

PT J
AU Schroeder, JA
Chung, WWY
TI Simulator platform motion effects on pilot-induced oscillation prediction
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS
NR 21
AB Simulator motion platform characteristics were examined to determine if the amount of motion affects pilot-induced oscillation prediction. Five test pilots evaluated how susceptible 18 different sets of pitch dynamics were to pilot-induced oscillations with three different levels of simulation motion platform displacement: large, small, and none. The pitch dynamics were those of a previous in-flight experiment, some of which elicited oscillations. These in-flight results served as truth data for the simulation. As such, the in-flight experiment was replicated as much as possible. Objective and subjective data were collected and analyzed. With large motion, pilot-induced oscillation and handling qualities ratings matched the flight data more closely than with small motion or no motion, Also, regardless of the aircraft dynamics, targe motion increased pilot confidence in assigning handling qualities ratings, reduced safety pilot trips, and lowered touchdown velocities. Whereas both large and small motion provided a pitch rate cue of high fidelity, only large motion presented the pilot with a high fidelity vertical acceleration cue.
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PT J
AU Craig, GL
Jennings, SA
Swail, CP
TI Head roll compensation in a visually coupled HMD: Considerations for helicopter operations
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 21
AB The helmet-mounted display (HMD) research program at the Flight Research Laboratory of the National Research Council of Canada examined the effects of HMD camera platform dynamics on pilot workload. Many currently fielded visually coupled HMD systems do not reproduce head movements in the roil axis which can lead to the presentation of visual information that is not consistent with vestibular and proprioceptive information. Hypothesis: Our hypothesis was that this sensory conflict can induce motion sickness and increase pilot workload. Methods: To examine this premise, three pilots new a series of standardized maneuvers with or without roll compensation in the camera platform of a visually coupled HMD system. Results: Increases in motion sickness symptoms and pilot workload were noted during complex, high-workload maneuvers when no roil compensation was present in the camera platform. During the most demanding maneuvers, the lack of roll compensation in the camera platform made it difficult for the evaluation pilot to

control the helicopter. Conclusions: Roll compensation in visually coupled HMD systems reduces pilot workload and motion sickness during critical flight periods where pilot workload may already be considerable.
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PY 2000
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PT J
AU Neubauer, JC
TI Classifying spatial disorientation mishaps using different definitions - Analysis of five years of USAF Class A mishaps
SO IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE
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PT J
AU Sipes, WE
Lessard, CS
TI A spatial disorientation survey of experienced instructor pilots - Obtaining more complete information regarding the incidence and prevalence of SD illusions
SO IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE
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PT J
AU Newman, DJ
Lathan, CE
TI Memory processes and motor control in extreme environments
SO IEEE TRANSACTIONS ON SYSTEMS MAN AND CYBERNETICS PART C-APPLICATIONS AND REVIEWS
NR 20
AB Cognitive-performance and motor-performance activities in multi-task, high-workload environments were assessed during astronaut performance in space flight and in isolation. Data was collected in microgravity on the International Microgravity Laboratory (IML) space shuttle mission (STS-42), and the Canadian Astronaut Program Space Unit Life Simulation (CAPSULS) mission offered an ideal opportunity to collect data for individuals in extreme isolation to complement the space flight data using similar hardware, software, and experimental protocols. The mental workload and performance experiment (MWPE) was performed during the IML-1 space flight mission, and the memory processes and motor control (MEMO) experiment was performed during the CAPSULS isolation mission. In both experiments, short-term exhaustive memory and fine motor control associated with human-computer interaction was studied. Memory processes were assessed using a Sternberg-like exhaustive memory search containing 1, 2, 4, or 7 letters. Pine motor control was assessed using velocity-controlled (joystick) and position-controlled (trackball) computer input devices to acquire targets as displayed on a computer screen. Subjects repeated the tasks under two conditions that tested perceptual motor adaptation strategies: 1) During adaptation to the microgravity environment; and 2) While wearing left-right reversing prism goggles during the CAPSULS mission. Both conditions significantly degraded motor performance but not cognitive performance. The data collected during both the MEMO experiment and the MWPE experiments enhance the knowledge base of human interface technology for human performance in extreme environments.
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PY 1999
PD AUG
VL 29
IS 3
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J9 IEEE TRANS SYST MAN CYBERN C
UT ISI:000081755100007

PT J
AU Barhydt, R
Hansman, RJ
TI Experimental studies of intent information on cockpit traffic displays
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS

NR 21
AB An initial experiment was conducted to examine the use of intruder aircraft intent information on prototype cockpit traffic displays. The current Traffic Alert and Collision Avoidance System (TCAS) plan-view display was used as a baseline. Displays corresponding to three additional intent levels (rate, target state, and trajectory) were tested, with higher levels representing a more complete knowledge of an intruder aircraft's intended trajectory. Intent-enhanced displays added an automation-based conflict probe and a profile-view display. The experiment, run on a Massachusetts Institute of Technology part-task Right simulator, required pilots to maintain a minimum separation from intruder aircraft in a variety of traffic situations. Pilots maneuvered earli and had fewer separation violations with the three enhanced displays. A follow-up experiment, using the same apparatus and procedure, was performed to determine the display features most responsible for the differences observed in the first experiment. Providing intent information directly on the display or incorporating it into a conflict probe both led to fewer separation violations and earlier maneuvers when compared to the Basic TCAS display.
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JI J. Guid. Control Dyn.
PY 1999
PD JUL-AUG
VL 22
IS 4
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UT ISI:000081538100003

PT J
AU Westwater,
Han, Y
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TI Remote sensing of boundary layer temperature profiles by a scanning 5-mm microwave radiometer and RASS: Comparison experiments
SO JOURNAL OF ATMOSPHERIC AND OCEANIC TECHNOLOGY
NR 20
AB Two techniques for deriving low-altitude temperature profiles were evaluated in an experiment conducted from November 1996 to January 1997 at the Boulder Atmospheric Observatory (BAO). The first used a scanning, single wavelength, 5-mm (60 GHz) microwave radiometer to measure vertical temperature profiles. Two radiometers were operated simultaneously; one used a discrete scan, the other scanned continuously. The second technique was a Radio Acoustic Sounding System (RASS) that operated at 915 MHz. Typically, radiometric profiles were produced every 15 min; those from RASS were 5-min segments taken every hour. Ground truth for the experiment was available from in situ measurements at the BAG. The BAO has an instrumented 300-m tower with 5-min measurements of temperature and relative humidity available at the surface and at altitudes of 10, 50, 100, 200, and 300 m. The tower measurements were occasionally supplemented with radiosonde releases and with hand-held meteorological measurements taken on the tow elevator. The differences between the radiometers and the tow sensors were about 1 degrees C rms. The accuracy using an in situ temperature measurement at the radiometer height as a

predictor was also evaluated; at the 200- and 300-m levels, only about 4 degrees C rms accuracies resulted. During the experiment, the RASS occasionally experienced radio frequency interference; to eliminate these effects, a quality-control algorithm for the RASS system was developed and evaluated. In addition, an experiment was herd in September 1996 at the Department of Energy's Atmospheric Radiation Program Southern Great Plains site in north central Oklahoma. For this experiment, evaluations of a scanning 5-mm radiometer relative to 3-hourly radiosondes are presented. Quality control on the radiosondes was provided by comparisons with independent in situ surface and 60-m tower observations. The agreement between the radiometric profiles and the quality-controlled radiosondes was better than 1 degrees C up to 800 m. Plans for future deployments of these instruments are discussed. In addition to the in situ comparisons, theoretical analyses of the scanning radiometer systems were also conducted. The effects of angular resolution of the current system, noise level, prediction from in situ measurements, and vertical resolution were examined.

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JI J. Atmos. Ocean. Technol.
PY 1999
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PT J
AU Kassapoglou, C
TI Minimum cost and weight design of fuselage frames - Part A: design constraints and manufacturing process characteristics
SO COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING
NR 17

AB As part of an approach to design fuselage frames for minimum weight, minimum cost, or a combination of the two, the design constraints and the effects of manufacturing process are discussed. Four different fabrication processes are considered: Conventional sheet metal, high speed machined metal, hand laid-up composite, and resin transfer molded composite. For each process, the limitations and applicability are translated to constraints for the geometry of the frame. In addition, the constraints arising from structural requirements are presented and discussed. These constraints are discussed as a necessary foundation for solving fuselage frame cost and weight optimization problems. (C) 1999 Elsevier Science Ltd. All rights reserved.

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PT J
AU Herdman, SJ
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Blatt, P
Suzuki, A
Venuto, PJ
Roberts, D
TI Computerized dynamic visual acuity test in the assessment of vestibular deficits
SO AMERICAN JOURNAL OF OTOLOGY
NR 18
AB Objective: The study was designed to measure dynamic visual acuity (DVA) during head movement as an assessment of the functional impact of vestibular deficits. Study Design: The study design was a prospective, clinical study. Setting: The study was performed in a tertiary, ambulatory referral center. Patients: Forty-two normal subjects, 29 patients with unilateral vestibular loss, and 26 patients with bilateral vestibular hypofunction who were 19-87 years of age were examined. Intervention: Diagnostic intervention was performed. Main Outcome Measure: Main outcome measures included the reliability, sensitivity, and specificity of a computerized test that measures visual acuity during head movement in normal subjects and in patients with vestibular deficits. Results: The computerized DVA test was reliable in both normal subjects (intraclass correlation coefficient [ICC] r = 0.87) and in patients with vestibular deficits (ICC r = 0.83). The sensitivity of the DVA test was 94.5% and the specificity was 95.2%. The positive predictive value (individuals who test positive on the DVA test who will have a vestibular deficit) was 96.3%. The negative predictive value (individuals who test negative on the DVA test who will not have a vestibular deficit) was 93%. Conclusions: The computerized DVA test is reliable and is able to distinguish among normal subjects and patients with vestibular deficits.
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PY 1998
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UT ISI:000079245700021

PT J
AU Padfield, GD
TI The making of helicopter flying qualities: a requirements perspective
SO AERONAUTICAL JOURNAL
NR 71
AB In this review paper, a recurring theme is the interplay between flying qualities as a technical discipline and flying qualities as an operational attribute. This interplay provides the setting for a presentation on the status of helicopt

flying qualities, using maritime helicopter operations as the focus, particularly the recovery phase and the helicopter-ship dynamic interface. Poor weather, inducing high sea states and ship motion, along with complex, invisible and disturbing airflow and degraded visibility, make the dynamic interface a particularly demanding environment for both pilot and helicopter. Flying qualities are a product of four elements - the aircraft, the pilot, the task and the environment - and the maritime application serves to give this viewpoint its full perspective. Mission-oriented flying qualities engineering is described within the systems framework of Aeronautical Design Standard 33 (ADS-33), utilising concepts like the mission task element, usable cue environment, response type and dynamic response criteria. The innovative constructs introduced by ADS-33 for flying qualities in degraded visual conditions are given special attention. The paper argues that the requirements for what constitutes safe and easy, or Level 1, flying qualities now exist and are well substantiated. New aircraft can now be designed to achieve these performance and safety standards while existing aircraft can be upgraded with integrated flight management systems featuring advanced control/flying qualities technologies. In this context, the paper also promotes the concept of concurrent requirements capture and preliminary design, to maximise the likelihood that user requirements are achieved and that designs are robust and work first time. The multidisciplinary nature of flying qualities is emphasised, embracing aeromechanics and flight dynamics, controls and displays and human factors. Similarly, the importance of high-fidelity design tools and comprehensive evaluation methods in the concurrent process is stressed. Handling deficiencies can increase the risk of helicopter accidents, particularly in degraded visual conditions or in emergencies where excursions beyond the operational flight envelope can lead to piloting difficulties. These situations are the new challenges for flying qualities engineers, and two areas are discussed here in some detail. First, flight in severely degraded visual conditions, highlighting the importance of understanding the fundamentals of human visual perception in the development of integrated control and display augmentation. Second, handling qualities following tail rotor failures are discussed and results from current research to develop new advice for aircrew are presented. The author takes the view that much more can and needs to be done to assist the pilot in the management of the tension between performance and safety in helicopt operations, through the provision of improved flying qualities.

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PT J
AU Braithwaite, MG
Beal, KG
Alvarez, EA
Jones, HD
Estrada, A
TI The optokinetic cervico reflex during simulated helicopt flight
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 12
AB Introduction: The optokinetic cervico reflex (OKCR) is a recently hypothesized, visually driven reflex that serves to stabilize die image of the external horizon on the retina during roll maneuvers in high-performance aircraft. Although reported anecdotally, head tilt during helicopter flight has not been studied formally. Such research is required to determine the full impact and significance that it may have on the flying performance of a rotary-wing aviator. Objective: The aim of this study was to investigate the relationship between horizon position and the perception of orientation and, thus, to generate vital information to assess whether OKCR plays an important role in spatial disorientation. Hypothesis: Pilots of rotary-wing aircraft will exhibit the OKCR. Methods: A UH-60 flight simulator study, with 20 volunteer pilots participating, was performed to examine the effects of this reflex during day flight and during flight with night vision goggles (NVGs). Results: The results confirm that the OKCR occurs during simulated helicopter flight, both with and without NVGs. As with previous studies, head roll increased during flight und visual meteorological conditions in relation to an increasing aircraft roll angle up to a maximum sustainable level and then remained constant. Head roll did not occur during night und instrument meteorological conditions. Conclusion: The presence of the OKCR will impact rotary-wing operations. Various aspects are discussed, and recommendations are made for future research.
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UT ISI:000077184100007

PT J
AU McConnell, VP
TI Fast-paced process evolution: Advanced RTM produces complex, repeatable, flight-critical parts
SO SAMPE JOURNAL
NR 6
AB In less than a decade, Dow-United Technologies has progressed Advanced Resin Transfer Molding (AdvRTM(TM)) to a trademarked and OEM qualified process that answers the previous limits of RTM by demonstrating part-to-part consistency, close tolerance dimensional control, and cost/performance properties superior to prepreg in primary composite structure for military and commercial aircraft.
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PT J
AU Hindson, WS
Chen, RTN
TI Operational tests of noise abatement approaches for rotorcraft using differential GPS for guidance
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 18
AB The NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) UH-60A Black Hawk helicopter was used to test the feasibility of using operational techniques to alleviate helicopter noise during approach to landing. Decelerating approaches were flown using multi-segment glidepaths, The approaches were designed to avoid flight conditions known to generate noise due to blade-vortex-interaction (BVI). A Local Differential Global Positioning System (LDGPS) was used for precision navigation, and guidance calculations were performed in an on-board computer. Steering commands were presented to the pilot using the existing electromechanical flight instruments of the UH-60A. Operational aspects of the noise abatement approaches were evaluated by pilots from NASA, FAA, and the helicopter industry. The methodology used to design the noise abatement trajectories is described, and navigation system and flight technical error data are reported.
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PY 1998
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UT ISI:000076934900008

PT J
AU Braithwaite, MG
Durnford, SJ
Crowley, JS
Rosado, NR
Albano, JP
TI Spatial disorientation in US Army rotary-wing operations
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 19
AB This paper describes two surveys concerning spatial disorientation (SD) in U.S. Army rotary-wing operations that sought to assess the hazard and to identify recommendations to control it. One survey was of accident records, and the oth was of aircrew experiences. Both surveys highlighted the magnitude of the problem. The accident survey showed that 30% of class A to C accidents involved SD as a significant factor, while the aircrew survey showed that 78% of aircrews have been disoriented (8% to the extent that flight safety was threatened). Both surveys showed a significant increase in SD associated with combat operations. Several differences between the two surveys were noted: 90% of the reviewed accidents were thought to involve type I (unrecognized) SD compared with only 43% of the reported incidents; both pilots in a particular aircraft were considered to have been disoriented in at least 59% of accidents compared with 23% of incidents; sudden loss of visual cues ("brownout," "whiteout," or inadvertent entry to instrument meteorological conditions) accounted for 25% of SD accidents compared with 13% of incidents; and 62% of the accidents occurred at night compared with only 36% of incidents. Neither survey showed any association between SD and fatigue or other human factors. The results of both surveys suggested that crew coordination, alerting devices (e.g., audio warnings on the radar altimeter), flight information displays, and autopilot functions would be good targets for improvement.
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PT J
AU Braithwaite, MG
Douglass, PK
Durnford, SJ
Lucas, G
TI The hazard of spatial disorientation during helicopter flight using night vision devices
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 16

AB Introduction: Night Vision Devices (NVDs) provide an enormous advantage to the operational effectiveness of military helicopter flying by permitting flight throughout the night. However, compared with daytime flight, many of the depth perception and orientational cues are severely degraded. These degraded cues predispose aviators to spatial disorientation (SD), which is a serious drawback of these devices. Methods: As part of an overall analysis of Army helicopter accidents to assess the impact of SD on military flying, we scrutinized the class A-C mishap reports involving night-aided flight from 1987 to 1995. The accidents were classified according to the role of SD by three independent assessors, with the SD group furth analyzed to determine associated factors and possible countermeasures. Results:Almost 43% of all SD-related accidents in this series occurred during flight using NVDs, whereas only 13% of non-SD accidents involved NVDs. An examination of the SD accident rates per 100,000 flying hours revealed a significant difference between the rate for day flying and the rate for flight using NVDs (mean rate for daytime flight = 1.66, mean rate for NVD flight = 9.00, $p < 0.001$). The most important factors associated with these accidents were related to equipment limitations, distraction from the task, and training or procedural inadequacies. Conclusions: SD remains an important source of attrition of Army aircraft. The more than fivefold increase in risk associated with NVD flight is of serious concern. The associated factors and suggested countermeasures should be urgently addressed.

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PY 1998
PD NOV
VL 69
IS 11
GA 133PA
J9 AVIAT SPACE ENVIRON MED
UT ISI:000076693900002

PT J
AU Iseler, L
TI Piloted simulator investigation of category A civil rotorcraft terminal area cockpit displays
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 13
AB A piloted simulation experiment was conducted in the NASA Ames Research Center Vertical Motion Simulator as a preliminary investigation of the use of integrated cockpit displays in terminal area operations for Category A civil rotorcraft. Category A is the transport category of rotorcraft which are required to be able to recover from an engine failure and continue flying. A UH-60 Black Hawk model was used for the simulation, with modifications made to the power available to simulate a civil rotorcraft. Hovering backups were flown from a confined area, raised vertiport site to a takeoff decision point (TDP), followed by normal flyout. Pilots flew the task with the standard Black Hawk instrument set or with one of two integrated formats presented on a color, panel-mounted display. Engine failures were randomly inserted slightly before and slightly after the TDP. The pilot was instructed to make a visual landback to the pad when an engine failed prior to reaching the TDP and to continue the flyout when an engine failed after passing through the TDP. Weather conditions were varied from calm, clear conditions to low visibility and ceilings, with crosswinds and turbulence. Evaluations were conducted with seven pilots. Objective and subjective data describing task performance and pilot workload were collected. It was hypothesized that even without the benefit of display assistance, pilots would achieve better performance handling an engine failure by using integrated displays during the ah-engines-operating back up phase prior to the engine failure

occurring. As expected, the pilots were able to maintain more precise night path control during the backup with the integrated display. This precise control, in turn, placed the pilot in a better situation from which to handle an engine failure. Pilot recognition of the TDP location was also highly improved with an integrated display. Emergency landbacks, on runs using the integrated display during the backup portion, were all performed within the specified tolerances. Some of the landbacks using the standard instrument set, however, exceeded the adequate performance parameters. Cooper-Harper Handling Qualities Ratings confirmed that pilot workload was reduced and pilots were able to fly more consistently within the desired performance parameters with the integrated display than with the standard instruments and visual cues.

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UT ISI:000075271300001

PT J

AU Braithwaite, MG
Durnford, SJ
Groh, SL
Jones, HD
Higdon, AA
Estrada, A
Alvarez, EA

TI Flight simulator evaluation of a novel flight instrument display to minimize the risks of spatial disorientation

SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 11

AB Background: Spatial disorientation (SD) in flight remains a major source of attrition. Many SD accidents would occur regardless of the instrument display in use, since the aircrew are simply not looking at the instruments. However, there are a number of accidents which might be amenable to improved instrument displays. In an attempt to improve maintenance and reattainment of correct orientation with a reduced cognitive workload, a novel instrument display has been developed. This paper describes an assessment of the display in a UH-60 helicopter flight simulator. Hypothesis: This study tested the hypothesis that during instrument flight and recovery from unusual attitudes, the novel display permits a more accurate maintenance and reestablishment of flight parameters than the standard flight instruments. Methods: There were 16 male aviators who flew a simulated instrument flight profile and recovery from unusual attitudes using both the standard flight instruments and the novel display. The two display formats were tested both with and without a secondary task. Results: When compared with the standard instruments, both control of flight parameters and recovery from unusual attitudes were significantly improved when using the novel display. Analysis of the secondary task scores showed that cognitive workload was reduced when using the novel display compared with the standard instruments. Conclusions: Results from all aspects of the assessment indicated benefits of the new display. Future testing should be carried out during real flight, and the display should be further developed to be used in a head-up or helmet-mounted device.

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JI Aviat. Space Environ. Med.
PY 1998
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GA 106WT
J9 AVIAT SPACE ENVIRON MED
UT ISI:000075174600002

PT J
AU Ying, Y
TI Analysis of impact threshold energy for carbon fibre and fabric reinforced composites
SO JOURNAL OF REINFORCED PLASTICS AND COMPOSITES
NR 16
AB Damage resistance of three different carbon fibre and fabric reinforced composites are evaluated after drop-weight impact damage. Finite element analysis coupled with failure criteria developed to predict the impact threshold energy of the laminates. The predicted impact threshold energy agreed reasonably well with the analytical values based on experimental data. An analytical method for predictions of maximum contact force and radius of contact region at different impact energy were presented in order to provide necessary information for finite element analysis.
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TI Aftereffects and sense of presence in virtual environments: Formulation of a research and development agenda

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AB This report represents a committee summary of the current state of knowledge regarding aftereffects and sense of presence in virtual environments (VEs). The work presented in this article, and the proposed research agenda, are the result of a special session that was set up in the framework of the Seventh International Conference on Human Computer Interaction. Recommendations were made by the committee regarding research needs in aftereffects and sense of presence, and, where possible, priorities were suggested. The research needs were structured in terms of the short, medium, and long term and, if followed, should lead toward the effective use of VE technology. The 2 most critical research issues identified were (a) standardization and use of measurement approaches for aftereffects and (b) identification and prioritization of sensorimotor discordances that drive after effects. Identification of aftereffects countermeasures (i.e., techniques to assist users in readily transitioning between the real and virtual worlds), reduction of system response latencies, and improvements in tracking technology were also thought to be of critical importance.
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TI Perception and control of altitude: Splay and depression angles
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NR 27
AB In 3 experiments altitude control was examined as a function of texture type and forward speed. Four texture types were used: grid (rectangular grid with neutral colored cells); dot (small triangles distributed randomly on the ground surface); splay (rows of colored texture parallel to the direction of motion); and depression (rows of colored texture extending perpendicular to the direction of motion). The first 2 experiments required participants to track a constant altitude. Experiment 3 required participants to descend as low as possible without crashing. Results showed an interaction between texture type and forward speed. At low speeds, there was little difference between performance with the depression and splay textures. However, performance with the depression texture deteriorated with increasing forward speeds. Performance with the splay texture was independent of forward speed.
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PT J
AU Plamondon, R
Alimi, AM
TI Speed/accuracy trade-offs in target-directed movements
SO BEHAVIORAL AND BRAIN SCIENCES
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AB This target article presents a critical survey of the scientific literature dealing with the speed/accuracy trade-offs in rapid-aimed movements. It highlights the numerous mathematical and theoretical interpretations that have been proposed in recent decades. Although the variety of points of view reflects the richness of the field and the high degree of interest that such basic phenomena attract in the understanding of human movements, it calls into question the ability of 'many models to explain the basic observations consistently reported in the field. This target article summarizes the kinematic theory of rapid human movements, proposed recently by R. Plamondon (1993b; 1993c; 1995a; 1995b), and analyzes its predictions in the context of speed/accuracy trade-offs. Data from human movement literature are reanalyzed and reinterpreted in the context of the new theory. It is shown that the various aspects of speed/accuracy trade-offs can be taken into account by considering the asymptotic behavior of a large number of coupled linear systems, from which a delta-lognormal law can be derived to describe the velocity profile of an end-effector driven by a neuromuscular synergy. This law not only describes velocity profiles almost perfectly, it also predicts the kinematic properties of simple rapid movements and provides a consistent framework for the analysis of different types of speed/accuracy trade-offs using a quadratic (or power) law that emerges from the model.
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UT ISI:A1997YJ78800062

PT J
AU McFadden, KL
TI Predicting pilot error incidents of US airline pilots using logistic regression
SO APPLIED ERGONOMICS
NR 9
AB In a population of 70164 airline pilots obtained from the Federal Aviation Administration, 475 males and 22 females had pilot-error incidents in the years 1986-1992, A simple chi-squared test revealed that female pilots employed by major airlines had a significantly greater likelihood of pilot-error incidents than their male colleagues, In order to control for age, experience (total flying hours), risk exposure (recent flying hours) and employer (major/non-major airline) simultaneously, the author built a model of male pilot-error incidents using logistic regression, The regression analysis indicated that youth, inexperience and non-major airline employer were independent contributors to the increased risk of pilot-error incidents, The results also provide further support to the literature that pilot performance does not diff significantly between male and female airline pilots. (C) 1997 Elsevier Science Ltd.
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PT J
AU Rozak, JN
Ray, A
TI Robust multivariable control of rotorcraft in forward flight
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 17
AB This paper presents the synthesis and analysis of multivariable robust control systems for a UH-60 Black Hawk helicopter in forward flight based on the ADS-33C specification and the Structured Singular Value (mu) analysis, Several robust controllers with different configurations (e.g., a rate or attitude command, 3 or 4-axis design) were constructed to determine which configuration provides the best overall handling qualities performance. It was determined that the Rate Command 3-axis, designed with an ideal model structure, yielded the best overall performance.
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UT ISI:A1997WX68000005

PT J
AU Braithwaite, MG
TI The British Army Air Corps in-flight spatial disorientation demonstration sortie
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 6
AB Following didactic instruction, most aircrew are able to experience some of the disorientating illusions and limitations of the orientational senses in a variety of ground-based devices. In order to reinforce instruction in spatial disorientation (SD) within the environment in which they operate, British Army Air Corps helicopter pilots also receive an airborne demonstration of the limitations of their orientation senses. Since 1982, a specific SD sortie has been programmed towards the end of the basic rotary-wing phase of flight training approximately 6 weeks after the aeromedical training module, and before students commence rotary wing instrument flight training. Refresher sorties are flown every 4 years. The conduct of the SD sortie is described in detail. Analysis of helicopter accidents demonstrates that this training is operationally effective by contributing towards the reduction of SD-related mishaps. It is cost-effective and the addition of this type of in-flight demonstration to the aeromedical training syllabus is regarded as being of great value to British Army helicopter aircrew. Similar instruction could be readily adopted by other services.
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VL 68
IS 4
GA WR011
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UT ISI:A1997WR01100011

PT J
AU Katoh, Z
TI Saccade amplitude as a discriminator of flight types
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 14
AB Purpose: Effectiveness of saccade amplitudes and dwell time lengths in determining pilots' eye scanning behaviors, and thus visual workload, during instrument- and scenery-centered simulator flight tasks was investigated. Method: Five male jet-aircraft pilots volunteered, and five different simulated flight tasks, including takeoff to landing, were selected for the study. Results: An aerobatic flight, considered to be a scenery-centered one, showed the largest saccadic amplitude among the five flight tasks, its mean value three times that of S-shaped circular flight (SLW), considered to be instrument-centered. The shortest dwell time was for landing, its dwell time length half those of the other flights, and the longest was for SLW. The post-hoc test result revealed that this measure is only partially successful in differentiating landing from the other types of flights. The regression coefficient of the aerobatic flight was about three times that of SLW, and takeoff was almost two times SLW. Conclusion: Saccade amplitude was the most important factor in distinguishing between the two types of flights. Dwell time length was supportive, and shift rate of the line of sight was inconclusive in differentiating flight tasks. A scattergram drawn with amplitudes and dwell times gives us a clear understanding of the difference between the two types of flights.
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IS 3
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PT J
AU Sahasrabudhe, V
Celi, R
Tits, AL
TI Integrated rotor-flight control system optimization with aeroelastic and handling qualities constraints
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS
NR 14
AB The results are presented of a study concerning the integrated optimization of rotor and flight control systems with simultaneous aeroelastic and handling qualities constraints. A representative subset of the ADS-33C handling qualities specification is reformulated into inequality constraint form, A simplified design model is used, consisting of three rotor design variables and five control system design variables for each Eight condition. It is not possible to satisfy the entire set of aeroelastic and handling qualities constraints using just the three rotor design parameters of this study, If the design is optimized for just one flight condition, optimizing simultaneously the rotor and the Eight control system leads to substantially better designs than by sequentially optimizing the rotor first and the flight control system next, The designs obtained using the two optimization strategies are quite different, confirming that rotor and flight control systems are strongly coupled.
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PT J
AU Gopher, D
TI Attention control: Explorations of the work of an executive controll
SO COGNITIVE BRAIN RESEARCH
NR 51
AB This contribution reviews three lines of studies set to investigate attention control and executive control operations, in the general context of the interplay between bottom-up and top-down processes in the conduct of proficient behavior. One line of studies focused on the act of switching attention between tasks and the mental costs associated with it. A second group of experiments investigated attention strategies and resource management in coping with high load and concurrent task demands. A third line of studies examined the influence of enhanced knowledge and accumulated experience on coping with malfunctions and mishaps in system response. The experimental results of all studies lend strong support to the existence and influence of executive control processes. These types of processes operate on the established representations and

knowledge bases of tasks, to make the best use of processing and response facilities. The experiments shed light on the nature of the processes and the variables that influence them. It is shown that proficient performance is far from being exclusively guided by automatic processing and response routines triggered directly by events in the environment. Instead it is a joint and non-trivial product of these two types of processes. Executive control is required not only in early stages of training, but also at high levels of mastery and proficiency. Automatism does :not eliminate or reduce the importance of executive control and strategic behavior. A new and powerful class of processes comes into play at this level of expertise, with strong influence on modes of behavior and the overall efficiency of performance.

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PY 1996
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GA WH807
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UT ISI:A1996WH80700004

PT J
AU Prislin, R
Jordan, JA
Worchel, S
Semmer, FT
Shebilske, WL
TI Effects of group discussion on acquisition of complex skills
SO HUMAN FACTORS
NR 25
AB The study tested whether group discussion facilitates

acquisition of Space Fortress (SF), a complex skills task, and if so, what aspects of discussion are responsible for the effect. The experimental group participants who engaged in unguided group discussion about SF performed the task significantly better than did controls. Factor analysis of task-related discussion yielded three general discussion orientations: advice, social comparison, and motivation. The latter two orientations interacted to predict the final performance: Social comparison contributed to performance at the low and average but not at the high levels of the motivation factor. An additional analysis of the advice or information exchange orientation yielded two dimensions recognized as strategy and cognitive overload. They also interacted to predict the final performance: Discussion of strategy was beneficial to performance, but only at the low level of cognitive overload. Implications for the organization of training protocols are discussed.

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UT ISI:A1996VL69700003

PT J
AU Hendrix, C
Barfield, W
TI Presence within virtual environments as a function of visual display parameters
SO PRESENCE-TELEOPERATORS AND VIRTUAL ENVIRONMENTS
NR 29
AB This paper reports the results of three studies, each of which investigated the sense oi presence within virtual environments as a function of visual display parameters. These factors included the presence or absence of head tracking, the presence or absence of stereoscopic cues, and the geometric field of view used to create the visual image projected on the visual display. In each study, subjects navigated a virtual environment and completed a questionnaire designed to ascertain the level of presence experienced by the participant within the virtual world. Specifically two aspects of presence were evaluated: (1) the sense of "being there" and (2) the fidelity of the interaction between the virtual environment participant and the virtual world. Not surprisingly, the results of the first and second study indicated that the reported level of presence was significantly higher when head tracking and stereoscopic cues were provided. The results from the third study showed that the geometric field of view used to design the visual display highly influenced the reported level of presence, with more presence associated with a 50 and 90 degrees geometric field of view when compared to a narrower 10 degrees geometric field of view. The results also indicated a significant positive correlation between the reported level of presence and the fidelity of the interaction between the virtual environment participant and the virtual world. Finally, it was shown that the survey questions evaluating several aspects of presence produced reliable responses across

questions and studies, indicating that the questionnaire is a useful tool when evaluating presence in virtual environments.

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PY 1996
PD SUM
VL 5
IS 3
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J9 PRESENCE-TELEOPER VIRTUAL ENV
UT ISI:A1996VF83500002

PT J
AU Schroeder, JA
TI Evaluation of simulation motion fidelity criteria in the vertical and directional axes
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 22

AB An evaluation of existing motion fidelity criteria was conducted on the NASA Ames Vertical Motion Simulator Experienced test pilots performed single-axis repositioning tasks in both the vertical and the directional axes using transfer-function approximations of a hovering helicopter. Gain and natural frequency variations were made only in the software filters that attenuate the commands to the simulator motion system. The variations spanned motion response characteristics from nearly full math-model motion to fixed-base. Between configurations, pilots recalibrated their motion response perception by flying the task with full motion. Pilots subjectively rated the motion fidelity of subsequent configurations relative to this full motion case, which was considered the standard for comparison. The results suggested that the existing vertical-axis criterion was accurate for combinations of gain and natural frequency changes. However, if only the gain or the natural frequency was changed, the rated motion fidelity was better than the criterion predicted. In the vertical axis, the objective and subjective results indicated that a larger gain reduction was tolerated than the existing criterion allowed, Significant degradations in performance were noted between the full-vertical motion and no-vertical motion configurations, The limited data collected in the yaw axis revealed that pilots had difficulty in distinguishing among the variations in the pure yaw motion cues, thus indicating that pure yaw motion may be of little importance in hovering flight simulation.

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PT J
AU SCHROEDER, JA
TISCHLER, MB
WATSON, DC
ESHOW, MM
TI IDENTIFICATION AND SIMULATION EVALUATION OF A COMBAT HELICOPT IN HOV
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS
NR 15
AB Frequency-domain parameter identification techniques were used to develop a hover mathematical model of the AH-64 Apache helicopter from flight data. The unstable AH-64 bare-airframe characteristics, without a stability augmentation system, were parameterized in the conventional stability-derivative form. To improve the model's vertical response, a simple transfer-function model approximating the effects of dynamic inflow was developed. The model, with and without stability augmentation, was then evaluated by AH-64 pilots in a moving-base simulation. It was the opinion of the pilots that the simulation was a satisfactory representation of the aircraft for the tasks of interest. The principal negative comment was that height control was more difficult in the simulation than in the aircraft.
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AU GOPHER, D
WEIL, M
BAREKET, T
TI TRANSFER OF SKILL FROM A COMPUTER GAME TRAINER TO FLIGHT
SO HUMAN FACTORS
NR 27
AB An experimental study was conducted to test the transfer of skills from a complex computer game to the flight performance of cadets in the Israeli Air Force flight school. The context relevance of the game to flight was argued on the basis of a skill-oriented task analysis, using the framework provided by contemporary models of the human processing system. The

influence of two embedded training strategies was compared, one focusing on the specific skills involved in performing the game, the other designed to improve the general ability of trainees to cope with the high processing and response demands of the flight task and teach better strategies of attention control. Efficient control and management of attention und high task load are argued to be skills that can improve with proper training and generalize to new situations. Flight performance scores of two groups of cadets who received 10 h of training in the computer game were compared with those of a matched group without game experience. Both game groups performed significantly better than the no-game group in the subsequent test flights. The results are discussed with reference to the theoretical framework within which the context relevance of the game was supported. Also considered are the effects of the different training schedules and the significance of the data to the study of attention control. The game has now been incorporated into the regular training program of the Air Force.

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PT J
AU PINTADO, P
MORTON, J
TI ON THE SCALING OF IMPACT LOADED COMPOSITE BEAMS
SO COMPOSITE STRUCTURES
NR 10

AB Approaches to the scaling of impact experiments on-laminated composite beams are presented and problems associated with incomplete similitude are discussed. In the case of beams scaled on a sublaminate basis, a correction factor is presented to scale the dynamic response of beams subjected to drop-weight impacts. The scaling procedure is evaluated in a series of scaled experiments on graphite-epoxy composite beams. It is shown that the correction factor provides a valid scaling procedure for the dynamic response but a significant scale effect on damage development and strength is observed.

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PT J
AU GRUNWALD, AJ
KOHN, S
TI VISUAL-FIELD INFORMATION IN LOW-ALTITUDE VISUAL FLIGHT BY LINE-OF-SIGHT SLAVED HELMET-MOUNTED DISPLAYS
SO IEEE TRANSACTIONS ON SYSTEMS MAN AND CYBERNETICS
NR 17
AB The pilot's ability to derive control-oriented visual field information from teleoperated helmet-mounted displays in nap-of-the earth flight is investigated in this paper. The visual field with these types of displays, commonly used in Apache and Cobra helicopter night operations, originates from a relatively narrow field-of-view forward looking infrared radiation (FLIR) camera, gimbal-mounted at the nose of the aircraft and slaved to the pilot's line of sight, providing a wide-angle held of regard. Pilots have encountered considerable difficulties in controlling the aircraft by these devices. The experimental simulator results presented here indicate that part of these difficulties can be attributed both to the narrow camera field of view and to head/camera slaving system phase lags and errors. In the presence of voluntary head rotation, these shortcomings are shown to impair the control-oriented visual field information vital in vehicular control, such as the perception of the anticipated flight path or the vehicle yaw rate. Since the pilot will tend to minimize head rotation in the presence of slaving system imperfections, the full wide-angle field of regard of the line-of-sight slaved helmet-mounted display is not always fully utilized. The findings in this paper are valid for a general class of head-slaved displays which are used in teleoperation and virtual environments and in which correct self-motion estimation is an essential part of the operator task.
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PT J
AU FREEMAN, WT
TI THE USE OF COMPOSITES IN AIRCRAFT PRIMARY STRUCTURE
SO COMPOSITES ENGINEERING
NR 36
AB This paper reviews the current applications of composites to airframes on a variety of aircraft with emphasis on the structures and materials developments that have led to production hardware. Special emphasis is placed on the issues and barriers that impede much greater use of composites in wings and fuselages of large commercial transports. Acquisition and life-cycle cost issues that dominate the decision process for further commitment of composites to primary structure in large aircraft production applications are reviewed.
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PT J
AU GRUNWALD, AJ
KOHN, S
TI FLIGHTPATH ESTIMATION IN PASSIVE LOW-ALTITUDE FLIGHT BY VISUAL CUES
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS
NR 21
AB A series of experiments has been conducted, in which subjects had to estimate the flight path while passively being flown in straight or in curved motion over several types of nominally flat, textured terrain. Three computer-generated terrain types have been investigated: 1) a random "pole" field, 2) a flat field consisting of random rectangular patches, and 3) a field of random parallelepipeds. Experimental parameters were the velocity-to-height (V/h) ratio, the viewing distance, and the terrain type. Furthermore, the effect of obscuring parts of the visual field has been investigated. Assumptions have been made about the basic visual-field information by analyzing the pattern of line-of-sight (LOS) mte vectors (streamers) in the visual field. The experimental results support these assumptions and show that, for both a straight as well as for a curved flight path, the estimation accuracy and estimation times improve, to a certain extent, with the V/h ratio. Error scores for the curved flight path are found to be about 3 deg in visual angle higher than for the straight flight path, and the sensitivity to the V/h ratio is found to be considerably larger. For the straight motion, the flight path could be estimated successfully from local areas in the far field, although at the expense of larger estimation times. However, curved flight-path estimates have to rely on the entire LOS mte pattern rather than on local field estimates.
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PT J
AU ESHOW, MM
SCHROEDER, JA
TI IMPROVEMENTS IN HOVER DISPLAY DYNAMICS FOR A COMBAT HELICOPT
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 13
AB This paper describes a piloted simulation conducted on the NASA Ames Vertical Motion Simulator. The objective of the experiment was to investigate the handling qualities benefits attainable

using new display law design methods for hover displays. The new display laws provide improved methods to specify the behavior of the display symbol that predicts the vehicle's ground velocity in the horizontal plane; it is the primary symbol that the pilot uses to control aircraft horizontal position. The display law design was applied to the Apache helmet-mounted display format, using the Apache vehicle dynamics to tailor the dynamics of the velocity predictor symbol. The representations of the Apache vehicle used in the display design process and in the simulation were derived from flight data. During the simulation, the new symbol dynamics were seen to improve the pilots' ability to maneuver about hover in poor visual cuing environments. The improvements were manifested in pilot handling qualities ratings and in measured task performance. The paper details the display design techniques, the experiment design and conduct, and the results.

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PT J
AU LISKIEWICZ, WJ

TI AN EVALUATION OF THE ROYAL-AIR-FORCE HELICOPTER SEARCH AND RESCUE SERVICES IN BRITAIN WITH REFERENCE TO ROYAL AIR-FORCE VALLEY 1980-1989
SO JOURNAL OF THE ROYAL SOCIETY OF MEDICINE
NR 17

AB The Royal Air Force (RAF) operates a helicopter Search and Rescue (SAR) service in the United Kingdom and territorial waters; it also provides a similar service in several locations abroad. A 10-year retrospective study of the SAR helicopt service operating from the RAF base at Valley on the island of Anglesey in North Wales is presented, with national SAR statistics over a similar period provided for comparison. Analysis of records kept by SAR aircrew at RAF Valley shows that their assistance had been requested on 1490 occasions during the 10-year period studied; most of these requests were the result of incidents involving holidaymakers, particularly in the mountains or along the coast. The results illustrate the versatility and life-saving potential of a highly-skilled and motivated service able to work in adverse weather and dangerous locations. In the light of current debate, the value of aeromedical evacuation of seriously ill patients using helicopters is discussed.

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AU FLACH, JM
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LARISH, JF
TI ACTIVE REGULATION OF ALTITUDE AS A FUNCTION OF OPTICAL TEXTURE
SO PERCEPTION & PSYCHOPHYSICS
NR 21
AB Two empirical studies are reported that examine active regulation of altitude as a function of the type of ground texture. Three ground textures were examined: lines perpendicular to the direction of motion, lines parallel to the direction of motion, and the combination (i.e., square or checkerboard texture). Although subjects only controlled altitude, disturbances were introduced on three axes: vertical, lateral, and fore-aft. The results show a clear advantage for texture parallel to the direction of motion. However, in considering these results, in the context of previous research on altitude control, the argument is made that there is no compelling evidence that suggests either parallel (splay) or perpendicular (density) texture is privileged with regard to altitude control. Rather, the most effective display for altitude control will be the one that best isolates the optical activity associated with changing altitude from the optical activity arising from other sources of disturbance (such as forward locomotion). Such a display will make it easier for the observer to distinguish and respond specifically to the disturbances of altitude.
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AU ESHOW, MM
TI FLIGHT INVESTIGATION OF VARIATIONS IN ROTORCRAFT CONTROL AND DISPLAY DYNAMICS FOR HOV
SO JOURNAL OF GUIDANCE CONTROL AND DYNAMICS
NR 19
AB This paper describes a flight investigation of the handling qualities issues associated with variations in display dynamics for varying levels of vehicle augmentation. The experiment was conducted on the NASA/Army CH-47B Variable-Stability Research Helicopter using its model-following control system and a color, panel-mounted display. A display law design method developed and flight tested previously was refined and expanded to account for guidance effects. Specifically, for rate, attitude, and velocity command vehicle response types, both integrator-like and gain-like display controlled element dynamics were evaluated in two hovering tasks conducted in simulated zero-visibility conditions. The tasks were performed both with and without automation of the vertical and

directional axes to assess the impact of divided attention on performance and work load. Quantitative and subjective data describing the pilots' ability to perform the tasks were collected and analyzed, and pilot-vehicle-display dynamics were identified. Results indicated that gain-like display dynamics were generally preferred and resulted in better inner-loop tracking and higher inner-loop crossover frequencies, while not degrading outer-loop position performance.

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AU CONROY, C
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TI FATAL OCCUPATIONAL INJURY RELATED TO HELICOPTERS IN THE UNITED-STATES 1980-1985
SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
NR 24
AB This paper discusses characteristics of occupational traumatic deaths, caused by helicopters, during 1980-1985. Death certificate data are used to describe demographic characteristics and causes of death. Information from National Transportation Safety Board (NTSB) investigations is used to describe pilot experience and environmental circumstances surrounding the incident. During 1980-1985, 374 worker deaths involving helicopters were identified in the National Traumatic Occupational Fatality (NTOF) database. The majority of deaths resulted from trauma to body organs (including the brain). According to NTSB investigations, 59% of crashes in this study were attributed to pilot error, compared to 16.5% from mechanical failure of the helicopter. Thirty percent of deaths were related to military use of helicopters. While death due to occupational exposure to helicopters is not common, some workers (e.g., helicopter pilots) appear to be at especially high risk. This group should be studied further to develop better strategies for their protection.

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AU BALLIN, MG
DALANGSECRETAN, MA
TI VALIDATION OF THE DYNAMIC-RESPONSE OF A BLADE-ELEMENT UH-60 SIMULATION-MODEL IN HOVERING FLIGHT
SO JOURNAL OF THE AMERICAN HELICOPTER SOCIETY
NR 31
AB The dynamic fidelity of an operational blade-element simulation model of the UH-60A helicopter is assessed for the hovering and low-speed flight regimes. Nonparametric frequency-response identification techniques and time-history comparisons are used to determine the validity of vehicle responses. Frequency-domain methods are applied to the model to isolate deficiencies and verify refinements and corrections. A dedicated flight-test program was conducted to provide data used in the analyses. Model deficiencies are also identified by using side-by-side pilot assessments of a motion-based simulation and of a test aircraft. Model refinements are found to improve fidelity significantly in the frequency range of interest to handling-qualities research. The applicability of the model to high-bandwidth flight-control research is also discussed.
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AU GUILMETTE, TJ
TREANOR, JJ
TI BASE-LINE AND COMPARATIVE NEUROPSYCHOLOGICAL DATA ON UNITED-STATES-ARMY AVIATORS
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PN 1
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UT ISI:A1986E343500003

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SO HUMAN FACTORS

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UT ISI:A1986C234600001

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AU LESTER, LF
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TI THE ADAPTABILITY RATING FOR MILITARY AERONAUTICS - AN
  HISTORICAL-PERSPECTIVE OF A CONTINUING PROBLEM
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JI Aviat. Space Environ. Med.
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TI PAVE LOW .3. INTERIOR LIGHTING RECONFIGURATION FOR NIGHT
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SO AVIATION SPACE AND ENVIRONMENTAL MEDICINE
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JI Aviat. Space Environ. Med.
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VL 53
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J9 AVIAT SPACE ENVIRON MED
UT ISI:A1982PU70100002

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TI A QUESTIONNAIRE STUDY OF PSYCHOLOGICAL BACKGROUND FACTORS IN
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JI Aviat. Space Environ. Med.
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UT ISI:A1980KH17400003

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JI Aviat. Space Environ. Med.
PY 1980
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Compendex

Journal Long Form, 1, Cole, J. L. //Evans, C. W. //Greenberg, C. E. //Saal, K. W. Sikorsky Aircraft Corporation, West Palm Beach, FL, United States, Development and qualification of the S-76C+ helicopter with 30-second/2-minute OEI power ratings Journal of the American Helicopter Society, 2001, 46, 2, 117-128, JHESAK, 0002-8711

The S-76C+ is the first U.S. manufactured helicopter to be certified in accordance with the FAA's new 30-second/2-minute OEI power ratings, and the first Sikorsky helicopter to be FAA/CAA certified to fully harmonized FAR/JAR-29 performance criteria. This paper discusses the joint Sikorsky/Turbomeca development flight test effort commencing with the shipment of Sikorsky's S-76C test aircraft to Turbomeca's CGTM flight test subsidiary at Pau, France where it was converted into a flying test bench for Arriel 2S1 engine development. Concurrent with Turbomeca's engine development effort, custom engine FADEC software was developed and refined, applying the lessons learned during previous FADEC development testing to optimize S-76C+/Arriel 2S1 engine operating characteristics. Unique engine integration and pilot training features were developed to accommodate the new 30-second/2-minute OEI power rating structure. Upon completion of development testing, the S-76C+ test aircraft returned to Sikorsky's Development Flight Center at West Palm Beach, Florida for low altitude, warm weather qualification testing. That was followed by cold weather testing at Fairbanks, Alaska, high altitude testing at Leadville, Colorado, and elevated helideck testing at a North Sea based oil drilling rig off the coast of Wick, Scotland. Flight testing Engine integration

Conference Proceeding, 2, Matvienko, G. G. //Ptashnik, I. V. //Romanovskii, O. A. //Kharchenko, O. V. //Shamanaev, V. S. Inst. of Atmospheric Optics SB RAS, Tomsk, Russian Federation, An airborne DF-laser lidar for detecting aerosol and gas leakages, 7th International Symposium on Atmospheric and Ocean Optics, Jul 19-22 2000, Tomsk, Russian Federation, 2001, 4341, 526-533

The present work is aimed at quantitative estimation of the capabilities of remote detection of aerosol and gas leakages from distances 0.5-15 km with an airborne DF-laser lidar, placed onboard an aircraft or a helicopter and operating with a topographic target, by numerical modeling. The requirements for guiding the development of this lidar system are also formulated. Deuterium-fluorine laser lidar Gas leakage Topographic target Airborne lidar system Discrete emission spectrum Differential absorption method

Journal Long Form, 3, Horn, Joseph F. //Calise, Anthony J. //Prasad, J.V.R. Georgia Inst of Technology, Atlanta, GA, USA, Flight envelope cueing on a tilt-rotor aircraft using neural network limit prediction, Journal of the American Helicopter Society, 2001, 46, 1, 23-31 JHESAK, 0002-8711

A method for using neural networks to provide predictive flight envelope limit information was developed. The method was applied to provide a tactile cueing system for normal load factor and angle-of-attack buffet limits on the V-22 tilt-rotor aircraft. Results from a real-time piloted simulation showed that the system enabled the pilot to maneuver along

the flight envelope boundaries without exceeding the limits. Results indicated that the approach has the potential to expand the effective safe maneuvering flight envelope of aircraft with structural load limits. Tilt rotor aircrafts Flight envelope cueing

Conference Proceeding, 4, Hashimoto, Seiji //Ogawa, Tomonori //Adachi, Shuichi //Tan, Anzhong //Miyamori, Gou, Utsonomiya Univ, Utsunomiya, Jpn, System identification experiments on a large-scale unmanned helicopter for autonomous flight, Proceedings of the 2000 IEEE International Conference on Control Applications, Sep 25-Sep 27 2000, Anchorage, USA, IEEE, Piscataway, NJ, USA, 2000, 1, 850-855

Unmanned helicopters are now used to spray agricultural chemicals and take aerial photographs. In the near future, the aircrafts are expected to be used for a wide array of activities, such as rescuing and fire fighting. Then, an autonomous flight using several sensors typified by GPS is expected. In this paper, system identification experiments for a large-scale unmanned helicopter are carried out. The helicopter is compensated by attitude control that permits the experiments during the flight. Using input and output data, system identification results are shown through numerical analysis. Moreover, the effectiveness of the identified model is demonstrated through a position control based on the H$-$INF$/ control theory. Unmanned helicopter Attitude control Flight control

Journal Long Form, 5, Anon, UK selects yards for ro-ros and ALSLs, Warship Technology 2001 JAN. 16, 0957-5537

AWSR Shipping Ltd. is the main bidder for the package of strategic sealift ro-ros ships and new landing ships for UK Royal Navy on Private Finance Initiative (PFI) and will be responsible for provision of the crews for ships. To save time ships will be constructed at two yards. The contracts for the ro-ros and alternative landing ship logistic (ALSL) for Royal Fleet Auxiliary (RAF) will secure 2000 jobs and prove to be cost-effective. It will be designed to carry load of around 130 armoured vehicles including battle tank, helicopters, ammunition and other supplies. Strategic sealifts Alternative landing ship logistics (ALSL) Royal fleet auxiliary (RFA)

Conference Proceeding, 6, McConley, Marc W. //Piedmonte, Michael D. //Appleby, Brent D. //Frazzoli, Emilio //Feron, Eric //Dahleh, Munther A. Draper Lab, Cambridge, MA, USA, Hybrid control for aggressive maneuvering of autonomous aerial vehicles, 19th Digital Avionics Systems Conference (DASC), Philadelphia, PA, USA, IEEE, Piscataway, NJ, USA, 2000, 1, 1.E.4-1-1.E.4-8

New advances in control theory are required to enable aggressive maneuvering of autonomous vehicles, while adapting in real time to changes in the operational environment. A hybrid control architecture, the states of which represent feasible trajectory primitives, is constructed to reduce the complexity of the motion-planning problem for a nonlinear, high-dimensional system such as an aerial vehicle. Any feasible trajectories in the primitive list are available to the automatic control system; these may include a complete set of transitions between pairs of trim trajectories in addition to pilot-inspired behaviors recorded during manual flight tests with a human pilot. This paper describes the structure of a hybrid automaton that solves a time-optimal motion-planning problem by sequencing maneuvers in real time from such a primitive list. The algorithm can be used in a free workspace, or in the presence of fixed or moving obstacles. We present simulation results showing the effectiveness of this approach for a behavior library generated by a combination of analysis and live flight tests with a small remote-controlled helicopter. Hybrid control Autonomous aerial vehicles

Conference Proceeding, 7, Zimmerman, Marc //Rodriguez, Mario //Ingram, Benjamin //Katahira, Masafumi //de Villepin, Maxime //Leveson, Nancy, Massachusetts Inst of Technology, Cambridge, MA, USA, Making formal methods practical, 19th Digital Avionics Systems Conference (DASC)Philadelphia, PA, USA, IEEE, Piscataway, NJ, USA, 2000, 1, 1.B.2-1-1.B.2-8

Despite its potential, formal methods have difficulty gaining acceptance in the industrial sector. Some complaints are based on supposed impracticality: Many consider formal methods to be an approach to system specification and analysis that requires a large learning time. Contributing to this skepticism is the fact that some types of formal methods have not yet been proven to handle systems of realistic complexity. To learn more about how to design formal specification languages that can be used for complex systems and require minimal training, we developed a formal specification of an English language specification of the vertical flight control system similar to that found in the MD-11. This paper describes the lessons learned from this experience. A companion paper at this conference describes how the model can be used in human-computer interaction analysis and pilot task analysis. Flight control systems

Journal Long Form, 8, Platts, J.T. DERA, Bedford, UK, Some aspects of DERA's aviation research of interest to the InstMC, Measurement and Control 2000, 33, 8, 229-233, MEACBX, 0020-2940

In identifying particular aspects of the Defence Research & Evaluation Agency's (DERA) work of interest to the instrumentation community, it can be realized that there is little that does not use aspects of measurement and control. The activities of two departments of DERA at Bedford are discussed. These departments are the Flight Management & Control Department (FMC), part of the Air Systems Sector, and a portion of the Aerodynamic's Department (AD) of Mechanical Sciences Sector. These activities include flight management and control research that represent a very small part of the work done

at DERA Bedford. Flight management Flight control Automatic low flying systems (ALFS) Collision warning systems (CWS)

Conference Proceeding, 9, Cribbs, R. //Friedmann, P.P. Univ of Michigan, Ann Arbor, MI, USA, Vibration reduction in rotorcraft using an enhanced ACSR model, 41st AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference and ExhibitAIAA/ASME/AHS Adaptive Structures ForumAIAA Non-Deterministic Approaches ForumAIAA Space Inflatables Forum, Apr 3-Apr 6 2000, Atlanta, GA, USA, AIAA, Reston, VA, USA, 2000, 1, 1850-1864

A coupled rotor/fuselage aeroelastic response model with refined aerodynamics has been developed for the prediction and control of vibrations. The model incorporates a three-dimensional structural dynamic finite element model of the fuselage, a flexible, four-bladed hingeless rotor, a free wake model and rotor/fuselage aerodynamic interaction effects. The influence of the various aerodynamic refinements as well as the influence of rotor/fuselage vertical separation on vibratory loads and fuselage accelerations are studied. Vibration reduction with active control of structural response (ACSR) is carried out using two control algorithms. The improved control scheme is capable of tailoring the vibration reduction process so as to produce low accelerations at locations of particular interest such as the pilot seat. Results indicate a large increase in vibratory loads and fuselage accelerations when using the refined aerodynamic models. Though both control methods reduce airframe vibrations, the improved control algorithm provides significantly lower accelerations when compared to the basic control algorithm with similar actuator requirements. The separation between rotor and fuselage is an important factor in vibrations. Vibration reduction Active control of structural response Rotorcraft Vibratory loads Coefficient of pressure

Conference Proceeding, 10, Schall, W.O. //Bohn, W.L. //Eckel, H.-A. //Mayerhofer, W. //Riede, W. //Zeyfang, E. DLR - Inst fuer Technische Physik, Stuttgart, Ger, Lightcraft experiments in Germany, High-Power Laser Ablation III, Apr 24-Apr 28 2000, Santa Fe, NM, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4065, 472-481

Vertical flight and pendulum experiments have been carried out with a simple paraboloid type lightcraft in the air-breathing mode. Pulsed laser energy of up to 240 J/pulse was delivered from a highly reproducible e-beam sustained CO-2/-laser at repetition rates up to 45 Hz. The lightcraft mass was varied in the range of between 22 and 55 g. An average thrust of 1.1 N has been derived from the flight data and the highest impulse coupling coefficient found in the pendulum experiments was 33.3$DOT@10$+$MIN@5$/ Ns/J. A double shock wave was detected that leaves the thruster exit and an attempt was made to model the thrust, using a modification of Sedov's similarity solution for a blast wave. Finally, the propulsion requirements for the launch of a 10 kg mass into low Earth orbit are presented. Lightcraft Laser propulsion Impulse coupling coefficient Thruster

Conference Proceeding, 11, Ratway, Michael J. //Bellomo, Carryn, Naval Surface Warfare Cent, Dahlgren, VA, USA, Inference evaluation in a finite evidence domain, Automatic Target Recognition X, Apr 26-Apr 28 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4050 120-128

Modeling of a target starts with a subject matter expert (SME) analysis of the available sensor(s) data. The SME then forms relationships between the data and known target attributes, called evidence, to support modeling of different types of targets or target activity. Speeds in the interval 10 to 30 knots and ranges less than 30 nautical miles are two samples of target evidence derived from sensor data. Evidence is then organized into sets to define the activities of a target and/or to distinguish different types of targets. For example, near an airport, target activities of takeoff, landing, and holding need to be evaluated in addition to target classification of civilian or commercial aircraft. This paper discusses a method for evaluation of the inferred activities over the finite evidence domain formed from the collection of models under consideration. The methodology accounts for repeated use of evidence in different models. For example, 'near an airport' is a required piece of evidence used repeatedly in the takeoff, landing, and holding models of a wide area sensor. Properties of the activity model evaluator methodology are discussed in terms of model construction and informal results are presented in a Boolean evidence type of problem domain. Finite evidence domain Inference evaluation Behavior model Track classification

Conference Proceeding, 12, Scanlon, Michael V. Army Research Lab, Adelphi, MD, USA, Acoustic mine detection coupling method using a liquid-filled roller array, Detection and Remediation Technologies for Mines and Mineliken Targets V, Apr 24-Apr 28 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4038 (I), 700-710

This acoustic mine detection system uses an acoustic array of hydrophones embedded within a unique fluid-coupling structure that deforms to the ground contours and has an acoustic impedance comparable to that of the ground to facilitate energy transfer and eliminate losses at the air ground interface. Broadband and impulsive acoustic array techniques are used to localize buried objects and interpret the buried object's surrounding. The goal of this system is a low-cost, hand-held mine detector that rolls or slides across the ground, suitable for a soldier to inspect and clear a two-foot wide path. The array contains sensors and sound sources, which send out various acoustic waveforms and analyzes the returning echoes and emissions to determine if an object buried below the surface has affected the propagating sound. The sensors on the array remain in a fixed linear geometry hovering over the ground to facilitate beamforming while

eliminating the huge losses associated with coupling airborne sounds to the ground. Reflections at material discontinuities, as well as mine shape, materials, and depth contribute to the variations of the induced and resultant sound field. Preliminary data is presented that shows detections of underground objects, and a discussion of future efforts, to include further processing of the data introduced in this report. Acoustic mine detection coupling method Liquid filled roller array

Conference Proceeding, 13, Crowley, John S. //Haworth, Loran //Szoboszlay, Zoltan //Lee, Alan, U.S. Army Aeromedical Research Lab, Fort Rucker, AL, USA, Helicopter pilot estimation of self-altitude in a degraded visual environment, Helmet- and Head-Mounted Display V, Apr 24-Apr 25 2000, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4021, 304-315

The effect of night vision devices and degraded visual imagery on self-altitude perception is unknown. Thirteen Army aviators with normal vision flew five flights under various visual conditions in a modified AH-1 (Cobra) helicopter. Subjects estimated their altitude or flew to specified altitudes while flying a series of maneuvers. The results showed that subjects were better at detecting and controlling changes in altitude than they were at flying to or naming a specific altitude. In cruise flight and descent, the subjects tended to fly above the desired altitude, an error in the safe direction. While hovering, the direction of error was less predictable. In the low-level cruise flight scenario tested in this study, altitude perception was affected more by changes in image resolution than by changes in FOV or ocularity. Night vision devices (NVD) Altitude perceptions

Conference Proceeding, 14, Hewlett, Dave //Cameron, Alex A. BAE SYSTEMS, Kent, UK, Advances in rotary wing Helmet Mounted Displays, Helmet- and Head-Mounted Display V, Apr 24-Apr 25 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4021, 79-89

The AH-1Z Integrated Avionic System developed by BAE Systems provides a major increase in the capability of AH-1Z attack helicopter. The helmet-mounted display is an important element within this upgrade providing the pilot with pilotage information, helmet cueing of weapons and high quality night vision. The HMD design has been a team effort involving a range of diverse specialties and has involved the combination of life support and avionic displays technologies into a single entity. Helmet-mounted displays (HMD) Attack helicopters Night vision devices

Conference Proceeding, 15, Lippert, Thomas M. //Rash, Clarence E. //Hauser, James J. Microvision, Inc, Bothell, WA, USA, Microvision, Inc. and US Army Aviation develop laser-scanning HMD, Helmet- and Head-Mounted Display V, Apr 24-Apr 25 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000 4021, 58-65

US Army Aviation is continuing its development of helmet-mounted visually coupled display (HMD) systems to improve day/night helicopter pilotage, weapons delivery, and mission rehearsal/in-flight replanning capabilities. The overall effort includes the establishment of display image source technologies to replace the venerable cathode-ray tube and improve the performance, safety, and utility of HMDs. Among the display technology developments sponsored is Microvision Inc.'s intensity-modulated, scanned laser beam approach. Generic rotorcraft daylight HMD system requirements are described in this paper, followed by a short history of the Army's AIHS Program, a review of Microvision's technology, and performance test results of the project phase I and preliminary phase II HMD system deliverables. Head-mounted displays (HMD) Retinal scanning displays Optomechatronics

Conference Proceeding, 16, Martin, Christopher //Lovberg, John //Clark, Stuart //Galliano, Joe, Trex Enterprises, San Diego, CA, USA, Real time passive millimeter-wave imaging from a helicopter platform, Passive Millimeter-Wave Imaging Technology IV, Apr 26-Apr 26 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4032, 22-28

A millimeter-wave imaging system that uses 32 MMIC low noise amplifiers to display a 60 $MUL 75 pixel image at a 30 Hz frame rate is presented. The pupil-plane phased array architecture of the system allows for a relatively thin large aperture antenna. A remotely located processor utilizes microwave guiding circuit boards to perform phase and frequency discrimination on the radiation received by the antenna array. Millimeter wave imaging Frequency processing Flight platforms

Conference Proceeding, 17, van Koersel, A.C. TNO Physics and Electronics Lab, Hague, Neth, Helicopter detection and classification demonstrator, Unattended Ground Sensor Technologies and Applications II, Apr 26-Apr 26 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4040 121-130

TNO-FEL developed a technology demonstrator that detects and classifies different helicopter types automatically. The demonstrator currently contains information of 11 different helicopter types, but can easily be expanded to include additional types of helicopters. Helicopter detection Classification demonstrator Groundsensor

Journal Long Form, 18, Zeyada, Y. //Hess, R.A. Univ of California, Davis, Davis, CA, USA, Modeling human pilot cue utilization with applications to simulator fidelity assessment, Journal of Aircraft, 2000, 37, 4, 588-597, JAIRAM, 0021-8669

An analytical investigation to model the manner in which pilots perceive and utilize visual, proprioceptive, and vestibular cues in a ground-based flight simulator was undertaken. Data from a NASA Ames Research Center vertical motion simulator study of a simple, single-degree-of-freedom rotorcraft bob-up/down maneuver were employed in the investigation. The study was part of a larger research effort that has the creation of a methodology for determining flight simulator fidelity requirements as its ultimate goal. The study utilized a closed-loop feedback structure of the pilot/simulator system that included the pilot, the cockpit inceptor, the dynamics of the simulated vehicle, and the motion system. With the exception of time delays that accrued in visual scene production in the simulator, visual scene effects were not included in this study. Pilot/vehicle analysis and fuzzy-inference identification were employed to study the changes in fidelity that occurred as the characteristics of the motion system were varied over five configurations. The data from three of the five pilots who participated in the experimental study were analyzed in the fuzzy-inference identification. Results indicate that both the analytical pilot/vehicle analysis and the fuzzy-inference identification can be used to identify changes in simulator fidelity for the task examined. Human pilot cue utilization Simulator fidelity assessment Vertical motion simulator Closed loop feedback structure Pilot Cockpit inceptor Motion system Fuzzy interference identification

Journal Long Form, 19, Schroeder, Jeffery A. //Chung, William W.Y. //Hess, Ronald A. NASA Ames Research Cent, USA, Evaluation of a motion fidelity criterion with visual scene changes Journal of Aircraft, 2000 37, 4, 580-587, JAIRAM, 0021-8669

An experiment examined how visual scene and platform motion variations affected a pilot's ability to perform altitude changes. Pilots controlled a helicopter model in the vertical axis and moved between two points 32-ft apart in a specified time. Four factors were varied: visual-scene spatial frequency, visual-scene background, motion-filter gain, and motion-filter natural frequency. Drawing alternating black and white stripes of varying widths between the two extreme altitude points varied visual-scene spatial frequency. The visual-scene background varied by either drawing the stripes to fill the entire field of view or by placing the stripes on a narrow pole with a natural sky and ground plane behind the pole. Both the motion-filter gain and natural frequency were varied in the motion platform command software. Five pilots evaluated all combinations of the visual and motion variations. The results showed that only the motion-filter natural frequency and visual-scene background affected pilot performance and their subjective ratings. No significant effects of spatial frequency or motion system gain were found for the values examined in this tracking task. A previous motion fidelity criterion was found to still be a reasonable predictor of motion fidelity. Motion fidelity criterion Visual scene changes Platform motion variations Visual scene spatial frequency Altitude changes Pilots Motion filter gain

Conference Proceeding, 20, Behringer, Reinhold //Tam, Clement //McGee, Joshua //Sundareswaran, Venkataraman //Vassiliou, Marius, Rockwell Science Cent, Thousand Oaks, CA, USA, System for synthetic vision and augmented reality in future flight decks, Enhanced and Synthetic Vision 2000 Apr 24-Apr 25 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4023, 81-86

Rockwell Science Center is investigating novel human-computer interface techniques for enhancing the situational awareness in future flight decks. One aspect is to provide intuitive displays which provide the vital information and the spatial awareness by augmenting the real world with an overlay of relevant information registered to the real world. Such Augmented Reality (AR) techniques can be employed during bad weather scenarios to permit flying in Visual Flight Rules (VFR) in conditions which would normally require Instrumental Flight Rules (IFR). These systems could easily be implemented on heads-up displays (HUD). The advantage of AR systems vs. purely synthetic vision (SV) systems is that the pilot can relate the information overlay to real objects in the world, whereas SV systems provide a constant virtual view, where inconsistencies can hardly be detected. The development of components for such a system led to a demonstrator implemented on a PC. A camera grabs video images which are overlaid with registered information, Orientation of the camera is obtained from an inclinometer and a magnetometer, position is acquired from GPS. In a possible implementation in an airplane, the on-board attitude information can be used for obtaining correct registration. If visibility is sufficient, computer vision modules can be used to fine-tune the registration by matching visual cues with database features. Such technology would be especially useful for landing approaches. The current demonstrator provides a frame-rate of 15 fps, using a live video feed as background and an overlay of avionics symbology in the foreground. In addition, terrain rendering from a 1 arc sec. digital elevation model database can be overlaid to provide synthetic vision in case of limited visibility. For true outdoor testing (on ground level), the system has been implemented on a wearable computer. Synthetic vision systems Visual flight rules (VFR) Heads-up displays (HUD)

Conference Proceeding, 21, Sadovnik, Lev //Manasson, Vladimir //Mino, Robert, WaveBand Corp, Torrance, CA, USA, Helicopter obstacle detection radar system, Enhanced and Synthetic Vision 2000, Apr 24-Apr 25 2000, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4023, 2-12

A MMW helicopter obstacle visualization radar system (HOVRS) is demonstrated by WaveBand with the support of BAE System. This system is capable of airborne detection of various obstacles. In particular, it will detect thin, 1 cm in diameter, wires from a distance of 600 m. An affordable HOVRS is possible because of the use of WaveBand's

novel scanning antenna, with resolution enhanced by post-processing. The unique antenna presents a low-cost, lightweight and low profile alternative to the traditional gimbal mount. This antenna provides a crucial capability to the HOVRS, leading to high-resolution MMW imaging. Helicopter obstacle visualization radar systems (HOVRS)

Journal Long Form, 22, Pelinescu, I. //Balachandran, B. Univ of Maryland, College Park, MD, USA, Analytical and experimental investigations into active control of wave transmission through gearbox struts, Proceedings of SPIE - The International Society for Optical Engineering 2000, 3985, 76-85, PSISDG, 0277-786X

Experimental and analytical investigations conducted into active control of longitudinal and flexural waves transmitted through a cylindrical gearbox strut are presented in this article. The development of an experimental model of a finite length active cylindrical strut instrumented with sensors, piezoelectric, and magnetostrictive actuators is described. The strut is included in an experimental arrangement where vibratory loads are applied along the strut's longitudinal and transverse directions while it is subjected to an axial static loading. Modal analysis studies are carried out in the frequency range of 10 Hz to 5 kHz with a finite element model of the cylindrical strut and the experimental model. During wave transmission through the strut, coupling between different types of modes is predicted by analysis and observed in the experiments. Actuator and sensor systems issues are discussed with relevance for control of vibrations transmitted through helicopter gearbox struts. Active vibration control Piezoelectric actuator Magnetostrictive actuator Cylindrical strut Gearbox strut

Conference Proceeding, 23, Jacot, Dean //Clingman, Dan, Boeing Phantom Works, Shape Memory Alloy Consortium and demonstration, Smart Structures and Materials 2000 - Industrial and Commercial Applications of Smart Structures Technologies, Mar 7-Mar 9 2000, Newport Beach, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 3991, 178-186

The Shape Memory Alloy (SMA) Consortium (SMAC) has been developing actuators and magnetically actuated SMA materials. This paper will summarize the overall SMAC developments, and concentrate on the development of a SMA torsional actuator. This is being developed for quasi-static twisting the V-22 rotor blades for added performance. The paper provides updated results to the 1999 SPIE paper on this subject, including further and more focused development of the actuator that combines thermoelectric heat control with SMA materials. Rotorcraft Torsional actuators

Conference Proceeding, 24, Schoess, Jeffrey N. //Arch, David //Yang, Wei //Cabuz, Cleopatra //Hocker, Ben //Johnson, Burgess //Wilson, Mark, Honeywell Technology Cent, Minneapolis, MN, USA, MEMS sensing and control: An aerospace perspective, Smart Structures and Materials 2000 - Smart Electronics and MEMS, Mar 6-Mar 8 2000, Newport Beach, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 3990, 22-27

Future advanced fixed- and rotary-wing aircraft, launch vehicles, and spacecraft will incorporate smart microsensors to monitor flight integrity and provide flight control inputs. This paper provides an overview of Honeywell's MEMS technologies for aerospace applications of sensing and control. A unique second-generation polysilicon resonant microbeam sensor design is described. It incorporates a micron-level vacuum-encapsulated microbeam to optically sense aerodynamic parameters and to optically excite the sensor pickoff. Optically excited self-resonant microbeams form the basis for a new class of versatile, high-performance, low-cost MEMS sensors that uniquely combine silicon microfabrication technology with optoelectronic technology that can sense dynamic pressure, acceleration forces, acoustic emission (AE), and many other aerospace parameters of interest. Honeywell's recent work in MEMS tuning fork gyros for inertial sensing and a MEMS free-piston engine are also described. Condition-based maintenance Vacuum-encapsulated microbeam

Conference Proceeding, 25, Allaei, Daryoush //Tarnowski, David J. //Mattice, Michael S. //Testa, Robert, QRDC, Inc, Excelsior, MN, USA, Smart Isolation Mount for Army Guns - Part 1: Preliminary results, Smart Structures and Materials 2000 - Smart Electronics and MEMS, Mar 6-Mar 8 2000, Newport Beach, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 3990, 70-77

The work reported in this paper is focused on an effective and efficient solution, namely Smart Isolation Mount for Army Guns (SIMAG), to the weapon stabilization and fire control issues facing U.S. Army guns. SIMAG is composed of the optimum integration of two innovative technologies, Vibration Control by Confinement and smart sensor/actuator/active control systems. The combined approach may also be applied to a gun barrel to reduce its undesired vibratory motions excited by external and internal disturbances, such as gun firing action. SIMAG reconfigures the distribution and propagation of excess vibration energy and confines vibrations to certain non-critical regions or modes within a structure. Concentrated passive, active, or smart damping elements or cancellation techniques may be applied to more effectively dissipate or cancel the trapped vibrations and to prevent an energy build up in the assembly. As the active elements, an array of collocated, PZT-based sensor-actuator sets is recommended for incorporation in SIMAG. Part of the active elements is used for spatially managing excess vibration energy while the other part is utilized for energy dissipation and cancellation. The preliminary results of our feasibility work on the SIMAG concept is demonstrated via computer simulations. It is shown that the insertion of a preliminary version of SIMAG in a 30 mm gun system onboard an attack helicopter reduces the fluctuating loads and deformations measured across the helicopter bottom shell by 40 to 50%. SIMAG makes

significant progress towards solving the firing control problems with affordable weight and power penalties by compensating for all errors in one of the two places, the turret-aircraft interface or gun barrel. Even though the initial target application of SIMAG is airborne guns, a modified version can be incorporated into ground armors, such as tanks and humvees. Smart isolation mount for army guns (SIMAG)

Conference Proceeding, 26, Ramanathan, Srinivasan //Varadan, Vasundara V. //Varadan, Vijay K. Pennsylvania State Univ, University Park, PA, USA, Deicing of helicopter blades using piezoelectric actuators, Smart Structures and Materials 2000 - Smart Electronics and MEMS, Mar 6-Mar 8 2000, Newport Beach, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 3990, 281-292

Deicing of fixed wing aircraft and rotorcraft that fly; at lower altitudes has been an area of research interest for many decades. The currently available solutions, though functional, are economically or environmentally inefficient. Some military helicopters have electrical deicing systems for rotor blades that use up to 12 kW of power to achieve all weather flight capability. This is not feasible for civilian use helicopters. A low power method for deicing rotorblades, by launching shear horizontal (SH) waves at the ice-substrate interface is proposed. Experiments were carried out using PZT-5A and PZT-8 shear plate actuators bonded to an aluminum plate. A low-temperature chamber was constructed for this purpose. The results indicate that the PZT-8 actuators were able to deice the aluminum plate melting the ice at the interface. Results are presented in the form of tabular data and digital photographs taken of the melting process. The deicing mechanism is discussed. Piezoelectric actuators Digital photography Shear plate actuators

Conference Proceeding, 27, Arcone, Steven A. //Delaney, Allan J. U.S. Army Cold Regions Research and Engineering Lab, Hanover, NH, USA, GPR images of hidden crevasses in Antarctica, GPR 2000: The 8th International Conference on Ground Penetrating Radar, May 23-May 26 2000, Goldcoast, Aust, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000, 4084 760-765

We have used airborne and ground-based GPR at 400-500 MHz to image hidden crevasses in Antarctica. The radar antennas were either pushed in front of a snowmobile, or cantilevered from a helicopter flying at about 6 m altitude and speeds near 15 m/s. We used a high trace acquisition rate, long time ranges, and migration to show snow bridge depth, crevasse width, septums between crevasses, connecting cavities and associated folded strata in the ground-based profiles. The crevasse images are formed by the discontinuities in reflections from the stratified firn. Diffractions from crevasse walls are strongly single-sided, originate from point and linear discontinuities, and provide advance warning. Airborne recorded images are similar, but less detailed than surface images. An increased trace rate could improve airborne imaging and allow greater profile speeds. Ground penetrating radar Crevasses Antarctica Snowmobile

Conference Proceeding, 28, Finlayson, Richard D. //Friesel, Mark A. //Carlos, Mark F. //Miller, Ronnie //Godinez, Valery, Physical Acoustics Corp, Princeton Junction, NJ, USA, Acoustic Emission Structural Health Management Systems (AE-SHMS), Nondestructive Evaluation of Aging Aircraft, Airports, and Aerospace Hardware IV, Mar 7-Mar 8 2000, Newport Beach, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 2000 3994, 128-137

Many of today's methods of inspecting structures are very time consuming, labor intensive and in many cases (due to limited access), impractical. In addition, long shutdown times are required to perform the inspections, thus creating tremendous expenses associated with manpower, materials and lost production. With continuing advances in signal processing and communications a significant interest has been shown in developing new diagnostic technologies for monitoring the integrity of structures with known defects, or for detecting new defects, in real time with minimum human involvement. The continued use of aging structures, especially in regard to the airworthiness of aging aircraft, is a major area of concern. Recent developments in both active and passive Acoustic Emission monitoring as an advanced tool for `Structural Health Management Systems (SHMS)', are illustrated by using two recently developed acoustic emission systems; the Acoustic Emission-Health and Usage Monitoring System (AE-HUMS) helicopter drivetrain health monitoring system, and the Acoustic Emission Flight Instrument System (AEFIS) composite health monitoring system. The data collected with these types of systems is processed with advanced data screening and classification techniques, which are employed to take full advantage of parametric and waveform-based acoustic emission. Acoustic emission structural health management systems (AE-SHMS) Acoustic emission-health and usage monitoring system (AE-HUMS) Acoustic emission flight instrument system (AEFIS)

Journal Long Form, 29, Walthall, Charles L. //Halthore, Rangasayi N. //Loechel, Sara E. //Elman, Greg C. //Markham, Brian L. U.S. Dep of Agriculture, Beltsville, MD, USA, Measuring aerosol optical thickness with a helicopter-based sunphotometer, IEEE Transactions on Geoscience and Remote Sensing, 2000, 38, 3, 1410-1416 IGRSD2, 0196-2892

The use of airborne sunphotometers and radiometrically calibrated sensors with fixed wing remote sensing platforms is a reliable method for obtaining atmospherically corrected surface reflectance. Here we describe a variation of such an instrument for use with helicopters. This system tracks the sun once positioned within 30$DGR of the solar disk. The electronics sample fast enough to collect data between passes of the rotor blades. Calibration for converting voltages to atmospheric transmittance was via the

Langley plot method and by intercomparison with calibrated surface sunphotometers. Aerosol optical thickness can be inferred at discrete wavelengths in the visible and near-infrared portions of the spectrum. Aerosol optical thickness data collected with the system agrees reasonably well with data collected using other surface-based sunphotometers. Aerosol optical thickness Sunphotometer Langley plot method Airborne measurements

Journal Long Form, 30, Celi, Roberto, Univ of Maryland, College Park, MD, USA, Optimization-based inverse simulation of a helicopter slalom maneuver, Journal of Guidance, Control, and Dynamics, 2000, 23, 2, 289-297, JGCODS, 0731-5090

An inverse simulation methodology based on numerical optimization is presented. The methodology is applied to a simplified version of the slalom maneuver in the ADS-33D helicopter handling qualities specification. The inverse simulation is formulated as an optimization problem with trajectory and dynamic constraints, pilot inputs as design variables, and an objective function that depends on the specific problem being solved. A maximum speed solution is described. The results show that numerical optimization is a reliable and flexible tool for inverse simulation, both when the required trajectory is prescribed explicitly and when it is defined indirectly through geometric and dynamic constraints. When the trajectory is defined indirectly, there is not a single acceptable trajectory, but rather an entire family with noticeable differences in the helicopter dynamics and in the required pilot inputs. Even when the trajectory is prescribed explicitly, multiple solutions exist. For handling qualities studies, the multiple solutions may provide an indication of the amount of scatter in pilot ratings to be expected for a given aircraft and a given maneuver. However, if the inverse simulation is used for simulation validation, then additional constraints may have to be placed on the solution to make it unique. Slalom maneuver Inverse simulation

Conference Proceeding, 31, Miki, Norihisa //Shimoyama, Isao, Univ of Tokyo, Tokyo, Jpn, Magnetic rotational micro-wings applicable to microrobots, 1999 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'99): Human and Environment Friendly Robots whith High Intelligence and Emotional Quotients', Oct 17-Oct 21 1999, Kyongju, South Korea, IEEE, Piscataway, NJ, USA, 1999, 2, 721-726

As the method of mobility for microrobots flight is more advantageous than walking due to the scale effect. In this work the flight mechanism that gains thrust by rotating magnetic wings in an alternating magnetic field is proposed. Micro-sized models whose wings are around 1 mm long were fabricated using MEMS technology. The wings are made of electroplated nickel or cobalt-nickel alloy, and a thin glass rod is attached to the center as an axis of rotation. The glass rod is inserted into a small glass tube which works as an outer bearing. The 0.9mm long micro-wings which weighs about 0.165mg succeed in taking off at a rotating frequency of 570Hz. It is estimated that 1.2mm long micro-wings can lift up 0.6mg at a rotating frequency of 600Hz. A small helicopter which has the rotational wings, a glass tube, a soft magnetic body, and polyimide legs was fabricated. It succeeded in flying up to the 1 cm high guides with its attitude stable., Microrobots Magnetic rotational micro wings Microfluidics

Journal Long Form, 32, Yang, Chao //Hong, Guanxin, Beijing Univ of Aeronautics and Astronautics, Beijing, China, Inflow models in trim and dynamics response of helicopter, Beijing Hangkong Hangtian Daxue Xuebao/Journal of Beijing University of Aeronautics and Astronautics 1999, 25, 5, 539-542BHHDE8, 1001-5965

For the current helicopter with single main rotor and tail rotor, the effects of inflow model with different characteristics on trim of helicopter and digital simulation of flight were discussed. Based on Pitt/Peters' first order dynamic uniform inflow mode, the effects of uniform and uniform inflow models of main rotor on helicopter trim and dynamic response to pilot control input at different forward flight speed state were analyzed, which could provide reference to chose the proper inflow model of main rotor for numerical simulation of different flight. The simulation results for UH-60A Black Hawk helicopter as an example were given., Inflow dynamics Trim

Journal Long Form, 33, Varnes, David //Duren, Russ, USN, Monterey, CA, USA, Pilot and crew aids for the H-60 helicopter, AIAA/IEEE Digital Avionics Systems Conference - Proceedings, 1999, 1, 4.D.4-1 - 4.D.4-8, ADACFY

The Naval Postgraduate School is cooperating with personnel at the Naval Air Warfare Center Aircraft Division (NAWCAD) in the development of application software for an intelligent kneeboard system to provide a multiple pilot and crew aids for the H-60 series of helicopters. NAWCAD personnel have already deployed a first generation kneeboard system that provides a moving map function. This system is completely self-contained. A second-generation system has recently been developed that is integrated into the H-60 avionics system via the MIL-STD-1553 bus. The newer system will provide the opportunity to add many new features to aid the pilot and crew of the helicopter. Some of the features being investigated include ground proximity warning system (GPWS) based on a 3D terrain database, traffic alert and collision avoidance systems (TCAS), and electronic information display, i.e. checklists, approach plates and other general aviation information. This paper focuses on work at the Naval Postgraduate School to develop a software program to detect the presence of vortex-ring state (VRS), an aerodynamic phenomenon associated with helicopters. Ground proximity warning system Electronic information display Vortex ring state

Journal Long Form, 34, Hussain, M.A. GE Research & Development Cent and Benet Labs, Menands, NY, USA, HRR, length and velocity decision regions for rapid target

identification Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3810 40-52PSISDG, 0277-786X

For the case where only available information is High Resonance Resolution (HRR), a high dimension Bayesian classifier was designed for the multi-class problem with empirically obtained threshold levels. The statistical separability of different classes was checked with Bhattachariyya distance for various signal to noise ratios. Based on the obtained results, the procedure was extended to rotary wing classification based on the modulation of the signature. Rapid target identification Bayesian classifier Bhattachariyya distance Pulse repetition interval High range resolution

Journal Long Form, 35, Patel, Vijay V. //Datta, K.B. CAIR, Bangalore, India, Robust optimal controller for a helicopter model, IETE Journal of Research, 1999, 45, 2, 103-112, 0377-2063

An unaugmented (open-loop except for the pilot) helicopter exhibits unacceptable responses in the hover. The responses to the collective, longitudinal and lateral cyclic, and pedals are highly coupled and unstable in the hover. Pilot work load is high and precise control is difficult without augmentation. In this system, robustness is a primary issue because of model uncertainty. In this paper, polynomial H$-$INF$/ control theory is applied to design a robust controller for a CH-47 helicopter and the results are analyzed with singular value plots showing that H$-$INF$/ design technique gives us superior results. Singular value plots

Journal Long Form, 36, Miller, C.A. //Hannen, M.D. Honeywell Technology Cent, Minneapolis, MN, USA, Rotorcraft Pilot's Associate: Design and evaluation of an intelligent user interface for cockpit information management, Knowledge-Based Systems, 1999 12, 8, 443-456 KNSYET, 0950-7051

The US Army's Rotorcraft Pilot's Associate (RPA) program is developing an advanced, intelligent `associate' system for flight demonstration in a future attack/scout helicopter. A significant RPA component is the intelligent user interface known as the Cockpit Information Manager (CIM). This paper describes the high-level architecture of the CIM, with emphasis on its pilot-perceptible behaviors: Crew Intent Estimation, Page Selection, Symbol Selection/Declutter, Intelligent Window Location, Automated Pan and Zoom, and Task Allocation. We then present the subjective results of recent full mission simulation studies using the CIM to illustrate pilots' attitudes toward these behaviors and their perceived effectiveness. Intelligent user interfaces Cockpit information management (CIM)

Journal Long Form, 37, Murphy, Kevin //Goldblatt, Scott //Warren, Jeffery //Chapman, Rickey //Hemler, James //Mitchell, Craig //Moe, George, Johns Hopkins Univ Applied Physics Lab, Laurel, MD, USA, Pointing and stabilization system for use in a high altitude hovering helicopter, Proceedings of SPIE - The International Society for Optical Engineering 1999, 3692, 23-32, PSISDG, 0277-786X

A pointing and stabilization system was developed and flight tested. The longest test sequence to date is a 30 minute long hover at 7000 ft altitude during which the payload was starting at a fixed aim point. During this half-hour period, pilots maintained the helicopter at its hover point within a circle of about 150 meters radius. The results confirm that the system provides a unique research capability to observe ground phenomena from a fixed airborne perspective and to register the resulting data into fixed ground coordinates. Pointing and stabilization system High altitude hovering helicopter Optical payload Commercial off the shelf Pilot

Journal Long Form, 38, Haas, Ellen C. U.S. Army Research Lab, Aberdeen Proving Ground, MD, USA, Can 3-D auditory warnings enhance helicopter cockpit safety?, Proceedings of the Human Factors and Ergonomics Society 1998, 2, 1117-1121, PHFSDQ, 0163-5182

The design and use of 3-D auditory warning signals can potentially enhance helicopter cockpit safety. A study was conducted to determine how quickly helicopter pilots could respond to helicopter malfunction warning signals in a simulated cockpit environment when four different signal functions (fire in left engine, fire in fight engine, chips in transmission, shaft-driven compressor failure) were presented in three different presentation modes (visual only, visual plus 3-D auditory speech signals, visual plus 3-D auditory icons). The dependent variable was pilot response time to the warning signal, from the time of signal onset to the time that the pilot manipulated the collective control in the correct manner. Subjects were 12 U.S. Army pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the U.S. Army. Results indicated that signal presentation was the only significant effect. Signal function and the signal presentation x signal function interaction were not significant. Post hoc test results indicated that pilot response time to the visual signals supplemented with 3-D audio speech or auditory icon signals was significantly shorter than that to visual signals only. The data imply that 3-D audio speech and auditory icon signals provide a safe and effective mode of warning presentation in the helicopter cockpit. Auditory warnings

Journal Long Form, 39, Vaden, Eric A. //Westerlund, Ken K. //Koonce, Jefferson M. //Lewandowski, William, FlightSafety Int, Daytona Beach, FL, USA, Use of a personal computer-based aviation training device in ab initio flight training, Proceedings of the Human Factors and Ergonomics Society, 1998, 2, 1374-1377 PHFSDQ, 0163-5182

A personal computer-based aviation training device (PCATD) was used to train 63 ab initio flight students. Thirty-nine foreign airline trainees and 24 students from the U.S. participated in approximately 10 hours of basic VFR training between the completion of their ground school course work and flight lessons. All PCATD training followed a strict syllabus and was instructor-led. After the completion of their PCATD training, students followed the traditional flight lesson syllabus and training performance was tracked up to private pilot certification. Dual flight hours prior to the first solo flight, landings prior to the first solo flight, dual flight hours between the first solo flight and private certification, and landings between the first solo flight and private certification provided dependent variables for this study. The results suggest that the PCATD training was effective in improving training performance for some students. Those most influenced were students who traditionally require substantially more training prior to solo and private certification than that called for by the syllabus used at the facility where this study was conducted. Results also indicate that, as expected, the PCATD exposure had the greatest impact on training performance prior to solo. Personal computer-based aviation training device (PCATD)

Journal Long Form, 40, Heers, Susan T. //Casper, Patricia A. Monterey Technologies, Inc, Los Gatos, CA, USA, Subjective measurement assessment in a full mission scout-attack helicopter simulation, Proceedings of the Human Factors and Ergonomics Society, 1998, 1, 26-30, PHFSDQ, 0163-5182

A full mission helicopter simulation was conducted in support of the US Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration. Four crews flew four doctrinally correct scenarios under two mission equipment package conditions. The Advanced Mission Equipment Package (AMEP) contained additional equipment and longer sensor ranges than the Baseline Mission Equipment Package (BMEP). Following each run, pilots filled out the NASA Task Load Index (TLX) workload scales and a perceived situation awareness (SA) scale. TLX ratings were lower for the AMEP, while SA ratings were higher for the AMEP. A similar inverse relationship was found in the scenario effects. A stepwise multiple regression found a significant relationship between SA ratings and three of the component TLX subscale ratings. Both perceived workload and situation awareness ratings indicate a benefit from the advanced technologies available on the AMEP. These measures were also sensitive to the varying demands of the scenarios and pilot responsibilities. Situation awareness Mission performance measures

Journal Long Form, 41, Feary, Michael //Sherry, Lance, SJSU/NASA Ames Research Cent, Moffett Federal Airfield, CA, USA, Evaluation of a formal methodology for developing aircraft vertical flight guidance training material Proceedings of the Human Factors and Ergonomics Society 1998, 1, 72-76 PHFSDQ, 0163-5182

Aircraft automation, particularly the automation surrounding vertical navigation, has been cited as an area of training difficulty and a source of confusion during operation. A number of incidents have been attributed to a lack of crew understanding of what the automation is doing. This paper describes the translation of information from a formal methodology used in design of an automated vertical guidance system to a training package, and an experiment that tested the new training. This study is part of a larger project to improve the recognition and understanding of the `objectives and behaviors' of automated systems through a formal methodology. The formal method, referred to as the operational procedures methodology, integrates the design of the system with the design of the training and display information requirements for that system (Sherry, 1995). The study utilized a training package designed to teach the vertical guidance portion of the Flight Mode Annunciator (FMA), as seen in normal operations of the Boeing MD-11. The results of the study showed that this type of training can be successfully delivered via a computer based training device. Additionally, a study in a full cockpit simulator showed that the training, coupled with the new display, provided significantly less errors on a simulated flight, although the training alone did not provide significantly better performance., Vertical navigation Flight Management Systems Flight Mode Annunciator

Journal Long Form, 42, Bodenhorn, Chris //Hess, Janice, Lockheed Martin Federal Systems, Owego, NY, USA, Transitioning Decision Aiding technology to the digitized battlefield, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1312-1320 PFASDL, 0733-4249

Decision Aiding technologies have been developed on the Army's Rotorcraft Pilot's Associate (RPA) Program to address the information overload problem. These technologies will provide the crew with the battlefield picture they need to complete their mission, continually monitor this dynamic picture for impacts to the mission plan, recommend changes to the mission plan, and help the crew execute these recommendations. The RPA Decision Aiding system architecture utilizes seven features that help to ensure these capabilities can be applied to many platforms of the digitized force. These features include encapsulating the Decision Aid within an interface layer, embedding much of the domain knowledge in data files, among others. Decision Aiding system

Journal Long Form, 43, Miller, Christopher A. //Guerlain, Stephanie //Hannen, Matthew D. Honeywell Technology Cent, Minneapolis, MN, USA, Rotorcraft Pilot's Associate Cockpit Information Manager: Acceptable behavior from a new crew member, Annual Forum Proceedings - American Helicopter Society 1999, 2, 1321-1332 PFASDL, 0733-4249

The U.S. Army's Rotorcraft Pilot's Associate program has been developing an advanced, intelligent `associate' system for flight test in a next-generation attack/scout helicopter. We have been involved in a portion of this effort devoted to the construction of an intelligent, adaptive interface known as the Cockpit Information Manager (CIM). This paper describes

the high level, task-centric architecture of the CIM and presents its pilot-perceptible behaviors: Crew Intent Estimation, Page Selection, Symbol Selection/Declutter, Intelligent Window Location, Automated Pan and Zoom, and Task Allocation. We also describe an innovation in the RPA program to facilitate crew integration with the associate - a simple crew coordination and task awareness visual display. We then present the subjective results of recent full mission simulation studies using the CIM to illustrate pilots' attitudes toward these behaviors and their perceived effectiveness, suggesting that the relatively high levels of pilot acceptance obtained may have been due, in part, to the addition of the crew coordination display. Cockpit Information Manager (CIM)

Journal Long Form, 44, Stiles, Peter N. //Vandenberg, John, Lockheed Martin Federal Systems, Owego, NY, USA, Dynamic optimal sensor employment, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1333-1345, PFASDL, 0733-4249

Searching for an object-of-interest from an aircraft is a generic problem. Examples include (1) search and rescue aircraft attempting to locate a downed pilot; (2) drug enforcement aircraft searching for small boats being used for smuggling; and (3) military reconnaissance aircraft searching for enemy tanks or air defense units. On the Rotorcraft Pilot's Associate (RPA) program, we have developed an automated decision aiding application addressing this generic problem of multiple aircraft, acting as a team, using onboard sensors to search for and locate vehicles on the ground. In the RPA context, the aircraft fly at low altitudes and scan with the radar only as much as needed to conduct an effective search. Due to terrain blockage, a given scan will miss areas on the ground that may harbor a vehicle. The problem is (1) to know what areas the sensor `saw' during a particular `look', (2) to keep track of areas that have already been searched, and (3) to determine how to optimally employ the sensor to continue and complete the search; i.e. when to use it, what direction to point it, what mode (e.g. field-of-view) it should operate in, and from what location and altitude it should be activated. By assisting the crew in performing these functions automatically, the area can be searched more quickly and carefully and with less risk to the crew. This paper describes the software solution developed on the RPA program, and provides a perspective on how it can be used operationally. Dynamic optimal sensors

Journal Long Form, 45, Benes, Reid //Robertson, Greta, Boeing Co, Mesa, AZ, USA, Rotorcraft Pilot's Associate test approach and results for Boeing simulation, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1346-1357PFASDL, 0733-4249

The Rotorcraft Pilot's Associate features a Cognitive Decision Aiding System (CDAS) developed to aid the crew during attack, reconnaissance, and special operations force missions. Periodic tests and evaluations of the system have been conducted since 1993 to provide customer and pilot feedback to the design team within the development cycles, as well as substantiate system performance. The first evaluations focused on isolating specific RPA behaviors in a very controlled test environment. As the system grew in both complexity and capability, the test team broadened the scope of each successive test, leading to Evaluation II (Feb/March 98) where a substantially complete system was tested in Part-task, Part-Mission and Full Missions, and finally the Performance Demonstration (July 98), which focused on Tactics, Techniques and Procedures (TTP) development in a strictly Full Mission environment. The overall test approaches including test objectives and test schedules will be discussed. Quantitative and some qualitative results will be presented for several key RPA features. Cognitive Decision Aiding System (CDAS)

Journal Long Form, 46, Dimitrov, George V. //Rippy, Lisa O. Aviation Applied Technology Directorate, Ft. Eustis, VA, USA, Rotorcraft Pilot's Associate: Technology for the battlefield of tomorrow, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1358-1363 PFASDL, 0733-4249

The Rotorcraft Pilot's Associate (RPA) Advanced Technology Demonstration (ATD) program has been initiated using artificial intelligence techniques and state-of-the-art computing technologies to manage and integrate next generation aircraft mission equipment and battlefield information, from both on- and off-board sensors. The program aims to enhance the lethality, survivability, and mission effectiveness of combat helicopters using `Associate Technology' and Cognitive Decision Aiding Systems (CDAS) to analyze the available information and provide options to the helicopter crew to help them best accomplish their objectives. RPA's CDAS contains detailed models of both the crew and the mission equipment/CDAS functions. Cognitive Decision Aiding System (CDAS)

Journal Long Form, 47, McBryan, Bernie //Joy, Mark, Boeing Co, Mesa, AZ, USA, Rotorcraft Pilot's Associate shared memory task network architecture, Annual Forum Proceedings - American Helicopter Society 1999, 2, 1364-1378, PFASDL, 0733-4249

The Army's Rotorcraft Pilot's Associate (RPA) program demonstrates knowledge based cognitive decision aiding (CDA) technology for existing and new helicopters. The RPA system uses symmetric multiprocessing software modules (agents) connected via a shared memory context model. To coordinate agents' modules and to provide real-time decision aiding, RPA uses a task network architecture (TNA) that includes run-time scheduling and dynamic task reallocation within a processor pool. The TNA is a software architecture or framework that supports the modeling of crew task activities, domain context, efficient prototyping, along with real-time operation in a multiprocessing system context. The TNA evolved from analysis and experience with the development and run-time requirements of the Air Force Pilot's Associate (PA) system, subsequent Army

Day/Night Advanced Pilotage System, and present RPA system. The current implementation is implemented in CPLUPLU on Silicon Graphics symmetric multiprocessing system using six of twelve processors. TNA consists of the data structures and constructs that enhance the developers' capability to define and implement the functionality of associate systems. This paper describes the detailed design of the Task Network Architecture on the shared memory symmetric multiprocessing system. Cognitive decision aiding (CDA) technology Task network architecture (TNA)

Journal Long Form, 48, Walz, Curtis //Brick, Scott //Bauer, Carl //Fischer, Doug, Boeing Military Aircraft & Missile Systems Group, Philadelphia, PA, USA, Nacelle control augmentation for tiltrotor flight directors, Annual Forum Proceedings - American Helicopter Society 1999, 2, 1477-1486 PFASDL, 0733-4249

Flight directors and autopilots have been successfully integrated into fixed and rotary wing aircraft for many years. Flight directors perform the basic task of translating flight guidance commands into a logical set of display symbology. The pilot responds to the display symbology and applies control system inputs to guide the aircraft along a desired flight path. A principal flight director design objective is to provide the pilot with precise flight path control and low workload, particularly when operating at night and/or in Instrument Meteorological Conditions (IMC). This paper discusses limitations of standard flight director symbology for the tiltrotor application and a design approach to supplement standard flight director symbology with nacelle control augmentation to accommodate the unique control characteristics of tiltrotor aircraft. An overview of the MV-22 tiltrotor flight director system is provided along with a description of three candidate types of nacelle control augmentation that were evaluated using man-in-the-loop simulation at the Boeing Flight Simulation Lab (FSL). This paper summarizes the results of an engineering trade study conducted to determine a nacelle control augmentation design approach for the MV-22 flight director system. Flight directors

Journal Long Form, 49, Kanbayashi, Hiroyuki //Tobari, Shigeru //Moriyama, Masami //Nakamura, Shuji, Advanced Technology Inst of Commuter Helicopter, Gifu, Jpn, Helicopter side stick controller Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1508-1514 PFASDL, 0733-4249

As one of its research themes, Advanced Technology Institute of Commuter Helicopter (ATIC), Gifu - Japan, is conducting a research and development of an Active Side Stick Controller (ASSC) which will provide pilot with a safer, more comfortable, and pilot-friendly flight control environments. This paper describes the system layout of the ASSC that has been built for evaluating its benefits on an experimental helicopter, Kawasaki BK117 Modified. This paper also outlines some of its technical features, including its unique function of back drive that enables a pilot to monitor movements of sticks during auto-pilot mode and also provides a potential function of interlocking between control sticks of a pilot and co-pilot. After reviewing some of the advantages which can be expected from the use of the ASSC, this paper concludes with a discussion of an ATIC's future study to integrate the ASSC with a flight management system. Active Side Stick Controller (ASSC) Flight control

Journal Long Form, 50, Haliscak, George, Kaman Aerospace Corp, Bloomfield, CT, USA, Vertical Reference Flight (VRF) the Kaman K-1200 `K-MAX' helicopter design, Annual Forum Proceedings - American Helicopter Society 1999, 2, 1515-1520 PFASDL, 0733-4249

External lift helicopter pilots in the commercial utility market depend upon Vertical Reference Flight (VRF) techniques. VRF simply means the pilot sees the external load, the pick-up and the delivery point, and the surrounding environment directly from the cockpit. Precision, speed, safety, and economy are the byproducts of using VRF techniques. The K-MAX helicopter is the only aircraft designed, built, tested, and certified for commercial external load operations with VRF as the principal design factor for operations. The cockpit is tailored inside and out for the pilot to see and fly the external load. The challenges of design, test, and operation with VRF have been overcome and the K-MAX has provided an efficient lifting platform that easily allows the pilot to directly view the external load operation. Vertical Reference Flight (VRF)

Journal Long Form, 51, Richards, Marvin K. //Kelley, E. Allen, Simula Technologies, Inc, Phoenix, AZ, USA, Development of a water impact dynamic test facility and crash testing a UH-1H aircraft onto a water surface, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 1653-1664, PFASDL, 0733-4249

Simula Technologies, Inc. and the U.S. Army Yuma Proving Ground have initiated an internally funded program to develop a test facility and test methodologies for conducting full-scale aircraft water dynamic impact tests. The test facility and test methodologies for conducting pure vertical impacts has been completed, and a combined vertical/longitudinal test facility is near completion. Methods of instrumentation and data acquisition have been developed and demonstrated. A 24-ft/sec vertical drop test of an instrumented UH-1H helicopter shell onto a water surface has been completed. This test indicated that water impacts can induce a relatively high acceleration onset rate when compared to ground impacts. A high acceleration onset rate, coupled with a lack of landing gear interaction with the impact surface, can increase the lethality of the crash in terms of occupant spinal loading and seat stroke required. Several UH-1H helicopter shells have been procured and are available for future water impact tests. The test facility is also capable of conducting full-scale vehicle crash impacts into other surfaces, if desired. Aircraft water dynamic impact tests

Journal Long Form, 52, Taghizad, A. //Bouwer, G. Office Natl d'Etudes et de Recherches Aerospatiales, Salon de Provence, Fr, Evaluation of helicopter handling qualities improvements during a steep approach using new piloting modes, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 2001-2009 PFASDL, 0733-4249

The paper describes the evaluation of two new piloting modes in term of handling qualities improvements during a helicopter steep approach. The new piloting modes are the Translational Rate Command (TRC) and the Speed & Glide Slope control (SGS). In order to simulate the behaviour of a BO 105 helicopter equipped with either the TRC or the SGS, two Conceptual Simulation Models (CSM) are developed and implemented on the DLR ground based simulator at Braunschweig. A steep approach scenario is also defined and is available on this simulator. The task consists of a dynamic descent of the helicopter from 500 m altitude to approximately 100 m with an average slope angle of $MIN@8$DGR@. Dynamic descent means that the slope angle, the heading and the speed are varying and the pilot has to follow these variations with a required precision. Handling Qualities investigations organized at Braunschweig with 4 pilots participation provided comparisons of the 2 piloting modes (TRC & SGS) with existing configurations (basic BO 105, RCAH : Rate Command Attitude Hold, ACAH : Attitude Command Attitude Hold). Good and promising results on TRC and SGS demonstrated the high interest of this kind of piloting modes in specific missions of helicopters where the trajectory control is primordial. Translation rate command (TRC) Speed and glideslope control (SGS) Handling qualities

Journal Long Form, 53, Jennings, S. //Craig, G. //Swail, C. //Kruk, R. Natl Research Council, Ottawa, Ont, Can, Contrasting effects of control system delay and visual system delay on helicopter pilot performance: Preliminary findings Annual Forum Proceedings - American Helicopter Society 1999, 2, 2041-2048, PFASDL, 0733-4249

Visually-coupled systems are designed to improve a pilot's ability to fly a helicopter in degraded visual environments. However, a display imaging system which does not provide accurate imagery with a minimal processing delay may be disorienting to the pilot. There is an extensive database relevant to control system time delay effects, however there are few direct comparisons of visual time delay and control time delay effects. An experiment was conducted in the variable stability NRC Bell 205 research helicopter to compare visual and control delays. Three hypotheses were examined: first, that a time delay in either the helicopter control system or the pilot visual feedback loop would increase pilot workload and increase pilot errors in the maintenance of aircraft position; second, that time delay in the visually coupled system will have greater performance effects due to disorientation and motion sickness effects that may be encountered with visual delay conditions in a dynamic environment; and third, that time delay effects would be more pronounced in tasks that require large aircraft pitch or roll rates near the ground. In order to test these hypotheses an image buffer was inserted into the video stream of a visually coupled system, which could add programmable pure time delays. Additionally, incremental time delays were programmed into the helicopter fly-by-wire control system. Pilots performed a series of standardized maneuvers to evaluate the effect of the delays on their ability to control the aircraft. The results show that visual and control system delays degrade performance an equivalent amount, however long video delays also increased the incidence of reported motion sickness symptoms. Helicopter pilots Control system delay Visual system delay

Journal Long Form, 54, Huff, Kip //Edwards, Eric, Boeing Co, Mesa, AZ, USA, Rotorcraft pilot's associate full-mission simulation architecture, Annual Forum Proceedings - American Helicopter Society 1999, 2, 2140-2154, PFASDL, 0733-4249

The Rotorcraft Pilot's Associate (RPA) program demonstrates cognitive decision aiding technology focused on aiding the Army aviation pilot in execution of attack, reconnaissance, and special operations forces (SOF) missions. The development, integration, and evaluation of this crew-aiding technology required a flexible, rapid-prototyping, full mission simulation system. The RPA Full Mission Simulation (FMS) was developed to meet these objectives. The RPA FMS architecture includes: dual crew stations, advanced controls and displays, advanced mission equipment package, tactical mission computer environment, manned team player stations, an area-of-interest head-tracked dome visual for the pilot, System Control, flexible data collection, large area terrain databases, and the RPA crew aiding system. The RPA FMS system is based on commercially available off-the-shelf (COTS) hardware and software with major system components hosted on Silicon Graphics symmetric multiprocessing computers. Full-mission simulation Special operations forces (SOF)

Journal Long Form, 55, de Waard, Pieter //Trouve, Michel, Natl Aerospace Lab NLR, Amsterdam, Neth, Tail shake vibration in flight: Objective comparison of aerodynamic configurations in a subjective environment, Annual Forum Proceedings - American Helicopter Society 1999, 2, 2306-2316 PFASDL, 0733-4249

Extensive computational fluid dynamic analysis and wind tunnel testing form part of the design of any new helicopter. Nevertheless, the so-called `tail shake' phenomenon is often encountered during early flight testing. A method is presented to characterize this wake related phenomenon in a tractable fashion. It is substantiated how a crew-correlated tail shake indicator was extracted from a subjective environment and developed into an objective characterization. Amongst other rotorcraft, it was applied to the NH90 helicopter, used in this paper to demonstrate the method. The differences between two early aerodynamic configurations tested are quantified and wake behaviour highlighted, using the so-called `$gamma@-$alpha plot'. It is concluded that the proposed method allows objective comparison and gives insight into wake behaviour, supporting engineering decisions during development flight testing. Tail shake Flight testing

Journal Long Form, 56, Ellerbrock, Philip John //Halmos, Zsolt //Shanthakumaran, P. Boeing Co, St. Louis, MO, USA, Development of new health and usage monitoring system tools using a NASA/Army rotorcraft, Annual Forum Proceedings - American Helicopter Society, 1999, 2, 2337-2348 PFASDL, 0733-4249

An airborne Health and Usage Monitoring System (HUMS) is being developed to acquire rotor and drive train loads in addition to vehicle flight parameter data. Advancements over previous systems include the addition of a partially wireless rotor data system and serially multiplexed smart digital strain sensors. The system has been integrated into the NASA/Army Rotorcraft Aircrew Systems Concept Airborne Laboratory (RASCAL) Sikorsky JUH-60A helicopter. This paper presents the development of a flight loads monitoring system using digital sensor technology, installed on the RASCAL aircraft to demonstrate the functionality of the system. Also presented are pre-flight tests and future research plans for the digital sensor technology. Health and usage monitoring system (HUMS) Digital strain sensors

Journal Long Form, 57, Galland, Philippe, EUROCOPTER, Marignane, Fr, How technology has served and will serve the cost reduction target, Annual Forum Proceedings - American Helicopter Society, 1999, 1, 1-11, PFASDL, 0733-4249

Operating costs have dramatically reduced during the helicopter pioneering phase from the fifties to the eighties. Cost efficiency means operating costs or life cycle costs which include effects of either production, development amortization, maintenance, insurance, crew or fuel. EUROCOPTER has emphasized operating cost reduction in its technology development and will continue to emphasize this operating cost parameter. The role of technology to reduce operating costs shows more than significant results, demonstrating that technology is a major contributor to the general objective `stop and reverse the spiraling cost of ownership and operation of the helicopter, ' which is defined from the beginning of any technology development. Operating cost reduction

Journal Long Form, 58, McBryan, Bernie //Joy, Mark, Boeing Co, Mesa, AZ, USA, Rotorcraft Pilot's Associate hierarchical planning, Annual Forum Proceedings - American Helicopter Society 1999, 1, 282-292 PFASDL, 0733-4249

The Army Rotorcraft Pilot's Association (RPA) program is a multi-year Advanced Technology Demonstration (ATD) program to demonstrate knowledge based cognitive aiding technology for existing and new helicopters. The planning system actively assists the crew in performing the mission and responding to unplanned events. A general overview of the RPA system and program is provided and the approach to hierarchical planning is described. Status is portrayed as a function of eight software build cycles. Hierarchical planning

Journal Long Form, 59, Schueler, Doug //Durkin, John //Funchion, Rick, Naval Air Warfare Cent, Patuxent River, MD, USA, Adaptation of a Ground Proximity Warning System for rotorcraft Annual Forum Proceedings - American Helicopter Society, 1999, 1, 293-299PFASDL, 0733-4249

Ground Proximity Warning Systems have experienced considerable success as a safety back-up device for fixed wing aircraft applications. Transferring this concept to a Rotorcraft, however, requires compensation for a type of aircraft that is intentionally flown at low altitudes, relatively slow airspeeds, and in most cases provides no definitive cues as it transitions to a landing or hovering state. The Naval Air System Command has chosen a system for selected helicopters in the Navy and Marine Corps inventory which has shown considerable promise during developmental and operational testing. The system incorporates a predictive warning algorithm which issues warnings based on the dynamic state of the aircraft rather than fixed altitudes alone. Other available features include a pilot selectable altitude warning, as well as warnings for excessive bank angle, gear-up landing, tailstrike, descent below ILS glideslope, and altitude loss immediately after takeoff. Predictive warning algorithm

Journal Long Form, 60, Miller, David G. //Lu, Yi //White, Fred //Osciak, Elizabeth M. //Roberts, Brad //Price, Robert //Wiedorn, Jon, Boeing Rotorcraft Div, Philadelphia, PA, USA, Flight simulation as a tool to develop V-22 slung load capabilities Annual Forum Proceedings - American Helicopter Society, 1999, 1, 619-636PFASDL, 0733-4249

Flight simulation activities contributing to development of the V-22 Osprey's externally slung load carriage capabilities are discussed. Configuration of the simulator, use of visual cues to indicate load motion to the pilot, the unique Lagrangian approach taken to mathematically model coupled load/aircraft dynamics and nonlinear elastic sling effects in real-time, and scope of piloted evaluations are described. Use of flight simulation as an exploratory tool to evaluate the unique capability of tiltrotor aircraft to carry external loads in high speed airplane mode flight is described. The role of piloted simulation in design of the V-22 external load autojettison system is also discussed. Interfaces between simulation activities and flight test planning and execution are chronicled from the standpoint of documenting the utility of simulation as a tool that can reduce flight test expenditures and risk. Correlation of simulation results with available flight test data is presented. Use of simulation to augment flight test results with the goal of providing generic flight envelopes applicable to the wide variety of loads to be carried by the V-22 is also illustrated. Coupled load/aircraft dynamics Nonlinear elastic sling effects

Journal Long Form, 61, Bradley, Roy //Turner, Graham, Glasgow Caledonian Univ, Glasgow, UK, Simulation of the human pilot applied at the helicopter/ship dynamic interface, Annual Forum Proceedings - American Helicopter Society, 1999, 1, 677-688 PFASDL, 0733-4249

The paper provides a review of the development of an algorithm to predict the control actions required to fly a given manoeuvre. The new algorithm, called SyCoS (Synthesis through Constrained Simulation), incorporates the crossover model to represent the pilots reflexive actions in terms of simple gain and delay parameters. In its final form the algorithm is referred to as the Compensatory Tracking Model (CTM) and has been implemented in the FLIGHTLAB environment for the study the control actions required for the launch and recovery of a helicopter to a moving ship in the presence of ship motion, airwake and turbulence. The results confirm that the SyCoS pilot can successfully carry out this task and replicate key aspects of the pilot strategy such as guidance and response to atmospheric disturbances. Other important features of the control activity which impact on pilot workload appear to he missing, however, indicating that further development of the SyCoS model is required before convincing predictions of workload can be obtained. Synthesis through constrained simulation (SyCoS) algorithms Compensatory tracking model (CTM) Software package FLIGHTLAB

Journal Long Form, 62, Rogers, Steven P. //Asbury, Charles N. //Haworth, Loran A. Anacapa Sciences, Inc, Santa Barbara, CA, USA, Development of a powerful but inexpensive helicopter flight simulator, Annual Forum Proceedings - American Helicopter Society, 1999, 1, 689-714 PFASDL, 0733-4249

This paper describes the design, development, and sample applications of a cost-effective, but powerful helicopter flight simulator. The Pilot/Rotorcraft Intelligent Symbology Management Simulator (PRISMS) has been developed to provide many of the features of simulators costing hundreds of times as much. An immersive, virtual reality approach has been used so that the pilot can turn his head to observe the aircraft or terrain in any direction. PRISMS offers head-tracked HMD symbology in screen-fixed, aircraft-fixed, and earth-fixed frames of reference, overlaying a gaming area of realistic terrain. PRISMS facilitates `quick-look' demonstrations, formal experiments, and training applications. The flight symbology, aircraft handling, and other characteristics are easily changed to suit the needs of the investigator. The system is portable for research or training in the field. This paper also describes the results of recent research conducted with 14 AH-64 Apache pilots in the evaluation of virtual waypoint and engagement area symbols as well as five other useful new HMD symbols. Pilot/rotorcraft intelligent symbology management simulators (PRISMS) Intelligent helmet-mounted display symbology

Journal Long Form, 63, Baker, Bill, Boeing Co, Mesa, AZ, USA, Rotorcraft Pilot's Associate (RPA) attack mission planner, Annual Forum Proceedings - American Helicopter Society, 1999, 1, 844-853PFASDL, 0733-4249

The US Army Aviation Applied Technology Directorate (AATD) launched a program to develop a system that can substantially improve a rotorcraft crew's ability to succeed during attack missions. Called the Rotorcraft Pilot's Assistance (RPA) Program, it can be effective during traditionally high crew tasking periods, such as those associated with the mounting and execution of a deliberate, synchronized attack operation, providing increases in the overall survivability and lethality of the attack team. Cognitive decision aiding systems Hierarchical task network architecture

Journal Long Form, 64, Ellis, D. Kris //Gubbels, Arthur W. Natl Research Council of Canada, Ottawa, Ont, Can, Development and flight testing of a command validation algorithm for a simplex fly-by-wire helicopter, Annual Forum Proceedings - American Helicopter Society 1999, 1, 1189-1197 PFASDL, 0733-4249

A full-authority experimental fly-by-wire flight control system is being installed on the Bell 412 HP helicopter, which operates as the Advanced Systems Research Aircraft of the National Research Council of Canada Flight Research Laboratory. The system will give the aircraft increased capability to perform handling qualities and control system research. It features a Health Monitoring Unit including a Command Validation Algorithm (CVA), which helps prevent the flight control computer from commanding the system actuators to a position that would place the aircraft in a potentially dangerous situation. The CVA employs a simplified mathematical model of the aircraft and an assumed pilot response to predict the attitude and altitude of the ASRA Bell 412. Flight testing Fly-by-wire flight control system Command Validation Algorithm (CVA) Flight Control Computer

Journal Long Form, 65, Hussain, M.A. GE Research & Development Cent, Menands, NY, USA, Application of Rayleigh quotients for rapid classification of rotary wing and fixed wing targets using high resolution radar signatures, Proceedings of SPIE - The International Society for Optical Engineering 1999, 3718, 267-275 PSISDG, 0277-786X

A new method of obtaining range profiles or frequency spectrums is presented. These spectrum do not sample zeros and are robust with respect to range motion or range registration. Based on the super-resolution methods, analysis is given for the Rayleigh's quotient procedure. It is shown that all the peaks of the range profiles are preserved and non of the zeros are sampled. High resolution radar signatures Rayleigh quotients

Journal Long Form, 66, Smeyne, Alan L. Litton Guidance & Control Systems, Northridge, CA, USA, Reconfigurable smart multi-function displays in an all-glass cockpit, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3690 73-82PSISDG, 0277-786X

Litton Guidance & Control Systems (G&CS) is the developer and supplier of Smart Multi-Function Display (SMFD) Systems. These programs include the UH-60Q, the SH-2G, the SH-60R, the CH-60, the EH-101, and others. The SMFD meets the all-glass cockpit requirements for the SH-2G(A), the SH-60R, and the CH-60 helicopters. The basic architectures for all-glass cockpit display systems are the centralized (dumb display or video monitor) and the distributed (smart display). Litton's SMFD has the flexibility to support either of these architectures as well as others. Litton's advantage comes from deploying a display system that provides Open System Architecture (OSA) for both hardware and software. With the OSA design philosophy, Litton's SMFD is easily customized by using a set of basic hardware modules which can be configured to provide the different functionality required by each aircraft type. The OSA design philosophy also accommodates future expansion and technological developments. This paper, showing the easy adaptation of the SH-2G display to meet the SH-60R and CH-60 requirements, demonstrates the advantages of Litton's OSA design philosophy. OSA is the key to providing the mix-and-match/plug-and-play of the existing modules, which also permits future growth. It is the versatility of the OSA framework that meets the bipolar requirements of the two system architecture types. Smart multifunction displays (SMFD) All-glass cockpits

Journal Long Form, 67, Kuklinski, Walter S. //O'Neil, Sean D. //Tromp, Laurens D. MITRE Corp, Bedford, MA, USA, Helicopter detection and classification using hidden Markov models Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3720 130-139PSISDG, 0277-786X

Hidden Markov models (HMMs) are probabilistic finite state machines that can be used to represent random discrete time data. HMMs produce data through the use of one or more `observable' random processes. An additional `hidden' Markov process controls, which of the `observable' random processes is used to produce an individual data observation. Helicopter radar signatures can be represented as quasi-periodic one-dimensional discrete time series that can be analyzed using HMMs. In the HMM helicopter detection and classification algorithm developed in this study, the states of the `hidden portion' of the HMM were used to represent time dependent alignments between the radar and helicopter rotor structures. For example, the times when specular reflections occur were used to define a `blade-flash' state. Since blade-flash frequency, and the corresponding non-blade-flash state duration, is an important feature in helicopter detection and classification, HMMs that allowed direct specification of state duration probabilities were use in this study. The HMM approach was evaluated using X-Band radar data from military helicopters recorded at Ft. A.P. Hill. After initial adaptive clutter suppression and blade-flash enhancement preprocessing, a set of approximately 1, 000 raw in-phase and quadrature (I/Q) data records were analyzed using the HMM approach. A correct target classification rate that varied between 98% for a PRF of 10 KHz to 91% at a 2.5 KHz PRF was achieved. Hidden Markov models (HMM) Automatic target recognition (ATR)

Journal Long Form, 68, Jennings, S. //Swail, C.P. //Craig, G. //Lasnier, S. Natl Research Council of Canada, Ottawa, Ont, Can, Integration and test of a high resolution helmet-mounted display, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3689, 188-196 PSISDG, 0277-786X

This paper describes the integration and proposed flight test of the Simulation Program for Improved Rotorcraft Integration Technology (SPIRIT) II helmet-mounted display on the National Research Council of Canada Bell 205 Airborne Simulator. The helmet-mounted display is a wide field-of-view (80$DGR@H$MUL@41$DGR@V with a 30$DGR binocular overlap) high resolution display (1280$MUL@960 pixels in each eye). Colors are displayed using a field sequential process, whereby green and red laser light is pulsed and directed onto the surface of a reflective ferro-electric liquid crystal display. The prototype helmet-mounted display overlays red, amber, or green symbology on monochrome green imagery obtained from high resolution daylight cameras. The optical design of the display does not form an exit pupil. This allows the wearer greater freedom in movement and comfort due to looser helmet fit tolerances. The helmet-mounted display was integrated with a head tracker and camera platform to form a visually coupled system on the National Research Council of Canada Bell 205. The integration process and flight test plan will be discussed. Helmet mounted displays (HMD) Head tracking

Journal Long Form, 69, Kedem, Sharon, Vision Systems Int, LLC, San Jose, CA, USA, Expanding the use of HMD for night missions using a modular design, Proceedings of SPIE - The International Society for Optical Engineering 1999, 3689, 90-97, PSISDG, 0277-786X

Helmet Mounted Displays have become a baseline requirement for every fixed wing jet and rotary wing aircraft. While designing a system to meet the requirements for daytime operation, it is equally important to think ahead and have embedded options to upgrade the system to have it support night missions. Combining the different requirements during day and night drive a design that has to fit both missions beyond reasonable volume and weight. This makes a modular approach a more ideal solution. The modular design enables the pilot to switch from a day configuration to the night configuration in seconds. This approach also allows the use of various modules, so the operator can pick the one that best fits his mission. Among these modules is the standard NVG, currently available in the squadron, which can be attached to the HMD shell. While allowing this flexibility, this design is also highly cost effective - each pilot has his own fitted helmet shell and the

display modules can be shared between all the pilots. Helmet mounted displays (HMD) Helmet mounted cueing system (HMCS)

Journal Long Form, 70, Rogers, Steven P. //Asbury, Charles N. //Haworth, Loran A. Anacapa Sciences, Inc, Santa Barbara, CA, USA, Evaluation of earth-fixed HMD symbols using the PRISMS helicopter flight simulator, Proceedings of SPIE - The International Society for Optical Engineering 1999, 3689, 54-65, PSISDG, 0277-786X

An experiment was conducted to compare performances on operational tasks with and without new earth-fixed symbology representing the positions of waypoints, battle positions, and engagement areas. Fourteen experienced AH-64 Apache pilots flew a representative attack mission in the Pilot/Rotorcraft Intelligent Symbology Management Simulator (PRISMS). Performances were significantly better in waypoint crossing accuracy, landing accuracy, engagement area recognition accuracy, and concealment from enemy positions when using the new symbols. Helmet mounted displays (HMD)

Journal Long Form, 71, Crowley, John //Johnson, Philip //Ledford, Melissa //Rash, Clarence, U.S. Army Aeromedical Research Lab, Fort Rucker, AL, USA, Simulating the degraded visual environment: Aeromedical assistance to an HMD research program, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3689 45-53, PSISDG, 0277-786X

In order to conduct helmet-mounted display (HMD) helicopter research flights in daylight, two versions of a simulated degraded visual environment (SDVE) were developed. SDVE-1 consisted of a tailored fire-retardant black cloth hood that is draped over the pilot's helmeted head and ventilated with a standard personal ventilator. While SDVE-1 successfully eliminated troublesome reflections, improved display readability, and was reasonably comfortable, pilots reported disturbing sensations of sensory deprivation and isolation. SDVE-2 combined colored filters on the hood and helicopter windscreen to allow the pilot a view of the cockpit interior while blocking light from the external environment. This system has been well accepted and has facilitated safe in-flight HMD research. Motion sickness remains an issue in HMD flight performance research. Helmet mounted displays (HMD) Motion sickness Disorientation

Journal Long Form, 72, Salmon, Neil A. Defence Evaluation and Research Agency, Malvern, UK, w-Band real-time passive millimetre-wave imager for helicopter collision avoidance Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3703 28-32PSISDG, 0277-786X

A w-band passive millimetre imager is proposed for use on a helicopter platform. The atmospheric transmission through fog and rain is much higher in the millimetre wave band than it is in the visible or infrared regions of the spectrum. This property enables passive millimetre wave imaging systems to offer recognizable imagery in adverse weather conditions. Furthermore, as the technique is based on incoherent imaging, it can be used in environments where it may be difficult for radar to process data into recognizable imagery. The 30 cm diameter real-time passive millimetre wave imager described here will have a radiometric sensitivity of around 1 $DGR@C and a radiation bandwidth of 80 GHz to 105 GHz. The system is based on the DERA mechanical scanning passive millimetre wave imager architecture. Passive millimeter wave imagers

Journal Long Form, 73, Jacot, A. Dean, Boeing Phantom Works-, Seattle, WA, USA, Shape Memory Alloy Consortium (SMAC), Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3674, 158-165, PSISDG, 0277-786X

The application of smart structures to helicopter rotors has received widespread study in recent years. This is one of the major thrusts of the Shape Memory Alloy Consortium (SMAC) program. SMAC includes 3 companies and 4 Universities in a cost sharing consortium funded under the Defense Advanced Research Projects Agency (DARPA) Smart Materials anti Structures program. This paper describes the objective of the SMAC effort, and its relationship to a previous DARPA smart structure rotorcraft program from which it originated. The SMAC program includes NiTinol fatigue/characterization studies, SMA actuator development, and ferromagnetic SMA material development (offering increased actuation speed). The paper summarizes the SMAC effort, and includes background and details on Boeing's development of a SMA torsional actuator for rotorcraft applications. SMA actuation is used to retwist the rotorcraft blade in flight, and results in a significant payload increase for either helicopters or tiltrotors. This paper is also augmented by several other papers in this conference with specific results from other SMAC consortium members. Torsional actuators Shape memory alloy actuations

Journal Long Form, 74, Purekar, A.S. //Pines, D.J. Univ of Maryland, College Park, MD, USA, Modeling damage in tapered flexbeams, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3668 I, 326-342, PSISDG, 0277-786X

Flexbeams in hingeless rotors have non-uniform geometries to form virtual hinges for the lead-lag and flap motions of blades. For bearingless rotors, the flexbeams also contain a virtual hinge for the pitch of the blades. Commonly, flexbeams are damaged through high cyclic and vibratory loadings. Damage in the form of delamination for composite beams degrade performance and can potentially cause catastrophic failure. This paper develops an analytical model of tapered rotorcraft flexbeams. In a beam of uniform cross section, the transverse dynamics of a beam can be characterized by four wavetypes. By tracking the progression of the waves along the beam and back again, the wavetypes can be used to model the response. A more practical application of these wavetypes is to use them in

a manner similar to shape functions for finite element analysis. The concept of a spectral element methodology is introduced for a uniform beam and then extended for an element with linearly varying width and thickness. A model of the delamination region is then incorporated into the spectral element methodology. Using this model for the dynamics of tapered beams, analytical results are then compared with experimental data for undamaged and damaged cases. Tapered flexbeams Hingeless rotors

Journal Long Form, 75, Friedmann, Peretz P. Univ of California, Los Angeles, CA, USA, Rotary-wing aeroelastic scaling and its implication for adaptive materials based actuation Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3668 I, 60-79PSISDG, 0277-786X

The aeroelastic scaling problem is revisited and it is shown that classical aeroelastic scaling relations, developed for flutter, need to be extended when dealing with modern aeroelastic applications, involving controls and adaptive materials based actuation. For such problems a novel two pronged approach is presented that produces refined aeroelastic scaling laws by a judicious combination of the classical approach with more sophisticated computer simulations. It is also shown that the rotary-wing equivalent to fixed-wing aeroelastic scaling, based on typical cross-section concepts, is the offset hinged spring restrained blade model. Scaling laws for the rotary-wing aeroelastic and aeroservoelastic problem are obtained. These scaling requirements imply that scale model tests, conducted on small models intended to demonstrate active control of vibration using adaptive materials based actuation, use very flexible models that often disregard aeroelastic scaling. Thus, the extension of these results to the full scale configuration is difficult. Rotary-wing aeroelastic scaling Adaptive materials

Journal Long Form, 76, Shaner, Mark C. //Chopra, Inderjit, Univ of Maryland, College Park, MD, USA, Design and testing of a piezostack actuated leading-edge flap, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3668, I, 50-59 PSISDG, 0277-786X

This paper presents the design and preliminary test results of a piezoelectric stack (piezostack) driven leading-edge flap actuator. The actuator uses six commercially available piezostacks with a curved contact tip for force and stroke profile tailoring. Force requirements were calculated using a quasi-steady aerodynamic model. Stroke amplification is achieved through a single lever. Initial results show that the current prototype is not ready to achieve the desired stroke output, but potential problems are identified and action is being taken to rectify these problems. Leading-edge flap High speed impulsive (HSI) noise

Journal Long Form, 77, Chen, Peter C. //Baeder, James D. //Evans, Robert A.D. //Niemczuk, John //Ross, Paul, Systems Planning and Analysis, Inc, Alexandria, VA, USA, Active twist smart rotor technology for blade-vortex interaction noise reduction, Proceedings of SPIE - The International Society for Optical Engineering 1999, 3668, I, 37-49, PSISDG, 0277-786X

The results of this feasibility study suggest that active blade twist technology is a viable means to reduce blade-vortex interaction (BVI) noise in rotorcraft systems. A linearized unsteady aerodynamics analysis was formulated and successfully validated with computation fluid dynamics (CFD) analysis. A simple control scheme with three control points was found to be effective for active BVI noise reduction. Based on current-day actuation technology where 1 to 2 degrees of twist per blade activation span is expected, measurable noise reductions of 2 to 4 dB were predicted for the relatively strong, close vortex interactions. For weaker vortex interactions, reductions of 7 to 10 dB were predicted. The required twist actuation per blade span for complete unsteady loading cancellation, however, may be infeasible because of the large stroke and high frequency activation requirements. Active twist smart rotor technology

Journal Long Form, 78, Ortel, Douglas J. //Balachandran, B. Lockheed Martin Technical Operations, Greenbelt, MD, USA, Control of flexural wave transmission through struts, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3668, II, 567-577 PSISDG, 0277-786X

In this study, the problem of controlling flexural waves transmitted through a cylindrical strut is addressed. This cylindrical strut is representative of a helicopter gearbox strut, which is attached at one end to the gearbox and at the other end to the fuselage. The primary disturbance is assumed to be transmitted from the end attached to the gearbox. Secondary forces are generated by a set of carefully positioned piezoelectric actuators, and feedforward and feedback schemes are used to determine the appropriate current inputs into these actuators. In one case, the control inputs to the actuators are chosen based on a performance function that includes the power supplied by the actuators to the strut. The abilities of the considered active control schemes to effectively attenuate the flexural displacements at the fuselage attachment end are examined and discussed. Future considerations for this work are also presented. Piezoelectric actuators

Journal Long Form, 79, Farrell, P.S.E. //Hollands, J.G. //Taylor, M.M. //Gamble, H.D. Defence and Civil Inst of Environmental Medicine, Toronto, Ont, Can, Perceptual control and layered protocols in interface design: I. Fundamental concepts, International Journal of Human Computer Studies, 1999, 50, 6, 489-520, IHSTEI, 1071-5819

Perceptual Control Theory (PCT) is a general psychological theory based on the tenet, 'All behaviour is the control of perception'. Layered Protocol Theory (LPT) can be seen as PCT applied to the special case of communication between cooperating partners, both controlling their own perceptions. PCT and LPT can be applied to the design and analysis of human-machine interfaces, although LPT may be more tractable in many cases. LPT is discussed in the context of the analysis and redesign of the interaction between a pilot and a Control Display Unit (CDU) in an operational helicopter. Perceptual control theory Layered protocol theory Control display unit

Conference Proceeding, 80, Miller, Christopher A. //Hannen, Matthew D. Honeywell Technology Cent, Minneapolis, MN, USA, User acceptance of an intelligent user interface: a rotorcraft pilot's associate example, Proceedings of the 1998 11th Annual ACM Symposium on User Interface Software and Technology, UIST-98, Nov 1-Nov 4 1998, San Francisco, CA, USA ACM, New York, NY, USA, 1999, 109-116

The U.S. Army's Rotorcraft Pilot's Associate (RPA) program is developing an advanced, intelligent 'associate' system for flight demonstration in future attack/scout helicopter. A significant RPA component is the intelligent user interface known as the Cockpit Information Manager (CIM). This paper describes the high level architecture of the CIM, with emphasis on its pilot-perceptible behaviors: Crew Intent Estimation, Page Selection, Symbol Selection/Declutter, Intelligent Window Location, Automated Pan and Zoom, and Task Allocation. We then present the subjective results of recent full mission simulation studies using the CIM to illustrate pilot's attitudes toward these behaviors and their perceived effectiveness. Intelligent user interface Cockpit information management Page selection Symbol selection declutter Automated task allocation Window location Intent estimation

Journal Long Form, 81, Hull, David M. //Vinci, Stephen J. U.S. Army Research Lab, Adelphi, MD, USA, Passive aircraft detection and noncooperative helicopter identification using extremely low frequency (ELF) electric field sensors, Proceedings of SPIE - The International Society for Optical Engineering, 1999, 3575, 134-145 PSISDG, 0277-786X

A new type of passive electric field sensor concept that measures extremely low frequency (ELF) electric fields shows promise for detecting low-flying aircraft near, for example, airport runways or national borders. Because different types of aircraft (jets, airplanes, and helicopters) exhibit different signature characteristics, this type of sensor allows basic target classification. Additionally, helicopters generate ELF electric fields with strong spectral lines corresponding to the rotation of the main and tail rotors, so that the sensor can perform passive, noncooperative helicopter identification. Arrays of these sensors can be used to estimate aircraft speed, direction, and height above the ground. We developed detailed 3-D models of an electrically charged helicopter and ground-based sensors, and simulated both target fields and sensor responses. We designed and built prototype sensors, which we used to collect data for various aircraft in the field; the collected signatures compare favorably with the simulated data. Our investigations to date indicate that these sensors naturally complement both fixed radars and distributed acoustic sensors; such a sensor could also be used alone as a low-cost and rugged alternative. This paper outlines the ELF sensor concept, the models, and the sensor hardware we used, and compares simulated and collected signatures. Electric field sensors

Journal Long Form, 82, Dudziak, Martin J. Silicon Dominion Computing, Inc, Richmond, VA, USA, Coordinated traffic incident management using the I-Net embedded sensor architecture, Proceedings of SPIE - The International Society for Optical Engineering, 1998, 3525, 404-416 PSISDG, 0277-786X

The I-Net intelligent embedded sensor architecture enables the reconfigurable construction of wide-area remote sensing and data collection networks employing diverse processing and data acquisition modules communicating over thin-server/thin-client protocols. The I-Net architecture lends itself to a critical problem in the management of both spontaneous and planned traffic congestion and rerouting over major intestate thoroughfares. Automated traffic management system (ATMS)

Journal Long Form, 83, Jones, Henry L. //Frew, Eric W. //Woodley, Bruce R. //Rock, Stephen M. Stanford Univ, Stanford, CA, USA, Human-robot interaction for field operation of an autonomous helicopter, Proceedings of SPIE - The International Society for Optical Engineering 1998, 3525, 244-251, PSISDG, 0277-786X

The robustness of autonomous robotic systems to unanticipated circumstances is typically insufficient for use in the field. The many skills of a human user often fill this gap in robotic capability. To incorporate the human into the system, a useful interaction between man and machine must exist. This interaction should enable useful communication to be exchanged in a natural way between human and robot on a variety of levels. This paper describes the current human-robot interaction for the Stanford HUMMINGBIRD autonomous helicopter. In particular, the paper discusses the elements of the system that enable multiple levels of communication. An intelligent system agent manages the different inputs given to the helicopter. An advanced user interface gives the user and helicopter a method for exchanging useful information. Using this human-robot interaction, the HUMMINGBIRD has carried out various autonomous search, tracking, and retrieval missions. Human-robot interaction Telerobotics

Journal Long Form, 84, Venkatesan, C. //Udayasankar, A. Indian Inst of Technology, Kanpur, India, Selection of sensor locations for active vibration control of helicopter fuselages, Journal of Aircraft, 1999, 36, 2, 434-442, JAIRAM, 0021-8669

Vibration control has always been a challenging problem to the helicopter designer. This paper addresses the problem of the formulation and solution of an active vibration control scheme for helicopters, based on the concept of active control of structural response. First, using a mathematical procedure employing the Fisher information matrix, optimum sensor locations have been identified in a three-dimensional model of a flexible fuselage structure. The reference parameters used in the selection process are the elements of a vector defined as the effective independence distribution vector and the condition number of the Fisher information matrix. It is observed that, irrespective of the excitation frequency, these optimally selected sensor locations experience relatively high levels of vibration. Then, using the measurement from these optimal sensor locations, a multi-input/multi-output control problem has been formulated and solved to obtain the active control forces required for vibration minimization in the helicopter fuselage. It is observed that sensor locations have a significant influence on the level of vibration reduction in a fuselage structure. Active control Fisher information matrix

Journal Long Form, 85, Hassan, Ah.A. //Thompson, Th. //Duque, E.P.N. //Melton, J. The Boeing Co, Mesa, AZ, USA, Resolution of tail buffet phenomena for AH-64D$+TM$/ Longbow Apache$+TM$/ Journal of the American Helicopter Society 1999, 44, 1, 16-25, JHESAK, 0002-8711

A cooperative numerical investigation involving researchers from McDonnell Douglas Helicopter Systems (MDHS), the US Army Aeroflightdynamics Directorate (AFDD) and the NASA Ames Research Center (ARC) was conducted to identify the cause, as well as the solution(s), to a pilot-reported horizontal and vertical tail buffeting problem on the Longbow Apache AH-64D helicopter in low speed descent flight. The investigation was conducted using the NASA Ames steady, three-dimensional, compressible Euler code, 'TIGER'. With the exception of the rotor, all geometric details of the flight test aircraft were modeled. Grid adaptation of a Cartesian computational grid near and on the surface of the configuration was used to preserve geometric integrity and solution accuracy. Flowfield diagnostics were performed using a combination of streamwise particle trajectories and cross flow vorticity plots. Numerical results indicated that two potential contributors, namely the blunt bases of the two side-mounted extended forward avionics bays (EFABS) and the bases of the two channel-like grooves created as a result of the attachment of the EFABS to the fuselage, were responsible for the shedding of high levels of vorticity which convected downstream and impacted the surfaces of the empenage. To reduce the observed levels of shed vorticity, three geometric modifications to the baseline helicopter fuselage configuration were made. A flight test program for the helicopter with a number of suggested modifications was conducted to verify their effectiveness on resolution of the tail buffet problem. Numerical results and supporting flight test data confirming the effectiveness of the geometric modifications are presented. Tail buffet

Journal Long Form, 86, Jones, J.G. //Padfield, G.D. //Charlton, M.T. Defence Evaluation and Research Agency, Bedford, UK, Wavelet analysis of pilot workload in helicopter low-level flying tasks, Aeronautical Journal 1999, 103, 1019, 55-63 AENJAK, 0001-9240

As part of a programme of research to improve mission effectiveness by studying pilot workload and task performance in mission-oriented flight tasks, a methodology has been developed in which wavelet analysis is used to extract information from records of vehicle response and of pilot control activity. By decomposing the records into discrete wavelets, components of vehicle agility and pilot workload are derived in the form of wavelet-based `quickness' parameters for vehicle agility and so-called `attack' parameters for pilot workload. It is shown how individual wavelet components in the records of pilot control activity, referred to as `worklets', can be associated with the sub-tasks of `guidance' and `stabilization'. It is demonstrated how these concepts can be applied to quantify changes in pilot control activity associated with increasing task difficulty or changes in aircraft handling qualities. Two examples are presented, one from a flight trial in which the task difficulty was increased by changes in a prescribed ground track and the other from a simulation trial in which an increased time delay was introduced into the response of the flight control system. Low level flying Flight control systems

Conference Proceeding, 87, Arumov, G.P. //Frolov, V.A. //Sidorov, I.M. //Veselova, G.V. //Bogomolov, V.P. //Myllyla, R.A. Russian Acad of Sciences, Moscow, Russia, Creating of control systems for dynamically complicated objects on the base of using of adaptive algorithms with a `model', Proceedings of the 1998 IEEE International Conference on Systems, Man, and Cybernetics. Part 5 (of 5), Oct 11-14 1998, San Diego, CA, USA, IEEE, Piscataway, NJ, USA, 1998, 5, 4382-4386

The authors of the paper propose the new principle solution of task on the automatic installation of loads during the assembly work with the help of helicopter. For this purpose, it was developed an original method and a special device - so-called universal platform that is fixed directly to a load and operates in complex with the helicopter. The platform's on-board computer uses a specially developed adaptive algorithm of control with `model'. This algorithm can provide a completely automatic correction of load and helicopter motion, in order to realize a smooth, highly accurate matching of the assembly points of the load and the support. In the paper it is described the platform control algorithm. It is also given a description of platform's construction and the main principles of its operating. It was shown that the platform with corresponding algorithm of control is a universal device and can operate on the Earth with any kind of lifting mechanism. Besides, the time of load assembly considerably reduces, the whole process of installation becomes more

simple and universal and does not requires a high experience of operator or pilot during the work. In Space, the platform may provide a high accuracy in the assembling of the complicated spatial construction at the orbital stations. As well, it may be used as a self-guided system in the process of approaching and docking of the spacecraft. Universal platforms

Conference Proceeding, 88, Yen, Gary G. USAF Phillips Lab, Kirtland AFB, NM, USA, Integrated health monitoring and control in rotorcraft machines, Proceedings of the 1995 Artificial Neural Networks in Engineering, ANNIE'95, Nov 12-15 1995, St.Louis, MO, USA, ASME, Fairfield, NJ, USA, 1995, 5, 885-890

We propose to design and evaluate an on-board intelligent health assessment tool for rotorcraft machines, which is capable of detecting, identifying, and accommodating various failure modes in rotorcraft machines under an adverse operating environment. A fuzzy-based neural network paradigm with an on-line real-time learning algorithm is developed to perform expert advising to the ground maintenance crew. A hierarchical fault diagnosis architecture is advocated to fulfill the time-critical and on-board needs in different levels of structural integrity over a global operating envelope. The research objective is to demonstrate the feasibility and flexibility of the proposed health monitoring procedure through numerical simulations of bearing faults in helicopter transmissions. Integrated health monitoring and control Rotorcraft machines

Journal Long Form, 89, Hindson, William S. //Chen, Robert T. N. NASA Ames Research Cent, Moffett Field, CA, USA, Operational tests of noise abatement approaches for rotorcraft using differential GPS for guidance, Journal of the American Helicopter Society, 1998, 43, 4, 352-359 JHESAK, 0002-8711

The NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) UH-60A Black Hawk helicopter was used to test the feasibility of using operational techniques to alleviate helicopter noise during approach to landing. Decelerating approaches were flown using multi-segment glidepaths. The approaches were designed to avoid flight conditions known to generate noise due to blade-vortex-interaction (BVI). A Local Differential Global Positioning System (LDGPS) was used for precision navigation, and guidance calculations were performed in an on-board computer. Steering commands were presented to the pilot using the existing electromechanical flight instruments of the UH-60A. Operational aspects of the noise abatement approaches were evaluated by pilots from NASA, FAA, and the helicopter industry. The methodology used to design the noise abatement trajectories is described, and navigation system and flight technical error data are reported. Multi-segmented glidepaths Local differential global positioning systems (LDGPS)

Journal Long Form, 90, Iseler, Laura, NASA Ames Research Cent, Moffet Field, CA, USA, Piloted simulator investigation of category A civil rotorcraft terminal area cockpit displays Journal of the American Helicopter Society 1998, 43, 3, 185-194 JHESAK, 0002-8711

A piloted simulation experiment was conducted in the NASA Ames Research Center Vertical Motion Simulator as a preliminary investigation of the use of integrated cockpit displays in terminal area operations for Category A civil rotorcraft. Category A is the transport category of rotorcraft which are required to be able to recover from an engine failure and continue flying. A UH-60 Black Hawk model was used for the simulation, with modifications made to the power available to simulate a civil rotorcraft. Hovering backups were flown from a confined area, raised vertiport site to a takeoff decision point (TDP), followed by normal flyout. Pilots flew the task with the standard Black Hawk instrument set of with one of two integrated formats presented on a color, panel-mounted display. Engine failures were randomly inserted slightly before and slightly after the TDP. The pilot was instructed to make a visual landback to the pad when an engine failed prior to reaching the TDP and to continue the flyout when an engine failed after passing through the TDP. Weather conditions were varied from calm, clear conditions to low visibility and ceilings, with crosswinds and turbulence. Evaluations were conducted with seven pilots. Objective and subjective data describing task performance and pilot workload were collected. It was hypothesized that even without the benefit of display assistance, pilots would achieve better performance handling an engine failure by using integrated displays during the all-engines-operating back up phase prior to the engine failure occurring. As expected, the pilots were able to maintain more precise flight path control during the backup with the integrated display. This precise control, in turn, placed the pilot in a better situation from which to handle an engine failure. Pilot recognition of the TDP location was also highly improved with an integrated display. Emergency landbacks, on runs using the integrated display during the backup portion, were all performed within the specified tolerances. Some of the landbacks using the standard instrument set, however, exceeded the adequate performance parameters. Cooper-Harper Handling Qualities Ratings confirmed that pilot workload was reduced and pilots were able to fly more consistently within the desired performance parameters with the integrated display than with the standard instruments and visual cues. Piloted simulators Civil rotorcraft Black Hawk helicopter Panel mounted display Engine failure Takeoff decision point

Book Whole, 91, Anon (Ed.)IEEE Comp Soc, Los Alamitos, CA, USA, 1998, 3499p, The proceedings contains 47 papers from the 1998 IEEE Aerospace Conference.

Topics discussed include: aircraft flight testing; aerospace test and evaluation; small satellites and enabling technologies; spacecraft design optimization; advanced launch vehicles; global positioning system (GPS) applications and technology; radio antennas; microwave antennas; radar remote sensing; space based radar (SBR); remote sensing-multi sensor; reflector antennas; and smart skin/reconfigurable phased-array antennas.

Military cockpits Air to ground targeting Rotorcraft flight testing Database terrain cueing Pilot induced oscillation (PIO) Rubidium atomic frequency standards Advanced launch vehicles Code division multiple access (CDMA) Space based radar (SBR) EiRev

Conference Proceeding, 92, Hill, Randall W. Jr. //Chen, Johnny //Gratch, Jonathan //Rosenbloom, Paul //Tambe, Milind, Univ of Southern California, Marina del Rey, CA, USA, Intelligent agents for the synthetic battlefield: a company of rotary wing aircraft, Proceedings of the 1997 9th Conference on Innovative Applications of Artificial Intelligence, Jul 27-31 1997, Providence, RI, USA, AAAI, Menlo Park, CA, USA, 1997, 1006-1012

We have constructed a team of intelligent agents that perform the tasks of an attack helicopter company for a synthetic battlefield environment used for running large-scale military exercises. We have used the Soar integrated architecture to develop: (1) pilot agents for a company of helicopters, (2) a command agent that makes decisions and plans for the helicopter company, and (3) an approach to teamwork that enables the pilot agents to coordinate their activities in accomplishing the goals of the company. This case study describes the task domain and architecture of our application, as well as the benefits and lessons learned from applying AI technology to this domain. Distributed interactive simulation Soar integrated architecture

Conference Proceeding, 93, Faibish, Sorin //Saban, Izhak, Univ. of Toronto, Toronto, ON, Can, New approach to laser image processing for dynamic scenes, Laser Radar Technology and Applications II, Apr 23-25 97, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1997, 3065 224-234, 0819424803

This paper presents the signal processing method of laser images used for detection of small collinear obstacles in helicopter airborne applications. It is very difficult, if not almost impossible, for a regular passive imaging sensor based on CCD/FLIR detectors to detect such small, remote objects. It was shown in the literature that the fusion of range and intensity data is needed for such a task. The paper presents a new and improved algorithm for real time image processing which enable detection of small tiny objects, from a fast moving platform. Two issues related to 3D visual sensing from laser sensors are addressed here. First, concerning the filtering and reduction of the large amount of data to be coped with for enabling real-time detection with low false alarm rate, in any ambient light conditions. Second, the fusion of range and intensity data for detecting small objects form cluttered data with high probability of detection. The preliminary experimental results show the potential of the proposed algorithm, based on spatio-temporal integration, to detect with high probability such objects like electrical cables from ranges of up to 400 meters. Dynamic scenes Forward looking infrared detectors

Conference Proceeding, 94, Malkoff, Donald B. Lockheed Martin Advance Technology Labs. Mt Laurel, NJ, USA, Evaluation of the Jonker-Volgenant-Castanon (JVC) assignment algorithm for track association, Signal Processing, Sensor Fusion, and Target Recognition VI, Apr 21-24 97, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1997, 3068, 228-239, 0819424838

The Jonker-Volgenant-Castanon (JVC) assignment algorithm was used by Lockheed Martin Advanced Technology Laboratories (ATL) for track association in the Rotorcraft Pilot's Associate (RPA) program. RPA is Army Aviation's largest science and technology program, involving an integrated hardware/software system approach for a next generation helicopter containing advanced sensor equipments and applying artificial intelligence `associate' technologies. ATL is responsible for the multisensor, multitarget, onboard/offboard track fusion. McDonnell Douglas Helicopter Systems is the prime contractor and Lockheed Martin Federal Systems is responsible for developing much of the cognitive decision aiding and controls-and-displays subsystems. RPA is scheduled for flight testing beginning in 1997. RPA is unique in requiring real-time tracking and fusion for large numbers of highly-maneuverable ground (and air) targets in a target-dense environment. It uses diverse sensors and is concerned with a large area of interest. Target class and identification data is tightly integrated with spatial and kinematic data throughout the processing. Because of platform constraints, processing hardware for track fusion was quite limited. No previous experience using JVC in this type environment had been reported. ATL performed extensive testing of the JVC, concentrating on error rates and run- times under a variety of conditions. These included wide ranging numbers and types of targets, sensor uncertainties, target attributes, differing degrees of target maneuverability, and diverse combinations of sensors. Testing utilized Monte Carlo approaches, as well as many kinds of challenging scenarios. Comparisons were made with a nearest-neighbor algorithm and a new, proprietary algorithm (the `Competition' algorithm). The JVC proved to be an excellent choice for the RPA environment, providing a good balance between speed of operation and accuracy of results. Jonker-Volgenant-Castanon assignment algorithm Multisensors Multitargets

Journal Long Form, 95, da Costa Ramalho, Marcus Vinicius //Waldmann, Jacques, Inst Tecnologico de Aeronautica, Sao Jose dos Campos, Braz, Otimizacao nebulosa com especificacao linguistica dos requisitos de desempenho: Aplicacao ao projeto TFL/LTR de autopiloto para helicoptero, Controle & Automacao, 1998, 9, 1, 9-17COAUFH, 0103-1759

A TFL/LTR-based autopilot design for the BO-105 rotorcraft is presented, aiming at the improvement of time response under a bob-up maneuver. The time-domain performance specs of the reduced-order model TFL are defined by use of linguistic variables. TFL synthesis is carried out with fuzzy optimization techniques and employing previous

knowledge of plant dynamics. LTR is accomplished via fuzzy optimization of filter parameters according to linguistic specs which define the admissible singul
ar value recovery error. The resulting autopilot is evaluated by simulation with the complete dynamical model, with rotor dynamics included. Good decoupling characteristics between latero-directional and longitudinal motions in the time-domain have been obtained, as well as robust behavior under structured perturbations with significant intensity at sensor outputs have been observed. Fuzzy optimization

Conference Proceeding, 96, Gubbels, Arthur W. //Carignan, Stephan J. R.P. //Erdos, Robert T. //Dion, Manfred, Natl Research Council of Canada, Ottawa, Ont, Can, Mechanical force override as an effective component of a research helicopter safety system, Proceedings of the 1998 54th Annual Forum. Part 1 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 1, 288-296

The design requirements for the safety system for the National Research Council Bell 412 fly-by-wire research helicopter includes the capability for the safety pilot to be able to mechanically override the FBW actuation system in the event of a jammed actuator, or the uncommanded full extension of an actuator. It was unknown what level of override force required in the system would be acceptable to pilots in an emergency situation. A piloted study was conducted on the NRC Bell 205 Airborne Simulator to determine if the required 15 lbf breakout force was acceptable. Cooper-Harper handling qualities ratings were assigned for the four mission task elements that were used to characterize recovery and landing from a failure during aggressive aircraft maneuvering. The study concluded that with the selected level of breakout force, it was possible to consistently conduct these tasks without danger of losing control of the aircraft, indicating that recovery and landing should be feasible under similar circumstances. Fly by wire (FBW) flight control systems Helicopter safety systems Mechanical force override

Conference Proceeding, 97, Benes, Reid, Boeing Co, Mesa, AZ, USA, Integrated three dimensional audio display for the Rotorcraft Pilot's Associate, Proceedings of the 1998 54th Annual Forum. Part 1 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 1, 267-271

Typical attack helicopter missions present multiple opportunities to increase the crew's situation awareness while not increasing channel saturation. The Rotorcraft Pilot's Associate (RPA) Three Dimensional Audio Display independently spatializes up to eight separate audio sources including the crew intercom, voice radio communications, and audio alerts. While research in the past has often focused on the improvements in target acquisition times provided by 3-D audio displays, the RPA design and implementation concentrated on the improvements in overall situation awareness that are possible through a more completely integrated cockpit audio display. In this immersive cockpit environment, the spatialized sounds and the related three dimensional visual information presented on the pilot's helmet mounted display coincide. This allows the pilot to combine the three dimensional audio and visual information into a natural, consistent, and coherent virtual environment that is representative of the real world mission situation. An examination of which alert types are aided most by the 3-D audio display will be studied. The effects of the 3-D audio system on situation awareness and crew coordination will be also be partially examined during more extensive full mission simulation evaluations of the RPA system scheduled for completion in March of 1998. Three dimensional audio display Helmet mounted displays (HMD) Multi function displays (MFD)

Conference Proceeding, 98, Moriarty, Brian J. //Zimmitti, Jonathan F. Kaman Aerospace Corp, Bloomfield, CT, USA, Design and certification of the K-MAX helicopter external personnel carrying device system, Proceedings of the 1998 54th Annual Forum. Part 1 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 1, 157-162

Kaman Aerospace Corporation has developed a Personnel Carrying Device System (PCDS) to transport essential crew using the K-MAX helicopter. The PCDS is attached to the exterior of the aircraft and is the first device to undergo certification under new draft regulations for FAR Part 27.865. The design and certification processes, as well as the test results, are discussed. The PCDS has completed all certification tasks to date and awaits final FAA flight. Personnel carrying device sy
stems (PCDS)

Conference Proceeding, 99, Kraay, Anthony G. //Pouliot, Michelle L. Boeing Co, Mesa, AZ, USA, Test and evaluation of the man-machine interface between the Apache Longbow$+TM$/ and an unmanned aerial vehicle, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 2, 1394-1400

The Boeing Company is studying a concept that involves teaming a manned rotorcraft, the Apache Longbow$+TM$/, with a unmanned air vehicle (UAV). During 1997 Boeing developed a preliminary man-machine interface between the Apache Longbow and an unmanned air vehicle. An early assessment of the man-machine interface in a virtual simulation environment was conducted. The study concentrated on the effects of crew workload during manned-unmanned teaming operations and acceptability of the design in terms of presentation of the data, functionality, and utility. A limited assessment of operational measures of effectiveness was also conducted. Subject pilots were satisfied with the man-machine interface, did not experience task overload and were able to perform UAV control tasks. Subjects did experience some difficulty with target acquisition and tracking, however. Initial data suggests that the potential exists to detect targets beyond the organic sensor range of current attack/reconnaissance rotorcraft without being exposed to threat detection. Unmanned aerial vehicles (UAV)

Conference Proceeding, 100, Leacock, G. R. //Thomson, D. G. Univ of Glasgow, Glasgow, UK, Helicopter handling qualities studies using pilot modelling and inverse simulation, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA AHS, Alexandria, VA, USA, 1998, 2, 1325-1336

A collaborative programme of research into helicopter handling qualities and mission effectiveness is currently underway in the UK, involving the Defence Evaluation and Research Agency, Glasgow Caledonian University and the University of Glasgow. This paper presents one contributing element to the programme, carried out at the University of Glasgow. The practice of using mathematical models to simulate pilot behaviour in one-axis stabilization tasks is a well known conventional simulation problem. In this paper an accepted mathematical model of a pilot is used as the controller of a rudimentary helicopter model. Test manoeuvre data from inverse simulation is used to provide time-histories for forcing functions to the pilot/helicopter system, and a constrained optimization routine is utilized to obtain values for the pilot gain and lead/lag equalization parameters. It will be shown that as the theoretical pilot is required to `fly' different manoeuvres, or indeed if the level of manoeuvre aggression is varied, the `pilot' adjusts these parameters to perform a tracking task in compensatory control. The paper considers initially the pilot and helicopter models and subsequently analyses the whole system, illustrating how the pilot model changes with different situations. Handling qualities

Conference Proceeding, 101, Stiles, Peter //Bodenhorn, Chris //Baker, Bill, Lockheed Martin Federal Systems, Owego, NY, USA, Decision aiding on Rotorcraft Pilot's Associate, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 2, 1212-1224

In the future data will be flooding into the cockpit from onboard sensors, offboard over-the-horizon and intelligence collection systems, and directly from friendly air and ground elements. Without onboard systems to help the crew analyze and use all this data, it will be overwhelming. Air crews will not be able to effectively understand what they face on the battlefield: who's out there, what issues require immediate attention, whether or not their current mission plan has been compromised, and what new plan would provide maximum advantage and minimum risk. However, with the right kind of decision aiding support, this data can dramatically improve survivability, lethality, and operational tempo. The Rotorcraft Pilot's Associate (RPA) team, sponsored by the U.S. Army Aviation Applied Technology Directorate (AATD) and comprised mainly of Boeing (MDHS) and Lockheed Martin (Federal Systems and ATL), has made significant progress in information management and decision aiding technology. This paper focuses on three aspects of RPA: (1) improved situation awareness provided by Data Fusion and Battlefield Assessment, (2) high-level mission replanning response controlled by the hierarchical Mission Planner, and (3) determination of optimal combat battle positions (CBPs) by the Attack Planner. High level mission replanning

Conference Proceeding, 102, Klein, Peter D. //Nicks, Colby O. Bell Helicopter Textron, Inc, Fort Worth, TX, USA, Flight director and approach profile development for civil tiltrotor terminal area operations, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 2, 1120-1133

Flight director guidance, display symbology, and approach profiles have been developed and evaluated at Bell Helicopter Textron Inc. using the XV-15 experimental tiltrotor aircraft. The aircraft was equipped with a limited authority digital stability and control augmentation system (SCAS) developed at Bell, a discrete nacelle control system that moves the nacelles to selected positions in response to pilot commands, a differential global positioning system (DGPS) airborne receiver and antennas, a flight director computer, and a liquid crystal display (LCD) in the left side of the instrument panel. Carrier phase differential corrections were used in the DGPS to determine aircraft position, altitude, and groundspeed. Flight director guidance laws were developed to control aircraft flight path, groundspeed, and configuration. Approach profiles that included reconversions from airplane to helicopter mode and glideslope angles of 6 and 9 degrees were evaluated. The aircraft and flight director system were used for the NASA/ARMY/Bell XV-15 acoustic test in June 1997 where profiles involving segmented glideslopes were executed. The profiles executed during the flight test evaluations and acoustic test are the first instrument flight rules (IFR) precision approaches flown in a tilt-rotor aircraft. Flight director guidance Stability and control augmentation systems (SCAS) Instrument flight rules Civil tiltrotor aircraft

Conference Proceeding, 103, Horn, Joe //Calise, Anthony J. //Prasad, J. V.R. //O'Rourke, Matt, Georgia Inst of Technology, Atlanta, GA, USA, Flight envelope cueing on a tilt-rotor aircraft using neural network limit prediction, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA AHS, Alexandria, VA, USA, 1998, 2, 1093-1104

This paper discusses a method for using neural networks to provide predictive flight envelope limit information. The method is applied to provide a tactile cueing system for normal load factor and angle-of-attack buffet limits on the V-22 tilt-rotor aircraft. The system was tested in real-time piloted simulation. Results show the system allowed the pilot to maneuver along the flight envelope boundaries without exceeding the limits. Results indicate that this approach has the potential to expand the effective safe maneuvering flight envelope of aircraft with structural load limits. Tilt rotor aircraft Flight envelopes

Conference Proceeding, 104, Carignan, Stephan J. R.P. //Gubbels, Arthur W. Natl Research Council of Canada, Ottawa, Ont, Can, Assessment of vertical axis handling qualities for the shipborne recovery task - ADS 33 (Maritime), Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 2, 1083-1092

Flight trials on the NRC Bell 205 Airborne Simulator were conducted at the Flight Research Laboratory to develop a vertical axis handling qualities criteria for a shipborne helicopter. A motorized vertical axis tracking mission task element was developed to simulate the high hover position of the flight deck landing task. The handling qualities resulting from the variation of heave damping and thrust to weight ratio were evaluated for deck motions associated with sea states 3 through 6. Desired performance was generally achieved with heave damping greater then $MIN@0.2 sec$+$MIN@1$/ provided that the thrust to weight ratio was high enough to enable the helicopter to match the flight deck vertical velocity. However for sea states 5 and 6, pilot workload, due primarily to collective activity, was sited as being too high for a Level 1 handling qualities rating. Further testing to establish suitable torque dynamics and verify roll requirements are proposed. Shipborne recovery tasks Vertical axis handling qualities Flight deck vertical velocity

Conference Proceeding, 105, Bickel, N. //Steinmaier, F. Eurocopter Deutschland GmbH, Muenchen, Ger, Design of a primary fly-by-light control system with a dissimilar redundant architecture, Proceedings of the 1998 54th Annual Forum. Part 2 (of 2), May 20-22 1998, Washington, DC, USA, AHS, Alexandria, VA, USA, 1998, 2, 916-928

This paper presents the design of a quadruplex redundant fly-by-light flight control system with dissimilar hard- and software for an EC135 helicopter for use in a research and technology demonstration program (ACT/FHS). This purpose implies a dual pilot concept with a safety and evaluation pilot leaving interaction priority to the safety pilot. As the reliability proof of such a new fly-by-light system in a helicopter is part of the ACT/FHS mission, a mechanical emergency backup has been still kept. The basic FBL system consists of 8 quadruplex inceptor stick sensors (4 axes for each pilot), a 4-lane control signal processing computer, 4 smart actuators for the pitch/roll/yaw/collective axis each containing a 4-lane actuator control electronic. An optional flight control computer can be attached for extended experimental or operational modes. The components communicate through optical links. Most benefits of a fly-by-light helicopter control system are seen in the reduced electromagnetic interference susceptibility of datalinks as well as in the adaptation flexibility due to handling qualities or aircraft configuration change requirements. Fly by light control systems Flight control

Book Whole, 106, Anon (Ed.), AHS, Alexandria, VA, USA, 1998 2, The proceedings contains 68 paper from the American Helicopter Society Annual Forum.

Topics discussed include: gear inspection; improved fuel isolation system (IFIS) beams; main rotor blades; peck drilling; thin wall machining; automated rotor blade surface finishing; rapid pilot interface development simulator; helicopter ground effect; military helicopters; seeded fault testing; helicopter transmissions; drive couplings; composite flexbeams; composite sandwich structures; smart rotor active control; automatic flight control system; avionics; aerospace fiber optics manufacturing; technology integration; helicopter skid gear dynamic drop analysis; bearingless rotor hub systems; rotor aerodynamics; flight mechanics; and tiltrotor aircrafts. Improved fuel isolation system (IFIS) beams Main rotor blades Automated rotor blade surface finishing Stability augmentation systems Helicopter integrated diagnostic system (HIDS) Drive system vibration monitoring Proprotor gearbox Tiltrotor aircrafts Helicopter tailboom EiRev

Journal Long Form, 107, Butler, Mark, FPT Industries Ltd, Portsmouth, UK, Design, manufacture and qualification of flexible fuel cells, Aircraft Engineering and Aerospace Technology, 1997, 69, 3, 241-246, AATEEB, 0002-2667

The increasing use of helicopters has naturally created demands for improved safety and performance from many of the aircraft's systems. If the passengers and crew are to survive a crash or even a `heavy landing', especially from the effects of a ballistic attack, it is vitally important that the aircraft fuel system is also crashworthy. Traditionally, flexible fuel cells have been employed which were constructed of fabric coated with nitrile rubber, with the emphasis being on constraining the forces involved, particularly in a forced landing. This understandably led to heavy fuel cells that were inflexible and difficult to install. Examines the new materials and techniques and the development of significantly lighter, more flexible systems in the construction of crashworthy cells and compares their characteristics and specifications. Flexible fuel cells

Conference Proceeding, 108, Braverman, A. S. Mil Moscow Helicopter Plant, Moscow, Russia, Operating cost reduction through helicopter cruise flight optimization, Proceedings of the 1997 53rd Annual Forum of AHS. Part 3 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 3, 133-138

The paper shows that optimization of prolonged flight conditions (cruise and high-endurance cruise) results in substantial fuel saving: up to 5-10%. Thus, fuel costs are also reduced. It gives the description of the device used in flight by the crew to define which of the flight conditions is optimal, shows how to control the main rotor speed in flight and how to perform actual flights under optimal flight conditions. It is proved that the capability to define optimal flight conditions results in a higher rate of climb and service ceiling of the

helicopter as well as in a lower rate of descent if one engine fails. The above capabilities plus the capability to determine exactly the range under actual flight conditions contribute to improved flight safety. Cruise flight optimization

Conference Proceeding, 109, Sarathy, S. //Schrage, D. //Losier, P. Clark Atlanta Univ, Atlanta, GA, USA, Investigation of excessive blade flapping in the Robinson R-22 helicopter, Proceedings of the 1997 53rd Annual Forum of AHS. Part 3 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 3, 12-19

The use of simulation models to aid in flight safety reviews and accident investigations is certainly not new. However, there have been very few instances of a completely new high fidelity model being developed in a extremely short time span, exclusively for the purposes of the investigations. This is all the more significant in the absence of relevant physical property data and well documented flight test data. The effort undertaken for the Federal Aviation Administration (FAA) Southwest region, covered the development of a simulation model, from ground up, as well as its validation using available data. This effort focused on investigating potential failure scenarios for the Robinson R-22 helicopter, which was under a FAA/NTSB Flight Safety Review. The results of the simulation indicate a sensitivity to abrupt pilot control inputs, consistent with the manufacturer's guidelines. In addition, some trends towards excessive flapping were observed, however, due to modeling assumptions and limitations of validation data, it was unclear if they were adequate to lead to failure. The preliminary results obtained, highlight a need to carry out further work, with a more refined version of this model, together with stronger validation using better documented flight test data. Excessive flapping

Conference Proceeding, 110, Gubbels, A. W. //Morgan, J. M. //Baillie, S. W. Natl Research Council of Canada, Ottawa, Ont, Can, Modifications to the NRC Bell 205 Airborne Simulator safety system in response to a recent incident, Proceedings of the 1997 53rd Annual Forum of AHS. Part 2 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 2, 1495-1502

The Bell 205 Airborne Simulator is a full authority fly-by-wire (FBW) research aircraft. On May 24, 1996 the NRC Bell 205 Airborne Simulator underwent a 4-axis actuator hardover upon engagement of the FBW system, with nearly catastrophic results. The sound design inherent in the current Bell 205 safety system allowed the safety pilot to override the FBW system and prevented the loss of aircraft and crew. However, during the resulting violent recovery, significant damage was caused to portions of the aircraft transmission mounting, drive shaft and intake bell mouth. Investigation has revealed that the likely cause of the hardover was the occurrence of a system reset in the VME-based flight control computer, which in turn caused a digital-to-analogue converter to reset to $MIN@10 volts, driving the aircraft actuators to full extension. As a result of this incident, many modifications were made to the Airborne Simulator safety system to prevent the reoccurrence of such an incident. Airborne simulators

Conference Proceeding, 111, Baillie, S. W. //Morgan, J. M. Natl Research Council Canada, Ottawa, Ont, Can, Preliminary investigation of the handling qualities of the Bell 412 HP helicopter during flight using night vision goggles, Proceedings of the 1997 53rd Annual Forum of AHS. Part 2 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 2, 1441-1451

The Bell 412 HP has an Automatic Flight Control System (AFCS) which has a limited authority attitude retention mode. Based on previous studies of the handling qualities of helicopters flown in degraded visual environments (DVE) and an investigation of the stability and control dynamics provided by the attitude retention system, the use of the attitude retention mode as a 'hands-on' flight control system may provide improved handling qualities for flight using night vision goggles. A limited scope, in-flight evaluation of the handling qualities of the Bell 412 HP, using a night vision goggle simulator and each AFCS mode, was performed to investigate this hypothesis. The results and pilot commentary demonstrate that the attitude mode does provide some improvement to the handling qualities of the aircraft during flight in DVE for some hover manoeuvring tasks. Certain aircraft characteristics, such as the high force gradient of the cyclic stick, and objectionable torque oscillations caused by the rotor rpm governor, prevent the aircraft from being rated as possessing Level 1 'satisfactory without improvement' handling qualities for ADS-33 hover manoeuvres in both degraded and undegraded visual environments. Flight control systems Night vision Night vision goggles

Conference Proceeding, 112, Hassan, A. A. //Thompson, T. //Duque, E. P. //Melton, J. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Resolution of tail buffet phenomena for AH-64D$+TM$/ Longbow Apache$+TM$/: a case study on the application of a modern CFD analysis tool for improved helicopter aerodynamic design, Proceedings of the 1997 53rd Annual Forum of AHS. Part 2 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 2, 1028-1048

A cooperative numerical investigation involving researchers from McDonnell Douglas Helicopter Systems (MDHS), the US Army Aeroflightdynamics Directorate (AFDD) and the NASA Ames Research Center (ARC) was conducted to identify the cause, as well as the solution(s), to a pilot-reported horizontal and vertical tail buffeting problem on the Longbow Apache AH-64D helicopter in low speed descent flight. The investigation was conducted using the NASA Ames steady, three-dimensional, compressible Euler code, 'TIGER'. With the exception of the rotor, all geometric details of the flight test aircraft were modeled. Grid adaption of a cartesian computational grid near and on the surface of the configuration was used to preserve geometric integrity and solution accuracy. Flowfield

diagnostics were performed using a combination of streamwise particle trajectories and cross flow vorticity plots. Numerical results indicated that two potential contributors, namely the blunt bases of the two side-mounted EFABS and the bases of the two channel-like grooves created as a result of the attachment of the EFABS to the fuselage, were responsible for the shedding of high levels of vorticity which convected downstream and impacted the surfaces of the empenage. To reduce the observed levels of shed vorticity, three geometric modifications to the baseline helicopter fuselage configuration were made. A flight test program for the helicopter with a number of suggested modifications was conducted to verify their effectiveness on the handling qualities of the aircraft. Numerical results and supporting flight test data are presented. Aerodynamic design Flowfield diagnostics

Conference Proceeding, 113, Schroeder, J. A. //Chung, W. W. //Laforce, S. NASA Ames Research Cent, Moffett Field, CA, USA, Effects of roll and lateral flight simulation motion gains on a sidestep task, Proceedings of the 1997 53rd Annual Forum of AHS. Part 2 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 2, 1007-1015

To represent coordinated maneuvers accurately in a ground-based flight simulator, the motion platform must translate laterally when it rolls. Typical platform lateral displacement limits often prevent an accurate representation of such maneuvers. The result is that the pilot receives an uncoordinated lateral specific force (ball not centered) when the model is not calculating one. This study examined the effects of these false uncoordinated roll-lateral motion cues when using a coordinated math model. The vehicle model represented a typical helicopter with satisfactory handling qualities in the roll-lateral axes. The task was a two-degree-of-freedom sidestep, in which the pilot controlled lateral position through roll attitude. Two gains varied in the motion platform control. One gain controlled the ratio between platform roll angle and math model (and thus visual) roll angle. The other gain controlled the amount of lateral platform movement, relative to the amount needed, to keep the apparent gravity vector aligned vertically about the pilot. Both gains varied from zero to one. With both gains equal to one, pilots evaluated the true 1:1 motion case, in which the motion cues matched the visual cues. As the motion cues degraded, both objective and subjective evaluations worsened. Pilot opinions of motion fidelity reasonably matched a combination of criteria developed previously. Roll motion Lateral motion Roll angle

Conference Proceeding, 114, Wroblewski, K. //Keller, K. McDonnell Douglas Aerospace, Mesa, AZ, USA, Rotorcraft Pilot's Associate Software development process, Proceedings of the 1997 53rd Annual Forum of AHS. Part 2 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA American Helicopter Soc, Alexandria, VA, USA, 1997, 2, 933-937

The Rotorcraft Pilot's Associate program is developing decision aids for the scout/attack rotorcraft. The program is sponsored by the U.S. Army Aviation and Applied Technology Directorate, Fort Eustis, VA. The decision aids include data fusion, situation assessment, defensive measures, flight or route planning, communications planning, attack planning, reconnaissance planning and mission execution aids. In addition a cockpit information manager aids in the presentation of information to two crew members. The RPA software development process is based on standard software practices but was tailored to the RPA domain and program needs. This paper describes the software development process from conceptual design to software requirement specification. A set of templates and a system architecture are used to guide the requirements development and software design across a team of contractor and government participants. These templates were derived from the domain and the goal for a pilot centered, 'associate' system. They also provide a consistent view or model of the system behavior regardless of the stage of development. Decision aids

Conference Proceeding, 115, Jewell, Wayne F. //Clement, Warren F. //Aponso, Bimal L. //Klyde, David H. Jewell Engineering, Inc, Los Gatos, CA, USA, Technical approaches to determine the minimum cues and fidelity requirements for real-time simulation of the rotorcraft/shipboard landing task, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 626-644

This paper describes the technical approaches that will be used to determine the minimum cues and fidelity requirements for real-time pilot-in-the-loop simulation of the rotorcraft/shipboard landing task. The test plan for this U.S. Navy-sponsored project includes the use of different simulation facilities, various mathematical models of the V-22 Osprey, and a variety of airwake and turbulence models of the flow field around the superstructure of a naval vessel. The various qualitative and quantitative metrics that will be used to define the minimum cues and fidelity requirements are also described in this paper. The results of the Phase I Small Business Innovative Research project are reported in Ref. 1. This Phase II effort will be completed in July 1998. Shipboard rotorcraft landing cueing operations

Conference Proceeding, 116, Williams, Suni //Long, Kurt, US Naval Test Pilot Sch, Patuxent River, MD, USA, US Navy's use of visual simulation technology to optimize and refine shipboard rotorcraft compatibility, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 607-625

The US Navy conducts shipboard Dynamic Interface (DI) test programs to evaluate the ability of helicopters to operate aboard various ship classes, and to determine limitations associated with such operations. This paper summarizes significant USN efforts that have

employed visual simulation technology, resident in the Manned Flight Simulator (MFS) facility, to improve shipboard rotorcraft compatibility. These efforts have included prototype visualization, design optimization visualization studies, manned flight simulation, and research efforts devoted to determining minimum cueing requirements for shipboard rotorcraft simulations. This paper also summarizes of work completed to date at MFS on an ongoing effort to determine the minimum visual cues necessary to conduct simulated shipboard rotorcraft launch/recovery operations. The visual cueing requirement effort investigates the impact of projected image size, ambient illumination, scene texture, and scene level of detail on a pilot's ability to conduct a simulated landing. Dynamic interface (DI) test program Manned flight simulators (MFS) Prototype visualization Shipboard rotorcraft compatibility Shipboard rotorcraft launch/recovery cueing operations Visual simulation

Conference Proceeding, 117, Hardesty, Mark //Metzger, Mark //Flint, Joe //Fredrickson, Daphne, McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Developmental test and evaluation of helicopters using a precision differential global positioning system, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 474-485

Development of new and innovative applications for high precision differential global positioning systems (DGPS) has exploded in the last two years. Real-time three-dimensional accuracy's of under three centimeters and processed position update rates in excess of four hertz, along with position update latencies of under eighty milliseconds are now commercially available. Immediate position information of this high accuracy and rate opens up tremendous possibilities for automated machine control applications. Over the last two years, MDHS has been developing the `Portable Test Range', a DGPS based aircraft position and velocity data archiving tool. When required, the system provides the flight crew with three-dimensional guidance and power cues integrated into a simple but highly effective flight director. The Portable Test Range has been used on numerous FAA certification flight test efforts, including noise certification, height-velocity curve development, and Category A profile development. In the Fall of 1996, the Portable Test Range was used as a flight director for a variety of complex landing approach profiles at NASA Crow's Landing airfield. This flight test program allowed for the simultaneous acquisition of laser position data, and was an opportunity to demonstrate the system to FAA, NASA, Army, and John Volpe Department of Transportation Technical Center staff. Certification of the `Portable Test Range' for all types of fixed wing and rotary wing flight test activities is ongoing. Velocity data archiving tools Flight tests

Conference Proceeding, 118, Cole, Jeffrey L. Sr. //Evans, Charles W. //Greenberg, Charles E. Sr. //Saal, Karl W. Sikorsky Aircraft Corp, West Palm Beach, FL, USA, Development and qualification of the S-76C$PLU helicopter with 30-second/2-minute OEI power ratings, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 450-462

The S-76C$PLU is the first U.S. manufactured helicopter to be certified in accordance with the FAA's new 30-second/2-minute OEI power ratings, and the first Sikorsky helicopter to be FAA/CAA certified to fully harmonized FAR/JAR-29 performance criteria. This paper discusses the joint Sikorsky/Turbomeca developments flight test effort commencing with the shipment of Sikorsky's S-76C test aircraft to Turbomeca's CGTM flight test subsidiary at Pau, France where it was converted into a `flying test bench' for Arriel 2S1 engine development. Concurrent with Turbomeca's engine development effort, custom engine FADEC software was developed and refined, applying the lessons learned during previous FADEC development testing to optimize S-76C$PLU@/Arriel 2S1 engine operating characteristics. Unique engine integration and pilot training features were developed to accommodate the new 30-second/2-minute OEI power rating structure. Upon completion of development testing, the S-76C$PLU test aircraft returned to Sikorsky's development flight center at West Palm Beach, Florida for low altitude, warm weather qualification testing, followed by cold weather testing at Fairbanks, Alaska, high altitude testing at Leadville, Colorado, and elevated helideck testing at a North Sea based oil drilling rig off the coast of Wick, Scotland. Helicopter power rating Software package FADEC One
engine inoperative (OEI)

Conference Proceeding, 119, Williams, Suni L. //Long, Kurtis R. US Naval Test Pilot Sch, Patuxent River, MD, USA, Dynamic interface flight tests and the pilot rating scale, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997 1, 438-449

The US Navy (USN) conducts Dynamic Interface (DI) shipboard rotorcraft tests to improve all aspects of shipboard rotorcraft compatibility. This paper summarizes current USN DI shipboard test methodology, test coordination, and data collection, reduction, and analysis techniques, emphasizing the unique piloting and test procedural requirements imposed by adverse shipboard operational conditions. The paper highlights technical challenges encountered during recent DI test programs, and summarizes innovative test methodologies currently employed to resolve those challenges. The paper discusses the USN's DI Pilot Rating Scale (PRS), which is a simplified version of the Cooper-Harper Rating Scale. The PRS is used as the major basis for evaluation of shipboard helicopter operational flight tasks, since it more adequately addresses the complicated mission task element interactions that occur in the shipboard environment. DI PRS development history, PRS category definitions, and DI PRS test usage examples are also discussed. PRS and Cooper-Harper Rating Scales are compared, emphasizing the impact of each on

both DI flight test operational efficiency and data validity. Dynamic interface (DI) shipboard helicopters Pilot rating scale (PRS) Cooper-Harper rating scale Flight tests

Conference Proceeding, 120, Murray, Jerry, Reticular Systems, Moffett Field, CA, USA, Environmental factors for I$+2$/ night vision device currency requirements, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 116-121

Improvements of night vision devices (NVDs) have made significantly easier to operate in the night tactical environment. However, the capabilities of these systems require that the methods for determining crew currency qualifications be reexamined. Skills developed with earlier systems greatly facilitated NVD operations. Most of these skills still apply to newer systems, however, the improved visual conditions in good conditions often do not require these skills. As a result, training in good conditions may not allow crews to maintain real proficiency. Currency is commonly determined a minimum number of flight hours using NVDs within a specified time. This leaves it to chance that the crew trains under the conditions that they are likely expected to operate. Requirements to maintain currency should explicitly state environmental factors for illumination and terrain luminance. Having a thorough understanding of a NVD system's capabilities and limitations, those responsible for managing flight training can assure the crews are prepared to operate in realistic operational conditions. Night vision devices (NVD) Terrain luminance

Conference Proceeding, 1, Swail, Carl //Kobierski, Robert, Natl Research Council, Ottawa, Ont, Can, Direct voice input for control of an avionics management system, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997 1, 109-115

This paper deals with the application of speech recognition in the helicopter cockpit environment. Direct Voice Input (DVI) avionics command systems, when employed properly, can reduce operator workload, enhance safety and improve situational awareness. A speaker-dependent connected speech recognition system has been developed at the National Research Council (NRC) and, in cooperation with the Canadian Marconi Company, integrated into an Avionics Management System (AMS). An operator interface was designed to allow manipulation of the communications functions of the AMS and was installed in the NRC Bell 412 helicopter. The system was evaluated during actual flight conditions by NRC and Canadian Forces pilots. Test scenarios included the use of a ground controller passing radio frequencies to the evaluation pilot who, while flying standard circuits, changed radio frequencies using the AMS either manually or by voice. The utility of DVI was also examined during a simulated operational mission. The average recognition accuracy of the system for pilots with a small amount of training on the use of DVI was 94.9%. Individual recognition scores varied from 88.4% to 99%. The system was determined to be valuable in improving safety and reducing workload in an eyes-out, high workload mission. Avionics management system (AMS) Direct voice input (DVI) avionics command systems Linear discriminant analysis (LDA) Mel scale filter banks

Conference Proceeding, 2, Oser, Randall L. //Stout, Rene'e J. //Tyler, Robert, Naval Air Warfare Cent Training Systems Div, Orlando, FL, USA, Assessing crew information requirements for advanced diagnostic and prognostic systems: Implications for interface and training design, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 97-10

Advanced diagnostic technologies that track and fuse sensor observables have been used to provide improved information for helicopter maintenance purposes. Because these systems can provide detailed information about emerging system anomalies, such systems have recently been considered for use during in-flight operations. Unfortunately, while important progress has been made in the area of technologies that can provide diagnostic information, very little is known about what information is actually required by the aircrews. One reason for the lack of knowledge is because few systematic approaches exist to structure and design investigations of the dynamic processes used by aircrews during complex task performance. The current paper will: (a) describe the concept of aircrew information requirements, (b) discuss a methodology that can be used to structure and guide investigations of aircrew information requirements, (c) present results from a test of the methodology using operational aircrews, and (d) outline the implications of the methodology for future interface and training design. Aircrew information requirements Diagnostic systems Prognostic systems

Conference Proceeding, 3, Andes, Robert C. Jr. Applied Systems Intelligence, Inc, Roswell, GA, USA, Assuring human-centeredness in intelligent rotorcraft cockpits: Using crew intent estimation to coordinate RPA functions, Proceedings of the 1997 53rd Annual Forum of AHS. Part 1 (of 3), Apr 29-May 1 1997, Virginia Beach, VA, USA, American Helicopter Soc, Alexandria, VA, USA, 1997, 1, 73-80

Intent interpretation is the process of identifying patterns of human operator behavior in order to form a causal explanation for observed actions in terms of the current objectives of the operator. The outputs of this process are utilized by intelligent subsystems to support changing operator goals in a dynamic environment. In this paper, the rationale and design for an intelligent Cockpit Intent Estimator (CIE) system for the Rotorcraft Pilot's Associate (RPA) is described. The CIE is an essential component of the RPA's crew-vehicle cockpit interface, known as the Cockpit Information Manager (CIM) function. Employment of the CIE in the associate allows the numerous, complex aiding functions of the RPA to remain `lock-step' with the crew as the mission unfolds. CIE interpretation

behavior, goal-processing activities, knowledge representation approach, and external communication mechanisms with other intelligent RPA subsystems are described with emphasis on CIE's essential role in the coordination of RPA functions to accurately follow the crew's lead and quickly regain coordination when the crew's intentions change. Of particular interest is the RPA team's significant accomplishment in the area of combining prescriptive, automated task coordination with descriptive, intent understanding for producing intelligent associate behavior. Cockpit intent estimator (CIE) systems Cockpit information manager (CIM) functions Causal explanation Intelligent rotorcraft cockpits

Journal Long Form, 4, Matthews, J. P. //Wismann, V. R. //Lwiza, K. //Romeiser, R. //Hennings, I. //De Loor, G. P. Univ of Wales, Wales, UK, Observation of the surface roughness characteristics of the Rhine plume frontal boundaries by simultaneous airborne thematic mapper and multifrequency helicopter-borne radar scatterometer, International Journal of Remote Sensing, 1997, 18, 9, 2021-2033 IJSEDK, 0143-1161

In this paper, we describe how high spatial resolution (10 m) multi-sensor remote sensing techniques can be used to study the surface roughness characteristics of large scale frontal boundaries (in this case associated with the Rhine Plume). The instrumentation employed in the research consisted of a Daedalus AADS 1268 Airborne Thematic Mapper (ATM) operated by the UK National Environment Council, the HELISCAT helicopter-borne multifrequency microwave scatterometer of the University of Hamburg, and research vessels (R.V.s) from the University of Wales and the Dutch Rijkswaterstaat. The data we present were gathered on 24 April 1991 when calm wind conditions developed within the test area. A sequence of thermal infrared images gathered by the ATM provides a record of the motion of a frontal boundary through this experimental region which is then used to identify the frontal signature in the HELISCAT data. ATM sunglint images show that the front is characterized by a zone of reduced surface roughness, some 75 m in width, which is detected on the `upstream' side of the front (as defined relative to the tidal flow direction), where surface current convergence can be expected. Radar backscatter levels at X and C bands are reduced by approximately 10 dB in this region but with increase in radar wavelength, the signature weakens and is rarely detected at L band. On crossing the front in the downstream direction, radar backscatter levels are rapidly restored. The available evidence indicates that the reduced backscatter signature is caused by a surface slick which is formed at the frontal interface rather than by short gravity wave damping from shear in local surface currents. Airborne thematic mapper (ATM) Multifrequency helicopter borne radar scatterometer Rhine plume

Journal Long Form, 5, Yen, Gary G. Oklahoma State Univ, Stillwater, OK, USA, Health monitoring of vibration signatures in rotorcraft wings, Neural Processing Letters, 1996, 4, 3, 127-137 NPLEFG, 1370-4621

We propose to design and to evaluate an on-board intelligent health assessment tool for rotorcraft machines, which is capable of detecting, identifying, and accommodating expected system degradations and unanticipated catastrophic failures in rotorcraft machines under an adverse operating environment. A fuzzy-based neural network paradigm with an on-line learning algorithm is developed to perform expert advising for the ground-based maintenance crew. A hierarchical fault diagnosis architecture is advocated to fulfill the time-critical and on-board needs in different levels of structural integrity over a global operating envelope. The research objective is to experimentally demonstrate the feasibility and flexibility of the proposed health monitoring procedure through numerical simulations of bearing faults in USAF MH-53J PAVE LOW helicopter transmissions. The proposed fault detection, identification and accommodation architecture is applicable to various generic rotorcraft machines. The proposed system will greatly reduce the operational and developmental costs and serve as an essential component in an autonomous control system. Fault detection Fault identification

Conference Proceeding, 6, Yen, Gary //Bui, Tuang, USAF Phillips Lab, Kirtland AFB, NM, USA, Health monitoring of vibration signatures in rotorcraft wings, Proceedings of the 1997 IEEE Aerospace Conference, Feb 1-2 1997, Snowmass Village, CO, USA, 1997 1, 279-288

We propose to design and to evaluate an on-board intelligent health assessment tool for rotorcraft machines, which is capable of detecting, identifying, and accommodating expected system degradations and unanticipated catastrophic failures in rotorcraft machines under an adverse operating environment. A fuzzy-based neural network paradigm with an on-line learning algorithm is developed to perform expert advising for the ground-based maintenance crew. A hierarchical fault diagnosis architecture is advocated to fulfill the time-critical and on-board needs in different levels of structural integrity over a global operating envelope. The research objective is to experimentally demonstrate the feasibility and flexibility of the proposed health monitoring procedure through numerical simulations of bearing faults in USAF MH-53J PAVE LOW helicopter transmissions. The proposed fault detection, identification and accommodation architecture is applicable to various generic rotorcraft machines. The proposed system will greatly reduce the operational and developmental costs and serve as an essential component in an autonomous control system. Online learning algorithm Fuzzy based neural network models Fault isolation

Journal Long Form, 7, Bradley, Barry, John Kennedy (Civil Engineering) Ltd, Manchester, Engl, Helicopter provides a solution for water line construction, Pipes and Pipelines International, 1997, 42 1, 12, PPIIAU, 0370-1204

As a result of poor rainfall in some of the districts in its area over the last two summers, Yorkshire Water has been forced into strengthening its existing strategic pipeline network

in a very short timescale. To enable the transportation of water from one part of the area to those most in need, a number of new pipelines and pumping station had to be laid and constructed in a dramatically short time. It was decided that due to the timescale available and the rocky and mountainous terrain encountered along the route, 1400 m of the pipeline and some 1500 tons of pipe bedding would have to be flown in. With local farmers and residents looking on, one helicopter, two pilots, and the construction crew, working with military precision, completed the task in six 14-hr working days. The complete 5 km of main was laid and commissioned from reservoir to reservoir in four weeks. Water line construction

Journal Long Form, 8, Paakkonen, R. //Kuronen, P. Tampere Regional Inst of Occupational Health, Tampere, Finl, Noise attenuation of helmets and headsets used by Finnish Air Force pilots, Applied Acoustics, 1996, 49, 4, 373-382, AACOBL, 0003-682X

The noise attenuation properties of aviation helmets and headsets are generally given only in commercial brochures, and attenuation comparisons between different types of helmets and headsets are seldom shown. Therefore a comparative study was carried out. Four military fighter helmets and two headset types were studied against pink noise in an anechoic chamber. In addition, the active noise reduction (ANR) system of one helmet and the deterioration effect of the noise attenuation of an Alpha aviation helmet in combination with sunglasses and a cushion cloth were studied. When the A-weighted noise attenuation values were compared, the noise attenuation value was 31 dB for the Silenta Super earmuffs, 27 dB for the Ampliguard earmuffs, 25 dB for the Alpha helmet with ANR, 22 dB for the Alpha helmet, 21 dB for the FFV 113B helmet, 16 dB (unadjusted) for the ACS helmet, and 10 dB for the ZSH-5 helmet. The sunglasses reduced the noise attenuation by 4 dB, and the cushion cloth only by 1-2 dB. ANR improved noise attenuation by 3-19 dB in the 63-250 Hz frequency range. We concluded that noise attenuation of greater than 20 dB is needed because modern fighters and helicopters often have a noise level higher than 100 dB in the cockpit. Therefore, the noise attenuation properties of aviation helmets should not be forgotten in helmet and headset design., Aviation helmets Headsets Pilot noise control Sunglasses Cushion cloth Silenta super earmuffs Ampliguard earmuffs

Journal Long Form, 9, Baillie, Stewart //Morgan, J. Murray //Mitchell, David //Hoh, Roger, IAR/NRC, Ottawa, Ont, Can, Use of limited authority response types to improve helicopter handling qualities during flight in degraded visual environments, Journal of the American Helicopter Society 1997, 42, 1, 89-95 JHESAK, 0002-8711

The concept and rationale involved in developing a Limited Authority Response Type (LART) to improve handling qualities of a helicopter for operations in degraded visual environments (DVE) is explained. A LART may be achieved by reprogramming existing, limited authority stability augmentation system actuators to produce a moderate bandwidth, low authority attitude response. A summary of the results from a piloted handling qualities experiment, conducted on the NRC Bell 205 Airborne Simulator, addressing this concept are presented. This experiment examined the handling qualities of a 'UH-60 - like' helicopter with various LART systems while conducting operations in degraded night vision goggle conditions. The results indicate an improvement in handling qualities for systems with attitude authority as low as 2.5 degrees and a general dislike of systems using parallel servos to increase the overall attitude authority. Provision of a pilot selectable height hold system during flight in DVE provided the greatest handling qualities improvement. Some inconsistency in pilot ratings and comments suggest more detailed research is required to confirm the results prior to practical applications of the concept. Limited authority response type Degraded visual environments Handling qualities Night vision goggles Usable cue environment Stability augmentation system

Conference Proceeding, 10, Johnson, E. N. //DeBitetto, P. A. //Trott, C. A. //Bosse, M. C. Charles Draper Lab Inc, Cambridge, MA, USA, 1996 MIT/Boston University/Draper Laboratory autonomous helicopter system, Proceedings of the 1996 15th AIAA/IEEE Digital Avionics Systems Conference, Oct 27-31 1996, Atlanta, GA, USA, IEEE, Piscataway, NJ, USA, 1996, 381-386

The Massachusetts Institute of Technology, Boston University and Draper Laboratory have cooperated to develop an autonomous aerial vehicle that won the 1996 International Aerial Robotics Competition. This paper describes the approach, system architecture and subsystem designs for the entry. This entry represents a combination of many technology areas: navigation, guidance, control, vision processing, human factors, packaging, power, real-time software, and many others. The aerial vehicle, an autonomous helicopter, performs navigation and control functions using multiple sensors: differential GPS, inertial measurement unit, sonar altimeter, and a flux compass. The aerial transmits video imagery to the ground. A ground based vision processor converts the image data into target position and classification estimates. The system was designed, built, and flown in less than one year and has provided many lessons about autonomous vehicle systems, several of which are discussed. Autonomous helicopter systems

Conference Proceeding, 11, Sanzhong, Li //Xianliang, Li //Qishan, Zhang, Beijing Univ of Aero. & Astro. Beijing, China, Small telemetry system, Proceedings of the 1996 International Telemetering Conference, ITC, Oct 28-31 1996, San Diego, CA, USA, Instrument Society of America, Research Triangle Park, NC, USA, 1996, 32, 857-862

A small PCM telemetry system designed for the flight test telemetry task of a new rotorcraft is introduced in this paper. It can provide a flexible frame format which is

completely set up by user in advance, to meet the requirements needed in different flight testing phases. In this telemetry system, the data are low in rate and volume but very valuable with stringent quality and transmission accuracy. Data encrypting and channel encoding techniques are employed to guarantee the quality and security of the data. The system architecture based on microprocessors is adopted in order to process the data flexibly. Real-time data processing, monitoring and post-flight analysis are performed by PC type computers. All key components of the system may be programmed. The cost of the total system integration is relatively reduced. Rotorcraft Flight testing

Journal Long Form, 12, Chatterji, Gano B. //Sridhar, Banavar, Sterling Software, Inc, Palo Alto, CA, USA, Discrete range clustering using Monte Carlo methods IEEE Transactions on Systems, Man, and Cybernetics Part A:Systems and Humans, 1996, 26, 6, 832-837ITSHFX, 1083-4427

For automatic obstacle avoidance guidance during rotorcraft low altitude flight a reliable model of the nearby environment is needed. Such a model may be constructed by applying surface fitting techniques to the dense range map obtained by active sensing using radars. However, for covertness passive sensing techniques using electro-optic sensors is desirable. As opposed to the dense range map obtained via active sensing, passive sensing algorithms produce reliable range at sparse locations and, therefore, surface fitting techniques to fill the gaps in the range measurement are not directly applicable. Both, for automatic guidance and as a display for aiding the pilot, these discrete ranges need to be grouped into sets which correspond to objects in the nearby environment. The focus of this paper is on using Monte Carlo methods for clustering range points into meaningful groups. We compare three different approaches and present results of application of these algorithms to an image sequence acquired by onboard cameras during a helicopter flight. Starting with an initial grouping, these algorithms are iteratively applied with a new group creation algorithm to determine the optimal number of groups and the optimal group membership. The results indicate that the Simulated Annealing methods do not offer any significant advantage over the basic Monte Carlo method for this discrete optimization problem. Discrete range clustering Image sequence Group creation algorithm Helicopter flight

Conference Proceeding, 13, Yen, Gary G. USAF Phillips Lab, NM, USA, Health monitoring of vibration signatures in rotorcraft wings, Proceedings of the 1996 IEEE International Symposium on Intelligent Control, Sep 15-18 1996, Dearborn, MI, USA, IEEE, Piscataway, NJ, USA, 1996, 121-126

We propose to design and to evaluate an on-board intelligent health assessment tool for rotorcraft machines, which is capable of detecting, identifying, and accommodating expected system degradations and unanticipated catastrophic failures in rotorcraft machines under an adverse operating environment. A fuzzy-based neural network paradigm with an on-line learning algorithm is developed to perform expert advising for the ground-based maintenance crew. A hierarchical fault diagnosis architecture is advocated to fulfill the time-critical and on-board needs in different levels of structural integrity over a global operating envelope. The research objective is to experimentally demonstrate the feasibility and flexibility of the proposed health monitoring procedure through numerical simulations of bearing faults in USAF MH-53J PAVE LOW helicopter transmissions. The proposed fault detection, identification and accommodating architecture is applicable to various generic rotorcraft machines. The proposed system will greatly reduce the operational and developmental costs and serve as an essential component in an autonomous control system. Health monitoring Rotorcraft wings System degradation Fault diagnosis Vibration monitoring system

Journal Long Form, 14, Stewart, John E. II, U.S. Army Research Inst Rotary Wing Aviation Research Unit, Fort Rucker, AL, USA, Two alternative velocity vector cues for the AH-64D: a comparative evaluation, Journal of the American Helicopter Society, 1996, 41, 4, 354-359 JHESAK, 0002-8711

The AH-64A employs an integrated helmet and display sight subsystem (IHADSS) presenting night vision system imagery and flight symbology to the pilot's right eye. Velocity vector and acceleration cues tell the pilot when the aircraft is accelerating, its speed, and vector. A low range (0-6 kt) cue is used to minimize velocity and drift variation for hovering and low speed flight. A transition range cue (0-60 kt) is used at speeds $GRT 6 kt, where less sensitivity to velocity change is required. The experiment compared the low range cue to an intermediate range (0-20 kt) cue, proposed for the AH-64D. Ten AH-64A pilots performed a mission consisting of seven standard maneuver tasks, in the Simulator Training Research Advanced Testbed for Aviation. Each performed the mission under IHADSS conditions using low and intermediate range cues (order counterbalanced). Results showed that drift and airspeed variation was significantly less for the low range cue during a stationary five-foot hover; airspeed variation was significantly less in the low range cue condition for hover taxiing. The 100 ft hover revealed no differences. For the hovering turn, turn rate and pedal movement were more constant in the low range cue condition, but the aircraft appeared less stable. No significant differences were noticed for landing and takeoff tasks. Velocity vector cues Integrated helmet and display sight subsystem Drift variation Hover taxiing

Journal Long Form, 15, Pechacek, Jim //Webb, Reed, AMSTA-TR-R, Warren, MI, USA, Crewman's associate (CA) cognitive decision aiding (CDA) applications for the U.S. army's future main battle tanks, Expert Systems with Applications, 1996, 11 2, 191-206ESAPEH

The application of artificial intelligence (AI) decision making for the U.S. Army's future main battle tank (FMBT) is currently under investigation by the TACOM crewman's

associate (CA) program. McDonnell Douglas Helicopter Systems is supporting this research by adapting rotorcraft pilot's associate (RPA) program's techniques under study for helicopters to ground combat weapons systems. This research centers on an armored unit mission scenario which contains several key crew decision points where cognitive decision aiding (CDA) is applied. The study identifies the mission segment functions where the CDA can augment the crew's decision making process (i.e. an en route mission change, actions-on-contact with the enemy, and a hasty attack). The CA program has defined unique crew aiding behaviors (called CABs) which partition the tasks between the FMBT crew and the CDA processors on-board so as to best utilize the advantages of the human crewmember and the computer planner-assessor. Crew selectable levels of the associate functioning are possible as illustrated by the implementation of the CABs in various CA advanced technology demonstrations (e.g. combined arms command and control - CAC2, hit avoidance, target acquisition, mobility, and crewstation design). The RPA task network logic structure is used to trigger the scenario event file and control the flow of the task partitioning, timing, and interactions. Areas of CDA commonality between the rotorcraft pilot's and crewman's associates are identified. CDA applications for the Army's combined arms operations exploit 'interoperability' in both situational awareness and information transfer between ground maneuver and aviation units. Potential benefits of these CDA applications for the FMBT crew and the armor platoon or higher echelon units are also cited. Cognitive decision aiding Main battle tanks Crew aiding behavior Battlefield information Intelligence data fusion

Journal Long Form, 16, Ropelewski, Robert, Bell 430 shows gains in performance, comfort, Aviation Week and Space Technology (New York) 1996, 145, 12, AWSTAV, 0005-2175

Bell Helicopter Textron has achieved a significantly improved level of performance and comfort in the intermediate twin-engine helicopter field with its 8-10 place Model 430. A key element of this success is the four-blade 680 rotor system, which, along with a stretched fuselage providing more interior volume, gives the Model 430 ample measures of smoothness, reduced noise and increased legroom designed to make it a solid competitor in the intermediate twin class. A number of other less apparent but equally significant new features in the 430 are intended to improve the reliability and maintainability of this aircraft over its predecessors. Helicopter pilots Electronic flight instrumentation system Autopilot Integrated instrument display system Full authority digital engine control Performance charts Stability and control augmentation system Passenger cabin

Conference Proceeding, 17, Wade, Robert L. //Walker, Gregory W. U.S. Army Missile Command, Redstone Arsenal, AL, USA, Flight test results of the fuzzy logic adaptive controller-helicopter (FLAC-H), Navigation and Control Technologies for Unmanned Systems, Apr 8-9 96, Orlando, FL, USA, 1996, 2738, 200-208, 0819421197

The fuzzy logic adaptive controller for helicopters (FLAC-H) demonstration is a cooperative effort between the US Army Simulation, Training, and Instrumentation Command (STRICOM), the US Army Aviation and Troop Command, an the US Army Missile Command to demonstrate a low-cost drone control system of both full-scale and sub-scale helicopters. FLAC-H was demonstrated on one of STRICOM's fleet of full-scale rotary-winged target drones. FLAC-H exploits fuzzy logic in its flight control system to provide a robust solution to the control of the helicopter's dynamic, nonlinear system. Straight forward, common sense fuzzy rules governing helicopter flight are processed instead of complex mathematical models. This has resulted in a simplified solution to the complexities of helicopter flight. Incorporation of fuzzy logic reduced the cost of development and should also reduce the cost of maintenance of the system. An adaptive algorithm allows the FLAC-H to 'learn' how to fly the helicopter, enabling the control system to adjust to varying helicopter configurations. The adaptive algorithm, based on genetic algorithms, alters the fuzzy rules and their related sets to improve the performance characteristics of the system. This learning allows FLAC-H to automatically b integrated into a new airframe, reducing the development costs associated wit altering a control system for a new or heavily modified aircraft. Successful flight tests of the FLAC-H on a UH-1H target drone were completed in September 1994 at the White Sands Missile Range in New Mexico. This paper discuses the objective of the system, its design, and performance., Unmanned aerial vehicles Flight tests

Conference Proceeding, 18, Bachelder, Edward N. //Hansman, R. J. Jr. Massachusetts Inst. of Technology, Cambridge, MA, USA, Issues in simultaneous HMD display of multireference frames for helicopter applications, Enhanced and Synthetic Vision 1996, Apr 8-10 1996, Orlando, FL, USA, 1996, 2736, 205-213, 0819421170

A preliminary study was conducted to investigate the use of reference markers found in the head-fixed frame as an aid to reference frame awareness during aircraft flight while using a helmet mounted display. Three reference-cueing displays were compared: (1) Sparse Reference display: all cockpit and airframe markers removed except for the instrument panel, (2) Cockpit Reference display: entire cockpit environment visible, and (3) Geo/Cockpit Reference display: cockpit environment visible with the addition of a surrounding wire-frame globe. The visual scenery was displayed to subjects using a helmet-mounted virtual reality device that had a 40 $MUL 50 degree field of view liquid crystal display. The study involved six pilots. The task was to locate targets from aural alert information. The aural alerts were based in either the Aircraft reference frame (i.e. target clock position relative to the aircraft nose), or the World reference frame (i.e. target bearing). These tasks were conducted while the subject rode through abrupt maneuvering flight at low level in a fixed-based Cobra helicopter simulator. Performance measures of the pilot's ability to discriminate the intended target from secondary targets in the visual field were collected, as well as subjective ratings for each reference display. The

Geo/Cockpit Reference display produced the highest target detection scores for both Aircraft and World-reference alerts. The highest overall detection scores were produced when World-referenced alerts were issued while using the Geo/Cockpit display. The Cockpit display scores were higher than the Sparse display's for both alert types. Subjective scores showed pilot preference for the Geo/Cockpit Reference display over the two displays for both Aircraft and World-reference alerts. A secondary exploratory experiment using the same tasking as the initial experiment was also conducted which observed the effect of peripheral cues. Target detection scores for both alert types decreased when peripheral cues were removed from the Cockpit display. Detection scores also decreased with the removal of peripheral cues from the Geo/Cockpit display during the Aircraft-referenced alerts. Target detection Helmet mounted displays Geo/cockpit displays World-reference alert

Conference Proceeding, 19, Sheldon, Stuart //Zadzora, Timothy, Veda Inc. Dayton, OH, USA, Intraformation positioning system, Enhanced and Synthetic Vision 1996, Apr 8-10 1996, Orlando, FL, USA, 1996, 2736, 176-182, 0819421170

The IntraFormation Positioning System is a networked relative navigation system currently being developed for rendezvous, join-up, and formation flight of Air Force helicopters and fixed wing aircraft in instrument meteorological conditions. The system is designed to be integrated into existing aircraft and will display relative positions of all aircraft within a formation, as well as the relative positions of other formations participating in coordinated missions. The system uses a Global Positioning System receiver integrated with the aircraft Inertial Navigation System to generate accurate aircraft position and velocity data. These data are transmitted over a data link to all participating aircraft and displayed as graphic symbols at the relative range and bearing to own aircraft on a situational awareness display format similar to a radar plan position indicator. Flight guidance computation is based on the difference between a desired formation slot position and current aircraft position relative to the formation lead aircraft. This information is presented on the flight director display allowing the pilot to null out position errors. The system is being developed for the Air Force Special Operations Command; however, it is applicable to all aircraft desiring improved formation situational awareness and formation flight coordination. Intraformation positioning Inertial navigation

Conference Proceeding, 20, Smith, Phillip N. //Sridhar, Banavar, NASA Ames Research Cent. Moffett Field, CA, USA, Real-time implementation of a passive ranging system, Enhanced and Synthetic Vision 1996, Apr 8-10 1996, Orlando, FL, USA, 1996, 2736, 143-153, 0819421170

A passive range estimation algorithm developed at NASA Ames Research Center for pilot- aiding during low-altitude helicopter operations has been tested off-line using imagery and motion data collected in flight, and has demonstrated excellent results using this real-world data. In developing a realtime computer architecture for this algorithm, several candidate parallel processing approaches have been previously investigated. A realtime parallel computer system based on the most-promising approach has now been implemented. This paper describes the hardware and software architecture of the realtime passive ranging system. The performance attained with this system indicates that realtime passive ranging can be achieved with a computer system compact enough for installation on board a helicopter. Passive ranging systems

Conference Proceeding, 21, DuBois, Thomas A. //DiPietro, Charles A. //Stevenson, Gary, Boeing Defense & Space Group, Secane, PA, USA, System concept for a rotorcraft vision system to improve cargo-handling operations, Enhanced and Synthetic Vision 1996, Apr 8-10 1996, Orlando, FL, USA 1996, 2736, 136-142, 0819421170

The shift in defense strategy towards more rapid power projection and deployment drives a need for improved transport rotorcraft mission effectiveness. More efficient cargo handling during sling load operations will decrease time in hover, thereby reducing overall mission timelines. Furthermore, less fuel expenditure in hover will increase the effective mission range. In addition, expected improvements in pilot situational awareness will increase safety during these precise rotorcraft handling operations. This is particularly applicable for naval operations during adverse sea states. This paper outlines a concept for a vision system to improve rotorcraft external cargo handling operations. It presents the operational concept, sensor characteristics, image processing approach, pilot display format, and demonstration strategy. Transport rotorcraft

Conference Proceeding, 22, Kreitmair-Steck, Wolfgang //Wolframm, Aribert P. //Schuster, Anselm, Eurocopter Deutschland GmbH, Munich, Ger, Heliradar: the pilot's eye for flights in adverse weather conditions, Enhanced and Synthetic Vision 1996, Apr 8-10 1996, Orlando, FL, USA, 1996, 2736 35-41, 0819421170

In 1992 Eurocopter Deutschland and Daimler-Benz Aerospace started a research program to investigate the feasibility of a piloting radar based on the so-called ROSAR technology: HELIRADAR. While available radar instruments are not capable of guiding a helicopter pilot safely under poor visibility conditions due to lack of resolution and lack of height information, ROSAR technology, a Synthetic Aperture Radar based on ROtating antennas, has been the promise to overcome these deficiencies. Based on ROSAR technology HELIRADAR has been designed to provide a video-like image whose resolution is good enough to safely guide a helicopter pilot under poor visibility conditions to the target destination. To yield very high resolution a similar effect as for Synthetic Aperture Radar systems can be achieved by means of a rotating antenna. This principle is especially well suited for helicopters, since it allows for a stationary carrier platform. Additional rotating arms with antennas integrated in their tips are mounted on top of the

rotating rotor head. While rotating, the antenna scans the environment from various visual angles without assuming a movement of the carrier platform itself. The complete transmitter/receiver system is fixed mounted on top of the rotating axis of the helicopter. The antennas are mounted at the four ends of a cross and rotate at the same speed as the rotor. The received radar signals are transferred through the center of the rotor axis down into the cabin of the helicopter, where they are then processed in the PolyCluster type high performance digital signal processor. Heliradar

Conference Proceeding, 23, Coppenbarger, Richard A. NASA Ames Research Cent. Moffett Field, CA, USA, Sensor-based automated obstacle-avoidance system for nap-of-the-earth rotorcraft missions, Head-Mounted Displays, Apr 8-10 1996, Orlando, FL, USA, 1996, 2735, 221-232, 0819421162

A rotorcraft guidance and control system designed for real-time detection and avoidance of terrain and obstacles has been developed and evaluated in a moving-base simulation. The system, referred to as pilot-directed guidance (PDG), relies upon forward-looking sensor information along with digital terrain elevation data to perform automated terrain-following and lateral and vertical obstacle avoidance maneuvering in the presence of flight path obstructions. An important aspect of this system is that it does not restrict the pilot to a predefined nominal course but instead allows for complete flight-path autonomy with no prior surveying of the obstacle environment. The pilot interface has been designed to enable the obstacle-avoidance sub-system to be transparent to the pilot except when performing emergency obstacle avoidance. Back-driven cockpit controls provide cueing to the pilot and also facilitate pilot-override of automated maneuvers when necessary, such as in the event of a sensor failure. The pilot interface also includes HMD symbology to provide the pilot with navigation and system performance information. This paper describes the fundamental components of the PDG system; the forward-looking sensor, data processing and fusion, guidance algorithms, controller design, and pilot interface. Important results from a piloted simulation are then presented that describe the overall performance and workload reduction potential of the PDG system. Forward looking sensors Head-mounted displays Pilot-directed guidance Rotorcraft Obstacle avoidance

Conference Proceeding, 24, Givens, Gerald S. //Yona, Zvi, Tracor Aerospace Cross Systems Div. Atlanta, GA, USA, Helmet-mounted display (day/night), Head-Mounted Displays, Apr 8-10 1996, Orlando, FL, USA 1996, 2735, 203-214, 0819421162

A dangerous situation is created when the pilot looks inside the cockpit for instrument information when flying combat and low altitude missions. While looking at instruments, a pilot cannot be performing situation analysis; yet not looking at instruments runs such risks as flying into the ground, particularly in low visibility conditions or in relatively featureless terrain where visual cues for altitude and attitude are inadequate or deceptive. The AN/AVS-7 HMD solves this problem for night flight for both helicopters and fixed wing aircraft which must operate in a 'nap of the earth' flight regime. The display unit mounts on the AN/AVS-6 night vision goggles and provides symbology overlaid on the pilot's outside view; cockpit instrument information is thus provided through the goggles. The pilot is immediately aware of changes in either his surroundings or the instrument readings. This minimizes the risk of critical information being missed in one area while the pilot is looking in the other. The 'day' HMD version of the AN/AVS-7 display now carries these advantages into daytime flights. This display unit operates in conditions from full sunlight to dusk, provides the same symbology as the night display, and connects to the night display interface with no aircraft modification. The day HMD mounts to the helmet using the attachment points previously reserved for the night vision goggles. This display improves the safety of daytime operations by keeping the eyes 'out of the cockpit' in difficult situations such as those presented during landings, cargo lifting and f light utilizing terrain masking. It offers the possibility of a less stressful way of familiarizing the pilot with the symbology and of the dynamic relationships it has to the aircraft and background motions. This familiarization is now accomplished during night flights using night vision goggles. The 'day' HMD is also a useful maintenance aid, easing the ground crew's checkout of the aircraft systems during the day. Head-mounted displays Night vision

Conference Proceeding, 25, Schoess, Jeffrey N. //Seifert, Greg //Paul, Clare A. Honeywell Technology Cent. Minneapolis, MN, USA, Smart aircraft fastener evaluation (SAFE) system: a condition-based corrosion detection system for aging aircraft, Smart Structures and Materials 1996: Smart Sensing, Processing, and Instrumentation, Feb 26-28 1996, San Diego, CA, USA, 1996, 2718, 175-184, 081942093X

The smart aircraft fastener evaluation (SAFE) system is an advanced structural health monitoring effort to detect and characterize corrosion in hidden and inaccessible locations of aircraft structures. Hidden corrosion is the number one logistics problem for the U.S. Air Force, with an estimated maintenance cost of $DLR@700M per year in 1990 dollars. The SAFE system incorporates a solid-state electrochemical microsensor and smart sensor electronics in the body of a Hi-Lok aircraft fastener to process and autonomously report corrosion status to aircraft maintenance personnel. The long-term payoff for using SAFE technology will be in predictive maintenance for aging aircraft and rotorcraft systems, fugitive emissions applications such as control valves, chemical pipeline vessels, and industrial boilers. Predictive maintenance capability, service, and repair will replace the current practice of scheduled maintenance to substantially reduce operational costs. A summary of the SAFE concept, laboratory test results, and future field test plans is presented. Smart aircraft fastener evaluation Rotorcraft Field tests

Conference Proceeding, 26, Searle, Ian R. //Ziola, Steve M. Boeing Defense & Space Group, Seattle, WA, USA, Identification of broadband acoustic emission signals,

Smart Structures and Materials 1996: Smart Sensing, Processing, and Instrumentation, Feb 26-28 1996, San Diego, CA, USA, 1996, 2718, 27-35, 081942093X

Aircraft and rotorcraft health monitoring systems (HMS) must be capable of identifying structural damage (cracks) when the damage is very small. Typically, small is small enough that classical finite element modeling methods are inadequate. Monitoring the structure at very high frequencies and using a combination of relativistic, and absolute measures of the monitored signals can be used to provide a measure of the structures health. Passively monitoring the structure for waveforms, generated by crack growth is a promising method for incorporation into a health monitoring system. This paper discusses research into the implementation of such a system. The issue of signal de-noising using adaptive filters prior to waveform identification are addressed, and results presented. Signal de-noising Broadband signals Rotorcraft

Book Whole, 27, Hopper, Darrel G. (Ed.), 1996, 2734310p 0819421154, The proceedings contains 34 papers.

Following topics are discussed: human system interface; flat panel technologies; transports; fighter aircraft and combat land vehicles; history and potential of technologies in military applications - lessons learned; helicopter cockpit, mission crew station, display generation, and 3D displays; avionic and military flat panel display product requirements; and backlights, COTS display qualification, and test and evaluation. Flat panel displays Mission crew station EiREV

Conference Proceeding, 28, Lopez, J. E. //Farber-Yeldham, I. A. //Oliver, K. A. //Protz, M. W. Alphatech, Inc, Burlington, MA, USA, Hierarchical neural networks for improved fault detection using multiple sensors, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1752-1758

Impressive fault detection and identification (FDI) system performance has been achieved using wavelet-based techniques coupled with neural networks. Wavelet-based FDI systems are typically designed by applying analyzing wavelets to data from a single sensor; however, in many instances, multiple sensors are positioned at various locations throughout a given mechanical system. When the data from the multiple positions is analyzed, varying perspectives into the mechanical system operation are obtained. Although multiple, high performance FDI systems may be designed using data from the single sensor sites, even greater accuracy systems evolve when individual FDI system information is combined to generate a composite FDI system utilizing a `hierarchical neural network'. When the sensor information input to the hierarchical neural network is appropriately selected, the various perspectives into the mechanical system operation may be combined for enhanced FDI performance. This methodology is examined and validated for two examples of helicopter transmission systems. Fault detection and identification system Continuous wavelet transform

Conference Proceeding, 29, Stevens, Patricia W. //Hall, David L. //Smith, Edward C. Pennsylvania State Univ, University Park, PA, USA, Multidisciplinary research approach to rotorcraft health and usage monitoring, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1732-1751

An in-depth literature survey of the state of the art of rotorcraft condition based maintenance is conducted. This survey describes health monitoring in baseline and HUMS equipped rotorcraft. Recent research developments in the area of health and usage monitoring and condition based maintenance are also summarized. Also described are the research efforts at The Pennsylvania State University aimed at developing a systems level approach for a predictive monitoring. The research includes sensor and sensing systems, signal processing, multi-sensor data fusion, system dynamic modeling, micro-mechanical failure modeling, and system architecture studies. The systems level approach used addresses the processing flow from sensors to signal processing, approximate reasoning and ultimately the display of information and maintenance recommendations., Health and usage monitoring system (HUMS)

Conference Proceeding, 30, Haas, David J. //Schaefer, Carl G. Jr. Naval Surface Warfare Cent, Bethesda, MD, USA, Emerging technologies for rotor system health monitoring, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1717-1731

Helicopter health and usage monitoring systems (HUMS) have been developed in an attempt to reduce operational costs and improve aircraft readiness and flight safety. However, existing HUMS are very limited in regard to their ability to monitor rotor system health. Reasons for this include difficulty in designing sensors that are rugged enough to survive for extended periods of time in the harsh rotor operating environment and the complexities associated with transferring power and data from the rotating system to the fuselage. Enabling technologies for rotor system health monitoring and fault detection are emerging at a rapid pace. These technologies include advanced sensors and signal processing techniques and the capability to process large quantities of data in real time. In this paper the application of HUMS to rotor systems is reviewed as well as ongoing efforts within the Navy to develop and demonstrate emerging technologies for an Air Vehicle Diagnostic System (AVDS) that includes a comprehensive rotor health monitoring and fault detection capability. Implementation issues and challenges in the development are

also discussed. Rotor system health monitoring Helicopter health and usage monitoring system (HUMS) Air vehicle diagnostic system (AVDS) Fault detection capability

Conference Proceeding, 31, Claveau/Frealle, C. Turbomeca - Div Turbomeca Microturbo, Bordes, Fr, Advanced fuel control system for turboshaft engines, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1644-1651

The development of advanced fuel control systems has significantly improved the performance of helicopter turboshaft engines. The system has made the helicopter's preparation for flight easier and has reduced the pilot's workload as the engine and the power transmission are being automatically maintained within their limits. Helicopter maneuverability has also been improved by the increased performances of the rotor speed governing functions. The ability to rigorously control the engine contingency ratings has also allowed to markedly improve twin-engine helicopter performance in One Engine Inoperative conditions. Turboshaft engines Advanced fuel control systems

Conference Proceeding, 32, Whalley, Matthew S. //Achache, Marc, U.S. Army Aeroflightdynamics Directorate, Moffett Field, CA, USA, Joint U.S./France investigation of helicopter flight envelope limit cueing, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1589-1617

Under the auspices of a memorandum of understanding (MOU) for cooperative research in helicopter aeromechanics, a joint program has been performed by the U.S. Army and the French Ministry of Defense to investigate methodologies for aiding the helicopter pilot in avoiding flight envelope limits. A series of piloted simulation experiments were conducted using the NASA Ames Vertical Motion Simulator and the Eurocopter France SPHERE simulator to investigate cueing algorithms and cueing modalities including head-up display symbology, panel-mounted display symbology, aural tones, automated voice warnings, and inceptor force feedback. Flight envelope limit cueing

Conference Proceeding, 33, Orkin, Curtis //Haliscak, George, Kaman Aerospace Corp, Bloomfield, CT, USA, K-MAX - improved handling qualities with cargo hook trolley, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1557-1568

In addition to providing exceptional lifting performance for many rigorous applications, the K-MAX was also designed to minimize pilot workload for the repetitive loading cycles of the commercial external lift helicopter market. Both characteristics are essential to the helicopter's acceptability. During 1995, Kaman significantly advanced the helicopter's handling qualities by developing a cargo hook trolley system. The trolley feature enhances the K-MAX handling qualities by focusing the external load through the center of gravity (CG) of the aircraft. The improved alignment reduces the offset (moment arm) between the external load vector and the aircraft center of gravity in the lateral plane. This reduced offset decreases the cyclic control necessary to counteract the lateral moment induced on the helicopter by the external load. Pilot workload is greatly reduced by diminishing the necessary adjustments to maintain precise normal aircraft attitudes in hover, forward and sideward flight with an external load. K MAX helicopters Repetitive loading cycles

Conference Proceeding, 34, Little, Michael E. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Longbow Apache flight control system development and flight test, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1537-1556

The AH-64D Longbow Apache flight control system integrated with the advanced crewstation controls and displays was designed to provide an intuitive and robust suite of flight management functions to the crew. This paper describes the Longbow electronic flight control system, its features and presents samples of the performance of the limited authority system. Specifically included are the design considerations concerning the implementation of the new altitude hold system. Also presented are the design rules that provide a coherent philosophy to the engagement and disengagement of the hold modes. Along with the design rules, the method of annunciation to the crew of the current state of the flight control system is outlined to provide a basic understanding of the total integration design guidelines that were employed to make the system usable, understandable and easily employable. Longbow Apache helicopter Flight control systems Advanced crewstation controls Flight management functions

Conference Proceeding, 35, Menon, P. K. //Iragavarapu, V. R. //Whalley, M. S. Optimal Synthesis, Palo Alto, CA, USA, Estimation of rotorcraft limit envelopes using neural networks, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3) Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1423-1431

Helicopter operation is constrained by complex limit envelopes that are difficult to predict and poorly enunciated to the pilot. The ability to sense and automatically avoid these limits can protect the rotorcraft from loss of control, avoid catastrophic failure, reduce the number of minor exceedances that degrade airframe fatigue life, and permit the pilot to safely fly the aircraft closer to the edge of the envelope. The development and operation of a neural network-based rotorcraft limit detection system that generates rotorcraft limit

avoidance data using on-board measurements is discussed. The system combines manufacturer's envelope limit data together with adaptively determined envelope limits on-board the aircraft. Both time-varying and time-invariant limits are included in the neural network. The operation of the limit detection neural network is demonstrated using data obtained from six-degree-of-freedom manned rotorcraft simulations. Rotorcraft limit detection system

Conference Proceeding, 36, Tatro, Jon S. //Bring, Valori B. //Crescini, Ron G. Bell Helicopter Textron, Inc, Fort Worth, TX, USA, V-22 EMD cockpit and full fidelity simulation: The path to operational suitability, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1213-1229

This paper describes the approach, facilities, test methods, and results of the Full Fidelity Simulation (FFS) test program conducted for the MV-22 tiltrotor aircraft. A brief overview of the MV-22 Engineering Manufacturing Development (EMD) cockpit is followed by a description of the test approach, mission scenarios, and test results. The FFS test program's primary objectives were (1) to verify the operational suitability of the MV-22 cockpit and cockpit management system (CMS) design, and (2) to identify areas requiring further design refinements. Both of these objectives were achieved. Regarding the former, the cockpit and CMS design essentially achieved operational suitability. Refinements were identified and submitted into the Crew Systems design issue process. Numerous issues produced by the FFS effort have resulted in changes to the baseline MV-22 design. This early insight into the operational suitability of the cockpit and CMS has benefited the V-22 program's efforts to prepare for a successful operational test and evaluation activity. V22 engineering manufacturing development (EMD) cockpit Full fidelity simulation (FFS) MV22 tiltrotor aircraft Operational suitability

Conference Proceeding, 37, Schwirzke, Martin F. J. //Sharkey, Tom J. NASA Ames Research Cent, Moffett Field, CA, USA, CSRDF evaluation of flight performance in MOPP IV gear, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1197-1203

As part of the Air Warrior (AW) evaluation, flight task performance in simulated combat missions was investigated using four helicopter pilots wearing both protective flight gear $LB@mission-oriented protective posture (MOPP IV)$RB and unencumbered by MOPP IV gear. The experiment was conducted using the U.S. Army's Crew Station Research and Development Facility (CSRDF) rotorcraft simulator. In each session, pilots flew simulated missions in which they performed tasks which required them to push touch sensitive keys and displacement-type switches. Analysis of the objective data indicated that data entry on a key pad required an average of 80% more time for pilots wearing MOPP IV gear. The subjective results indicated that pilots reported greater performance decrements while wearing MOPP IV gear. Pilots felt that MOPP IV gear effects on flight task performance were significantly detrimental even when the objective measured effect was marginal or nonexistent. Mission oriented protective posture (MOPP) Air Warrior evaluation program Simulated combat missions Protective flight gear

Conference Proceeding, 38, Haworth, Loran //Szoboszlay, Zoltan //Kasper, Eugene //De Maio, Joe //Halmos, Zsolt, Ames Research Cent, Moffett Field, CA, USA, In-flight simulation of visionic field-of-view restrictions on rotorcraft pilot's workload, performance and visual cueing, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1155-1185

A study has been conducted to document the effects of limiting a rotorcraft pilot's field-of-view (FOV) on performance, workload and visual cueing. Pilot FOV was physically restricted during flight tests to simulate current and next generation Helmet Mounted Display FOVs for night vision pilot systems. A helmet FOV restricter was constructed for this test to limit the horizontal peripheral limits of the rectangular shaped FOV to 100, 80, 60, 40, and 20 degrees, while the vertical limits and overlap were held constant at 40 degrees. Ten pilots executed a series of prescribed low altitude maneuvers using an instrumented NAH-1S helicopter. Field of view restrictions Helmet mounted displays Inflight simulation Visual cueing

Conference Proceeding, 39, Dennison, Thomas W. //Gawron, Valerie J. Sikorsky Aircraft, Stratford, CT, USA, Tools and methods for helicopter user interface development and test, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 1141-1147

The various human factor tools and test methods used in the development and design of helicopters are discussed to provide an inventory of these tools within a framework based on the iterative and recursive nature of the design process, not step-by-step instructions. Inexpensive, low fidelity examples, as well as very expensive representations of the product in use in its environment, are presented. Distinction was made between tools that test the physical crew station interface and tools that test the perceptual and cognitive interface. The strengths and limitations of each tools are also discussed, including some sources, cost and references. Helicopter user interface

Conference Proceeding, 40, Kimberlin, Ralph Dace, Univ of Tennessee Space Inst, Tullahoma, TN, USA, Civil single pilot IFR certification - procedures and pitfalls, Proceedings of the 1996 52nd Annual Forum. Part 2 (of 3), Jun 4-6 1996,

Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 2, 971-978

This paper describes the procedures used and problems encountered during the certification of a McDonnell-Douglas MD-369E helicopter for single pilot instrument flight. To maximize the utilization of the private helicopter, it should be certified for all weather operation. It can be accomplished for a single pilot without all axis stability augmentation, provided that adequate instrument displays are used and that human factors are considered to reduce pilot workload. This project demonstrated that current IFR certification regulations are not formulated for light helicopters and may present roadblocks to certification. However, it also demonstrated that single pilot IFR certification with minimum stability augmentation is possible and can offer potential safety benefits. McDonnel Douglas MD 369E helicopters Single pilot instrument flight Instrument flight rules (IFR)

Conference Proceeding, 41, Peters, David A. //Bayly, Philip //Li, Sihao, Washington Univ, St. Louis, MO, USA, Hybrid periodic-shooting, auto-pilot method for rotorcraft trim analysis, Proceedings of the 1996 52nd Annual Forum. Part 1 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 1, 780-793

A discrete auto-pilot method is developed and applied to various helicopter trim models. The results show that the method solves the stable and unstable system trim problem successfully. A unified trim algorithm is also developed and applied to various helicopter trim models. This algorithm combines the advantages of the periodic shooting method, the auto-pilot method and the discrete auto-pilot method. Therefore it overcomes the inefficiency of the periodic shooting (when the system is very large) and the instability of the auto-pilot when the system is neutrally stable (such as in free-flight) or unstable. The results show that such a unified method is very efficient and robust to solve the rotorcraft trim problem. Hybrid periodic shooting auto pilot method Rotorcraft trim analysis Helicopter trim models

Conference Proceeding, 42, Oldroyd, Paul K. //Sehgal, Ajay, Bell Helicopter Textron, Inc, Fort Worth, TX, USA, Design, development, and fabrication of the Model 430 bearingless main rotor yoke, Proceedings of the 1996 52nd Annual Forum. Part 1 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 1, 587-602

The Model 430 rotorcraft represents the next generation Bell intermediate twin helicopter. It incorporates numerous improvements over existing designs. Most notable of these is the bearingless main rotor system. This paper will give a brief overview of the Model 430 development program from inception through first flight, with specific emphasis on the main rotor system, particularly the main rotor yoke. The yoke was identified as the component critical to the enabling technology for the bearingless rotor concept. This paper will present significant detail on the evolution of the concept; critical element design, tooling, and fabrication and testing; and production component design, tooling, and fabrication for the main rotor yoke. Particular attention will be paid to the elements that presented technical, manufacturing, and tooling risks. Incorporation of the results of the risk reduction efforts into the production design will also be presented. Bell intermediate twin helicopters Bell Model 430 rotorcraft Bearingless main rotor yoke Integrated instrument display system Electronic flight instrumentation system Full authority digital electronic control Liquid inertial vibration eliminator isolators Pylon mounting system

Conference Proceeding, 43, Choi, Keeyoung //He, ChengJian //Du Val, Ronald W. Advanced Rotorcraft Technology, Inc, Mountain View, CA, USA, Helicopter rotor disk and blade element comparisons, Proceedings of the 1996 52nd Annual Forum. Part 1 (of 3), Jun 4-6 1996, Washington, DC, USA American Helicopter Soc, Alexandria, VA, USA, 1996, 1, 541-557

This study performs comparisons of blade element and rotor map models under identical operational conditions to assess the significance of the increased sophistication of the blade element models on simulation fidelity and to weigh the benefits against the additional cost associated with the increased computational requirements. The effects of the varying levels of sophistication of each element of a rotorcraft simulation on the fidelity of the simulation in different bandwidths are investigated. The comparison of trim, performance, static stability, transient response and frequency response are used to evaluate the models. Finally, the simulation models are integrated with a manned flight simulator and assessed by pilots. For the static analysis, the blade element model predictions correlate with the flight test results slightly better than the rotormap model. However, for the dynamics test, especially pilot evaluation, the blade element model shows significantly better results than the rotormap model. Blade element models Simulation fidelity Rotormap model Rotorcraft simulation

Conference Proceeding, 44, O'Connell, James //JanakiRam, Ram //Hardesty, Mark, McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Noise certification of the MD900 Explorer helicopter, Proceedings of the 1996 52nd Annual Forum. Part 1 (of 3), Jun 4-6 1996, Washington, DC, USA, American Helicopter Soc, Alexandria, VA, USA, 1996, 1, 80-91

McDonnell Douglas Helicopter Systems received a type certificate from the FAA for its NOTAR system-equipped MD900 Explorer helicopter in December 1994. To demonstrate compliance with FAA and international noise regulations for civil helicopters, noise measurements were obtained during level flyovers in accordance with the alternative noise certification flight test procedures specified in FAR 36 Appendix J for light

helicopters. Subsequent flight tests were conducted in late 1995 to demonstrate compliance with the requirements of FAR 36 Appendix H. The more comprehensive FAR 36-H test provided the opportunity to examine the noise characteristics of the MD900 in detail, and facilitated direct comparison with the same type of data obtained for the smaller MD500N helicopter in 1991. This paper examines the noise control features incorporated into the MD900 design based on experiences with the MD500N. Noise certification test results are presented for both helicopters. It also includes discussion on a simplified alternative procedure used for conducting the level flight test condition during the Appendix H test and comments regarding MDHS's first experience with a differential GPS (global positioning system) to provide pilot guidance and helicopter position information. The alternative test procedures, combined with the differential GPS, contributed toward significant reductions in flight time and costs traditionally associated with noise certification testing. MD900 Explorer helicopter Noise certification MD500N helicopter

Book Whole, 45, Anon (Ed.)American Helicopter Soc, Alexandria, VA, USA, 1995, 2. The proceedings contains 73 papers.

Topics discussed include aircraft design, integrated manufacturing process and control, flight simulation, flight dynamics, aeroacoustics, crew stations and human factors, maintenance, structures and materials for aircrafts, handling qualities and dynamics, and aircraft propulsion. Aircraft design Flight simulation Aeroacoustics Wind tunnel testing Blade vortex interactions Stereolithography Helicopter handling qualities EiRev

Conference Proceeding, 46, Baillie, Stewart //Morgan, J. Murray //Mitchell, David //Hoh, Roger, Flight Research Lab, Use of limited authority response types to improve helicopter handling qualities during flight in degraded visual environments, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1717-1728

The concept and rationale behind developing a Limited Authority Response Type (LART) to improve handling qualities of a helicopter for operations in degraded visual environments (DVE) is explained. A LART may be achieved by reprogramming existing, limited authority stability augmentation system actuators to produce a moderate bandwidth, low authority attitude response type. Selected results from a piloted handling qualities experiment, conducted on the NRC Bell 205 Airborne Simulator, addressing this concept are presented. This experiment examined the handling qualities of a 'UH-60 - like' helicopter with various LART systems while conducting operations in poor night vision goggle conditions. The results indicate an improvement in handling qualities for systems with attitude authority as low as 2.5 degrees and a general dislike of systems using parallel servos to increase the overall attitude authority. Provision of a pilot selectable height hold system during flight in DVE provided the greatest handling qualities improvement. Pilot comments and some inconsistent results suggest more detailed research is required to confirm the results prior to practical applications of the concept. Limited authority response type Degraded visual environments Stability augmentation system Night vision goggle

Conference Proceeding, 47, Williams, Jeffrey N. //Howard, Jacob M. //Fletcher, Jay W. U.S. Army Aviation Technical Test Cent, Fort Rucker, AL, USA, OH-58D(I) Kiowa warrior transient powertrain speed characteristics test in the frequency domain, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1512-1518

A new application for frequency domain system identification technology used in the identification of the OH-58D(I) Kiowa Warrior rotorcraft engine governing system dynamics is presented. The Airworthiness Qualification Test Directorate (AQTD) of the U.S. Army Aviation Technical Test Center conducted a flight test at Edwards AFB, CA to investigate the OH-58D(I) Kiowa Warrior transient powertrain speed characteristics in powered flight. Of particular interest was the dynamic response of the digital Electronic Supervisory Control (ESC) to its multiple inputs and the impact of that response on rotor speed governing. This paper documents the test planning and execution with emphasis on the methodology in the areas of measurement selection, instrumentation, test input design, and safety. Additionally, preliminary frequency response and modeling results are presented and applications of the results are discussed. The engine governing system frequency response identification is a new application for the developing technology of frequency domain flight testing., Rotorcraft engine Transient powertrain speed Electronic supervisory control Test planning Test execution Measurement selection Instrumentation Flight testing Rotor speed Engine compressor speed

Conference Proceeding, 48, Hicinbothom, James H. //Weiland, William //Santarelli, Thomas //Fry, Clarence A. //Voorhees, James W. //Zaklad, Allen L. CHI Systems, Inc, Lower Gwynedd, PA, USA, AMMI: intelligent support for alarm systems in advanced rotorcraft, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA American Helicopter Soc, Alexandria, VA, USA, 1995, 2 1491-1497

The Active Man-Machine Interface, or AMMI, is an intelligent interface aid for the alarm, or Warning/Caution/Advisory (WCA), sub-systems of advanced military and commercial aircraft. Tomorrow's highly-instrumented advanced 'glass cockpit' rotorcraft may routinely generate literally hundreds of thousands of pieces of information about aircraft components' status and potentially thousands of WCA messages, only some of which require immediate decision making and action. AMMI will assist the aircrew by monitoring both mission and aircraft status contexts using an embedded executable cognitive model

of the aircrew. When either the WCA system or AMMI detects a problem, AMMI will augment the WCA system's normal PVI displays with context-dependent aiding, such as: Action lines: tells the pilot what must be done immediately. Reminders: provides key information when it is most needed and is likely to have been forgotten. Corroboration: helps pilot to determine if the WCA signal is real before undertaking drastic action. Prediction: extrapolates key parameters, such as mission time remaining. Impact: presents potential performance impact of failure of one sub-system on other sub-systems. An initial working prototype of AMMI has been implemented to augment the WCA system of a notional advanced rotorcraft. Rotorcraft Active man machine interface Intelligent interface aid Glass cockpit Warning caution advisory system Sub system instrumentation Alert response management for embedded diagnostics

Conference Proceeding, 49, Klymenko, Victor //Rash, Clarence E. UES, Inc, Fort Rucker, AL, USA, Human factors evaluation of visual field-of-view effects of partial binocular overlap designs in helmet-mounted displays, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1450-1465

The Helmet Integrated Display Sight System (HIDSS) is a new binocular helmet-mounted display (HMD) under development by the U.S. Army for the RAH-66 Comanche helicopter. The HIDSS design uses a partial binocular overlap field-of-view (FOV) instead of a full overlap FOV where each of the two eyes sees the entire FOV. A full overlap FOV would have been an ideal optical display design configuration; however, technical and human factor considerations have limited the size of the FOV for each eye. The partial overlap display design overcomes this limitation by sharing the larger sensor FOV between the two eyes. Here a portion of the outside scene is displayed to both eyes, and each eye independently sees an additional portion. This has led to a number of visual human factor issues including the effect of this display design on the appearance of the FOV, on target detectability and on the binocular alignment of the two images. We review ongoing work conducted in our lab on the perceptual and performance effects of partial binocular overlap designs $LB@1-8$RB@. Helmet integrated display sight systems Optical display design configuration Binocular helmet mounted display Visual human factor Field of view Binocular overlap design Full overlap field of view Target detectability Binocular alignment Night vision

Conference Proceeding, 50, Holley, C. D. //Busbridge, M. L. Bell Helicopter Textron, Inc, Fort Worth, TX, USA, Evolution of the venom variant of the AH-1W supercockpit, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3) May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1436-1449

An extensively modified AH-1W SuperCobra has been proposed for the British Army's new attack helicopter. Called Venom, the aircraft features an advanced technology mission equipment package integrated at the human/machine level by the AH-1W SuperCockpit. This cockpit is one of the world's most capable and integrated attack helicopter crewstations, incorporating the latest techniques in 'glass cockpit' design. These techniques include mission-oriented application of automation and enhanced data management that makes the right information available to the crew at the right time. This was coupled with improved geometric accommodation, ergonomic control grips, and other crew-centered approaches. A key design objective was to reduce crew workload and enhance mission effectiveness while establishing and maintaining crew confidence in the advanced mission-oriented automation. Evolution of the Venom variant to the SuperCockpit is described herein, including cockpit design and the tools used to create and validate it. The control-display format approach is discussed and typical display formats are presented. Supercockpit Attack helicopter Glass cockpit Mission oriented application Geometric accommodation Ergonomic control grips Crew centered Crew workload Enhance mission effectiveness Multifunction displays

Conference Proceeding, 51, Hannen, Matthew D. //Cloud, Thomas M. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Case study in the design and testing of hands-on controls - the longbow apache grip development process, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1417-1435

The US MDHS AH-64D Longbow Apache attack helicopter is equipped with an integrated controls and displays suite providing the pilot and copilot-gunner with the ability to control the advanced avionics equipment and weapon systems incorporated in the aircraft. The new AH-64D crew station controls and displays suite includes four grips that provide hands-on and eyes-out controls. The development of the grips represents a recent case study in the design and user testing of hands-on controls tailored for the demanding missions performed by attack and scout helicopter pilots. Grip development process Attack helicopter Hands on controls Crew station controls Eyes out controls Cyclic grip Collective grip Left hand targeting grip Right hand targeting grip User pilot testing

Conference Proceeding, 52, Buresh, Jon A. //Grewe, Robert L. //McClellan, Max C. //Phillips, Rick E. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Longbow joint contractor and government reliability and testability design methodology, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1301-1312

The system reliability requirement for the AH-64D Longbow Apache was increased over 50% from the AH-64A Apache while adding an additional major sensor subsystem: the millimeter fire control radar. This improvement was particularly challenging since the entire

improvement had to come from the one third of the helicopter that was being upgraded. To meet this challenge, the Longbow Apache Program decided that a new design philosophy was required. The Longbow concept was based upon a joint contractor, government, and subcontractor team using an Integrated Product Development (IPD) or multi-discipline coupling approach. This design methodology allowed the government, the system integrator (McDonnell Douglas), the Fire Control Radar (FCR) contractor (Longbow Joint Venture-Westinghouse and Martin Marietta), and the subcontractors to work together towards achieving these challenging reliability and testability goals. Apache helicopter System integrator Fire control radar Testability System mean time between failure Fault detection Fault isolation Environmental stress screening Derating criteria Reliability development growth tests

Conference Proceeding, 53, Iseler, Laura, NASA Ames Research Cent, Moffett Field, CA, USA, Piloted simulator investigation of category a civil rotorcraft terminal area cockpit displays, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1074-1093

A piloted simulation experiment was conducted in the NASA Ames Research Center Vertical Motion Simulator to investigate the use of integrated cockpit displays in terminal area operations for Category A civil rotorcraft. The UH-60 Black Hawk mole was used for the simulation with some modifications made to the power available to simulate a civil rotorcraft. Evaluations were conducted with six pilots. Objective and subjective data describing task performance and pilot workload were collected and analyzed. Engine failure Takeoff decision point Handling qualities ratings

Conference Proceeding, 54, Gold, Phillip J. //Moore, Lloyd W. //Fowler, Donald W. Sikorsky Aircraft Corp, Stratford, CT, USA, Rotorcraft integrated fire and flight control (IFFC) mission simulation, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1062-1073

The technical approach for the Integrated Fire and Flight Control (IFFC) Phase II contract involved the development of real-time simulation and pilot evaluation of rotorcraft IFFC concepts. The candidate mission tailored control laws and helmet mounted display symbology were based on the Phase I IFFC architectures. The RAH-66 Comanche helicopter was used as the baseline advanced armed rotorcraft. Real-time, piloted simulation/evaluation of IFFC control laws, fire control / target sensor / weapon interfaces, and cockpit displays was conducted for proof of concept in terms of mission effectiveness in the context of air-to-air and air-to-ground mission scenarios. The formal IFFC simulation experiment was conducted during April 1994 with two Sikorsky and two U.S. Army pilots. The experiment collected quantitative weapon launch data and qualitative pilot assessments of the IFFC modes, IFFC automation, display symbology, and pilot workload. The results from the data analysis indicate significant reductions in engagement timelines (time to get on target and launch a weapon), aiming errors, and workload with IFFC as compared to the baseline (no IFFC) rotorcraft. Integrated fire and flight control Helmet mounted display Flight control system

Conference Proceeding, 55, Stewart, John Edward II, U.S. Army Research Inst Aviation Research and Development Activity, Fort Rucker, AL, USA, Comparison of two alternative velocity vector cue combinations for the AH-64D integrated helmet and display sight subsystem, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1052-1061

AH-64As are equipped with integrated helmet and display sight subsystems (IHADSS) which display 6 and 60 kt velocity vector (VV) cues. Movement and acceleration cues aid in controlling drift and velocity during low-speed and transitional night vision system (NVS) flight. Addition of a 20 kt cue was proposed for the AH-64D, pending an empirical investigation. AH-64A pilots flew seven Aircrew Training Manual (ATM) tasks in the simulator training research advanced testbed for aviation (STRATA) under day, NVS 6/60 and NVS 20/60 VV cue conditions. The STRATA visual display consisted of three rear-projection screens. For NVS operations the screens were black, the pilot only able to see the visual scene through IHADSS. Results indicated that (1) Of 210 task events, 209 were performed to ATM standards; (2) A significant main effect of cue condition supported the 6 kt VV cue over the 20 kt cue; (3) performance differences were greatest for ATM tasks involving hovering. Velocity vector cue Rear projection screens Integrated helmet and display sight subsystems Night vision system Hovering Aircrew training manual Simulator training research advanced tested for aviation

Conference Proceeding, 56, Clement, Warren F. //Aponso, Bimal L. //Jewell, Wayne F. Systems Technology, Inc, Mountain View, CA, USA, Minimum cues and fidelity requirements for real-time simulation of the rotorcraft shipboard landing task, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1036-1051

This paper describes a two-phase effort to identify the essential cues and minimum fidelity requirements for real-time pilot-in-the-loop simulation of the rotorcraft shipboard landing task in terms of fleet pilot training and support of dynamic interface flight testing. Phase I has been completed; Phase II is planned for mid-1995 through mid-1997. Rotorcraft shipboard landing task Dynamic interface flight testing

Conference Proceeding, 57, Crocco, James R. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Simulation architecture of the rotorcraft pilot's associate program, Proceedings of the 1995 51st Annual Forum. Part 2 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 2, 1023-1027

The manned simulation architecture of the Rotorcraft Pilot's Associate (RPA) program supports both the development and evaluation goals of the program. The contractors' manned simulation effort is divided into two major portions, the Rapid-Prototyping Mission Simulator and the Full Mission Simulation. The Rapid-Prototyping Mission Simulator (RPMS), first operational during the preliminary design phase of the RPA system, is a development tool for engineers to examine the performance and interactions of the associate system, or Core Architecture, in a mission context. RPMS includes one crew station with advanced controls and displays, a simplified out-the-window display system, a battlefield environment simulation, and an advanced Mission Equipment Package (MEP) simulation. Full Mission Simulation provides a two crew station mission environment for the evaluation of the RPA Core Architecture. One crew station is placed within a 20 foot dome with a sophisticated out-the-window projection system while the RPMS crew station is the other. Full Mission Simulation includes a complement of manned, desktop Auxiliary and Communication Players to add further simulation fidelity and team interactions for the RPA and crew. This paper presents the approach of McDonnell Douglas Helicopter Systems with the description of hardware and software systems of the two portions of the manned simulation effort. Rotorcraft pilot associate program Rapid prototyping mission simulates Mission equipment package Full mission simulation

Conference Proceeding, 58, Jacobsen, Robert A. //Rediess, Nicholas A. //Hindson, William S. //Aiken, Edwin W. //Bivens, Courtland C. NASA Ames Research Cent, Moffett Field, CA, USA, Current and planned capabilities of the NASA/ARMY rotorcraft aircrew systems concepts airborne laboratory (RASCAL), Proceedings of the 1995 51st Annual Forum. Part 1 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 1, 758-771

The Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) is a UH-60 Black Hawk helicopter that is being modified by NASA and the US Army for flight systems research. The principal systems that are being installed in the aircraft are a Helmet-Mounted Display (HMD) and associated imaging systems, and a programmable full-authority Research Flight Control System (RFCS). In addition, comprehensive instrumentation of both the rigid body of the helicopter and the rotor system is provided. This paper describes the design features of this modern rotorcraft in-flight simulation facility and their current state of development. A brief description of initial research applications is included. Rotorcraft aircrew systems concepts airborne laboratory UH 60 Black Hawk helicopter Helmet mounted display Research flight control system

Conference Proceeding, 59, Kirkpatrick, Philip L. //DiPietro, Charles A. //Choe, Yongkuk, Boeing Defense and Space Group, Philadelphia, PA, USA, CH-47 advanced cockpit management system, Proceedings of the 1995 51st Annual Forum. Part 1 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 1, 711-721

This paper describes the Advanced Cockpit Management System (ACMS) that Boeing has developed for application on the Chinook family of helicopters. The ACMS provides the functionality required to perform day/night and adverse weather missions, and is flexible and modular enough to satisfy customer specific requirements. The ACMS utilizes a federated architecture comprised of three loosely coupled equipment groups. The Pilotage group is that set of equipment the pilot requires to fly a typical aircraft and is considered 'aircraft independent'. The Air Vehicle group provides controls and displays for the Chinook specific equipment. The Mission group provides customer specific avionics such as communication, navigation, aircraft survivability and mission equipment. Advanced cockpit management system Chinook helicopter Aircraft survivability and mission equipment

Conference Proceeding, 60, Hindson, William S. //Chen, Robert T. N. NASA Ames Research Cent, Moffett Field, CA, USA, Flight tests of noise abatement approaches for rotorcraft using differential GPS guidance, Proceedings of the 1995 51st Annual Forum. Part 1 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 1, 681-694

The NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) UH-60A Black Hawk helicopter was used to test the feasibility of using operational techniques to alleviate helicopter noise during approach to landing. Decelerating approaches were flown using multi-segment glidepaths. The approaches were designed to avoid flight conditions known to generate noise due to blade-vortex-interaction (BVI). A Local Differential Global Positioning System (LDGPS) was used for precision navigation, and guidance calculations were performed in an onboard computer. Steering commands were presented to the pilot using the existing electromechanical flight instruments of the UH-60A. Operational aspects of the noise abatement approaches were evaluated by pilots from NASA, FAA, and the helicopter industry. The methodology used to design the noise abatement trajectories is described, and navigation system and flight technical error data are reported. Rotorcraft aircrew systems concepts airborne laboratory Blade vortex interaction UH 60A black hawk helicopter Local differential global positioning system

Conference Proceeding, 61, Robertson, Greta A. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Measuring the benefits of a complex system: the Rotorcraft Pilot's Associate evaluation program, Proceedings of the 1995 51st

Annual Forum. Part 1 (of 3), May 9-11 1995, Fort Worth, TX, USA American Helicopter Soc, Alexandria, VA, USA, 1995, 1 259-265

The Rotorcraft Pilot's Associate (RPA) program is developing a cognitive decision aiding system that will be an intelligent associate and aid to helicopter crew members. RPA builds on future avionic subsystems, fuses battlefield information, reasons about threat intent, develops and continuously updates mission plans, provides recommendations and takes authorized actions. The evaluation team's charter is to create and apply an evaluation methodology to measure the benefits of the RPA technology. We believe that the benefits of RPA can best be measured at multiple levels of the battlefield, from the individual crew through the higher echelons. During our early analysis of scout/attack missions and the RPA concept, we focused on how RPA will help the crew to do their job better. Benefits of RPA are reflected in more timely and accurate information for commanders, flexibility and responsiveness to changing situations, and efficient and effective mission task execution. These improvements are expected to be magnified at higher echelons of command. Maneuver force commanders will receive a clear view of the battlefield from a more responsive asset. Our evaluation plan encompasses several platforms, facilities, and evaluation methods. Our approach to human-centered design, the definition of an associate, and the linking of RPA behaviors to measurements is described. The process of mapping RPA concepts into the aviation mission down to actions taken by RPA will also be discussed. Preliminary design and diagnostic information is provided. Rotorcraft pilot associate evaluation program Cognitive decision aiding system Helicopter crew members Avionic subsystems Maneuver force commanders Echelons

Conference Proceeding, 62, Tate, Simon J. Defence Operations Agency, Bedford, Engl, Development and application of novel visual aids to increase operational limits at the helicopter/ship dynamic interface, Proceedings of the 1995 51st Annual Forum. Part 1 (of 3), May 9-11 1995, Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1995, 1, 235-258

Pilot visual cueing aids have a significant impact on the operational limits of helicopters involved in ship operations. Lighting aids fitted to frigates and destroyers of the Royal Navy have undergone little development over the years. With the introduction of larger and more capable aircraft to vessels of this size the problems of the recovery task in particular have shown the need for more effective pilot visual cueing devices. This paper reports on the development of a package of improved visual aids for use on small ships. These include; an electro-luminescent panel (FLP) based lighting system with additional aircraft positioning cues, the use of roll-stabilised horizon bars and the development of a sensor-driven active hover position indication (HPI) system to assist the pilot in positioning the aircraft accurately over the flight deck. The impact of the use of Night Vision Goggles (NVGs) was also investigated. The trials programme included extensive use of the DRA's Advanced Flight Simulator (AFS) to provide a high fidelity piloted simulation. This allowed a high degree of flexibility in developing ideas and also provided support to subsequent land and sea-based flight trials. Pilot visual cueing aids Helicopter ship dynamic interfaces Electroluminescent panel Lighting system Night vision goggles Flexibility

Conference Proceeding, 63, Swaminathan, Ramesh //Prasad, J. V. //Sankar, L. N. Georgia Inst. of Technology, Atlanta, GA, USA, Active control of blade-vortex interactions using a neuro-fuzzy controller, 3rd Int. Conference on Intelligent Materials and 3rd European Conference on Smart Structures and Materials, Jun 3 1996, Lyon, Fr, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1996, 2779, 903-906, 0819421650

Rotorcraft blade-vortex interactions (BVI) result in large pressure fluctuations over rotor blades leading to increased unsteady blade loads, noise, and vibration. Previous studies have indicated that an effective method for reducing BVI is through the use of active control schemes. As a workable dynamic model of the process for controller design is difficult to develop a rule-based fuzzy controller is used in this study. As the choice of the fuzzy controller parameters for acceptable performance depend on flight condition, a neural network is trained to adaptively modify the fuzzy controller parameters as a function of flight condition. The resulting neuro-fuzzy control scheme is evaluated using a numerical simulation model of BVI in order to demonstrate the effectiveness of the proposed scheme. Rotorcraft Blade-vortex interactions Active control

Conference Proceeding, 64, Carman, Gregory P. //Mitrovic, Milan, Univ. of California/Los Angeles, Los Angeles, CA, USA, Magnetic-field requirements for an active-control flap on a rotorcraft, 3rd Int. Conference on Intelligent Materials and 3rd European Conference on Smart Structures and Materials, Jun 3 1996, Lyon, Fr, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1996, 2779, 724-728, 0819421650

In this paper, we describe a nonlinear constitutive relation for magnetostrictive materials that includes coupling between temperature, applied loads, and magnetic field strengths. The model is used to predict the magnetic field requirements for actuating a control flap to reduce the vibrational loads in a rotorcraft system. This prediction is based on the force/displacement requirements presently available in the literature for a particular flap. Results indicate that reasonable changes in the ambient temperature and centrifugal forces generated by the rotating blade strongly influence magnetic field requirements. Rotorcraft Control flaps

Conference Proceeding, 65, Straub, Friedrich K. //King, Robert J. McDonnell Douglas Aerospace, Mesa, AZ, USA, Application of smart materials to control of a helicopter rotor, Smart Structures and Materials 1996: Industrial and Commercial

Applications of Smart Structures Technologies, Feb 27-29 96, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1996 2721, 66-77, 0819420964

Smart material actuator technology for operation `on the blade' is now becoming available and has the promise to overcome the size, weight and complexity issues of hydraulic and electric on-rotor actuation. However, the challenges of the limited output capability of the materials and the dynamic operating environment must be fully addressed and resolved. The present study covers the conceptual sizing and design of a full scale demonstration system to provide active control of noise and vibrations as well as inflight blade tracking for the MD-900 helicopter. Active control is achieved via a trailing edge flap and trim tab, both driven by on- blade smart material actuators. Overall, this ARPA sponsored program entails the design, development, and whirl tower testing of the full scale active control rotor system. If successful, an entry in the NASA Ames 40 $MUL 80 foot wind tunnel and flight tests are planned for a follow on program. On-rotor actuation MD-900 helicopter

Conference Proceeding, 66, Walthall, C. L. //Williams, D. L. //Markham, B. L. //Kalshoven, J. E. //Nelson, R. F. USDA-ARS, Beltsville, MD, USA, Development and present configuration of the NASA GSFC/WFF helicopter-based remote sensing system, Proceedings of the 1996 International Geoscience and Remote Sensing Symposium. Part 3 (of 4), May 28-31 1996, Lincoln, NE, USA, IEEE, Piscataway, NJ, USA, 1996, 3, 1797-1799

There is a need for calibrated remote sensing data from airborne platforms emphasizing spatial, spectral, temporal, bidirectional and polarization information domains. A system developed by NASA Goddard Space Flight Center and Wallops Flight Facility utilizing a helicopter as the platform has proven to be a versatile means of acquiring such data. As the system evolved, it was used for the acquisition of data supporting field measurement campaigns such as an acid deposition effects study, the First International Satellite Land Surface Climatology Project (ISLSCP) Field Experiment (FIFE), the Forest Ecosystems Dynamics Project (FED), and the BOReal Ecosystem Atmosphere Study (BOREAS) among others. The data collected with the helicopter system have been used to develop relationships between vegetative parameters and remotely sensed measurements, validate atmosphere and vegetation models, address scaling issues, and provide low altitude data for instrument calibration studies. Off-the-shelf field and experimental instrumentation have been flown as part of the system. Most recently, gyro-stabilized, pointable mounts and an automatic sun-tracking sun photometer were specifically designed and fabricated for the system. The stages of development of the helicopter system over a twelve year period are described and illustrate the advantages and limitations afforded to investigators using helicopter-based systems. Helicopter based remote sensing system Atmosphere model Vegetation model Forest canopies

Journal Long Form, 67, Doyle, R. S. //Harris, C. J. Univ of Southampton, Southampton, Engl, Multi-sensor data fusion for helicopter guidance using neuro-fuzzy estimation algorithms, Aeronautical Journal, 1996, 100, 996, 241-251AENJAK, 0001-9240

Described is an approach which performs data fusion on the output of multiple, spatially separate, sensors engaged in the real time tracking of obstacles in a helicopter's environment. The generated information can be used either as a flight director aid or as feedback required by an automatic collision avoidance system. This paper explores methods of fusion of estimates using neuro-fuzzy models, and addresses some of the weakness of the Kalman filter approximation introduced by the assumptions made in its derivation. Multi sensor data fusion Flight director aid Obstacle track estimation

Journal Long Form, 68, Hyyppa, Juha //Hallikainen, Martti, Helsinki Univ of Technology, Espoo, Finl, Applicability of airborne profiling radar to forest inventory, Remote Sensing of Environment, 1996, 57, 1, 39-57, RSEEA7, 0034-4257

In this work the applicability of airborne profiling radar to forest inventory was studied in detail. The radar stand profiles were collected by using a helicopter-borne ranging scatterometer, HUTSCAT (Helsinki University of Technology SCATterometer), which can probe the forest canopy from the top to the bottom due to its ranging capability. Several radar variables were analyzed from stand profiles, and compared with field-measured characteristics of 20 m by 20 m sample plots, by applying multivariate data analysis methods. It was shown that mean and dominant heights, height of the crown base line, and stem volume per hectare can be obtained with good accuracy. Furthermore, the ranging radar can measure mean and dominant tree heights more accurately than is usually obtained with conventional field measurements. As possible direct application, it is proposed that radar measurements would be employed with helicopter-borne ocular inventories in order to improve the estimation accuracy and to speed up the measurements. Airborne profiling radar Forest inventory Ranging scatterometer Forest canopy Multivariate data analysis Radar stand profiles

Journal Long Form, 69, Bhanu, Bir //Das, Subhodev //Roberts, Barry //Duncan, Dave, Univ of California, Riverside, CA, USA, System for obstacle detection during rotorcraft low altitude flight IEEE Transactions on Aerospace and Electronic Systems, 1996, 32, 3, 875-897IEARAX, 0018-9251

An airborne vehicle such as a rotorcraft must avoid obstacles like antennas, towers, poles, fences, tree branches, and wires strung across the flight path. Automatic detection of the obstacles and generation of appropriate guidance and control actions for the vehicle to avoid these obstacles would facilitate autonomous navigation. The requirements of an obstacle detection system for rotorcraft in low-altitude Nap-of-the-Earth (NOE) flight based

on various rotorcraft motion constraints is analyzed here in detail. It argues that an automated obstacle detection system for the rotorcraft scenario should include both passive and active sensors to be effective. Consequently, it introduces a maximally passive system which involves the use of passive sensors (TV, FLIR) as well as the selective use of an active (laser) sensor. The passive component is concerned with estimating range using optical flow-based motion analysis and binocular stereo. The optical flow-based motion analysis that is combined with on-board inertial navigation system (INS) to compute ranges to visible scene points is described. Experimental results obtained using land vehicle data illustrate the particular approach to motion analysis. Obstacle detection system Rotorcraft Active sensors Passive sensors Motion analysis Binocular stereo

Conference Proceeding, 70, Hiles, Kirk E. //Dixon, Gregg W. United States Coast Guard Acad, Enhancing undergraduate education: design of a gas turbine laboratory facility, Proceedings of the 1996 International Gas Turbine and Aeroengine Congress & Exhibition, Jun 10-13 1996, Burmingham, UK, ASME, New York, NY, USA, 1996

An undergraduate gas turbine laboratory facility was designed and installed by four senior Mechanical Engineering students for their capstone design project at the U.S. Coast Guard Academy. The seniors instrumented a 65 horsepower gas turbine auxiliary power unit from an HH-3F Pelican helicopter and installed it in the existing engine laboratory. The objective of this project was to provide an opportunity for engineering students to better understand thermodynamic principles of gas turbine operation through hands-on experimentation. The laboratory facility was designed to allow students to determine the performance characteristics of the T-62-16B gas turbine and relate them to a Brayton cycle model. This paper details the installation and instrumentation of the gas turbine, the design of the data acquisition system, the results obtained with initial system tests, and future experimental plans. Pelican helicopter Instrumentation Data acquisition system

Journal Long Form, 71, Haas, David J. //Flitter, Lance //Milano, Joel, U.S. Naval Surface Warfare Cent, Bethesda, MD, USA, Helicopter flight data feature extraction or component load monitoring, Journal of Aircraft 1996, 33, 1, 37-45, JAIRAM, 0021-8669

Helicopter flight data are analyzed using univariate and multivariate techniques to extract features of relevance for rotor system component load prediction. The vibratory component of four rotor system loads is examined; main rotor pushrod, rotor blade normal bending, lag damper, and main rotor shaft bending load. Univariate relationships between these loads and fixed system parameters are examined and basic trends are highlighted. Multivariate approaches including multiple linear regression and artificial neural network analyses are utilized to create load prediction models. Fixed system parameters form the basis of the models and include pilot control positions and aircraft state parameters. Generally, the loads can be predicted quite well during steady level flight, as well as moderate and high-g flight where fatigue damage is most likely to occur. Low speed and hovering flight and flight conditions with low engine torque are the most difficult flight conditions for accurate load prediction. Significant parameters in the regression and neural network models are identified and several flight regimes are defined that can be used to improve load prediction accuracy. Helicopter flight data Component load monitoring

Conference Proceeding, 72, Farell, Cesar //Mohamed Sitheeq, M. Univ of Minnesota, NM, USA, Aerodynamic considerations for rooftop helideck design, Proceedings of the 1996 5th International Conference on Engineering, Construction, and Operations in Space. Part 2 (of 2), Jun 1-6 1996, Albuquerque, NM, USA, ASCE, New York, NY, USA, 1996, 2, 1245-1251

An analysis of wind conditions and the aerodynamic design for the rooftop helideck of the Fairview Medical Center (FMC), Minneapolis, is presented, based on an extensive literature search and the examination of current Federal Aviation Administration (FAA) and United Kingdom Civil Aviation Authority (CAA) guidelines. The following points are examined: pilot comments; the advisability of a model study; the need for field measurements; the configuration of the helideck, including its location on the rooftop, dimensions, and the size of the air gap under it; and the effects of rotor downwash and temperature on helicopter power and lift. Recommendations for site measurement of wind characteristics and future work are given. Rooftop helideck Fairview medical center Pilot comments Air gap Rotor downwash

Conference Proceeding, 73, Buell, Heinz, GEC-Marconi Systems, AN/ASN-128B, an integrated Doppler/GPS navigation system, Proceedings of the 1996 National Technical Meeting Jan 22-24 1996, Santa Monica, CA, USA, Inst of Navigation, Alexandria, VA, USA, 1996, 249-258

GPS receivers have been successfully embedded in Doppler Radar dead-reckoning navigation systems. These integrated systems provide significant performance advantages over each sensor operating by itself, including continuously available navigation and guidance information, operation in areas of high GPS jamming and automatic initialization and continuous updating of Doppler position. Automatic integration of data from the two sensors relieves an already overloaded pilot from having to perform this critical task. The U.S. Army has funded GEC-Marconi Electronic Systems Corporation to embed a single-card P(Y) code GPS receiver into its AN/ASN-128 Lightweight Doppler Navigation System (LDNS). The new system has been given the nomenclature of AN/ASN-128B. Three systems have been built and have been extensively tested including bench, environmental and flight tests. A multi-year production contract was awarded to

GEC-Marconi Systems in August 1995 to build 1693 systems, with deliveries starting in April, 1996. This paper discusses the advantages of the integrated AN/ASN-128B, including its ease of installation into helicopters that already have the AN/ASN-128, its performance, operation in the National Air Space, a nonprecision tactical approach capability and a MIL-STD-1553 interface to support integration with other avionics in future bused aircraft. The integration or combining of GPS and Doppler position and velocity data will be described. A brief review of the system and GPS card test results will be presented. Finally, a brief review of potential areas of growth will be given. Integrated navigation systems Multilayer production contracts Doppler radar dead reckoning navigation systems Memory capability Doppler position Automatic data integration Flight testing

Conference Proceeding, 74, Johannessen, Rolf //Howe, David, Lambourne Navigation Ltd, Application of differential GPS to the conduct of helicopter off-shore approaches in the North Sea, Proceedings of the 1995 51st Annual Meeting, Jun 5-7 1995, Colorado Springs, CO, USA Inst of Navigation, Alexandria, VA, USA, 1995, 475-479

The North Sea is an area with considerable helicopter traffic which relies extensively on terrestrial hyperbolic systems for en-route navigation. Approaches to the off-shore platforms are performed using the aircraft's weather radar. As hyperbolic navigation systems are likely to have a limited future, and the replacement of weather radar-based approaches is considered desirable, the possibility of using GPS is being explored both for en-route and approach guidance. As there is an outstanding need for generic airworthiness requirements for the conduct of off-shore approaches, and as the approach phase is the more demanding, a research programme has been launched which concentrates on the use of DGPS for helicopter off-shore approaches. The multipath environment is expected to be particularly harsh in the vicinity of the off-shore platforms. This will be investigated along with the flyability of a system which utilises GPS to generate approach guidance. Differential global positioning system Helicopter offshore approaches Helicopter traffic Hyperbolic en route navigation systems Generic airworthiness requirements

Conference Proceeding, 75, Reed, Morgan D. //Landry, Connie E. //Werther, Kenneth C. Jr. John E. Chance and Associates, Inc, Lafayette, LA, USA, Application of air and ground based laser mapping systems to transmission line corridor surveys, Proceedings of the 1996 IEEE Position Location and Navigation Symposium, PLANS, Apr 22-26 1996, Atlanta, GA, USA, IEEE, Piscataway, NJ, USA, 1996, 444-451

The ability to reliably and accurately locate and survey objects while moving or without physically occupying them is the key to the productivity of the FLI-MAP and TruckMAP laser mapping systems. These advanced technology systems incorporate OTF Kinematic GPS, GPS-aided attitude, and reflectorless laser range finding sensors into complete remote sensing survey platforms. The FLI-MAP system is a helicopter-based laser scanning system capable of collecting 5000 geo-referenced data points per second at typical survey speeds of 40 knots. The TruckMAP system is a van-based mobile mapping system capable of collecting survey data in a point and acquire fashion. The combination of these two complementary systems is an unmatchable solution to mapping and surveying electric transmission line corridors in a quick, precise, and cost-effective way. FLI-MAP and TruckMAP have been fielded for over a year. This paper presents the systems and technologies they employ as well as the operational data collecting and processing issues. A case study of a recent transmission line survey is presented to demonstrate the applicability of these technologies to corridor mapping and surveying. Laser mapping systems Transmission line corridor surveys Helicopter based laser scanning system

Journal Long Form, 76, Phillips, Chad //Karr, Charles L. //Walker, Greg, U.S. Bur of Mines, USA, Helicopter flight control with fuzzy logic and genetic algorithms, Engineering Applications of Artificial Intelligence 1996, 9, 2, 175-184, EAAIE6, 0952-1976

Researchers at the U.S. Bureau of Mines, in conjunction with researchers at the University of Alabama and the U.S. Army, have developed a fuzzy system for controlling the flight of UH-1 helicopters through various maneuvers. Since flying a helicopter is an extremely difficult task, the fuzzy logic controller was necessarily quite complex. In fact, the control tasks were distributed over four individual control units, each of which had its own rules and associated membership functions. Because the fuzzy logic controller was large, and because the rules implemented in the individual control units were not necessarily those a human pilot would use, an efficient technique for writing the rules was required. A genetic algorithm was used to discover rules that provided for effective control of the helicopter. Genetic algorithms are search algorithms based on the mechanics of natural genetics, and have demonstrated the ability to locate rules for fuzzy logic controllers. This paper describes the architecture of the helicopter fuzzy logic controller, provides the details of the genetic algorithm application, and presents the results of an actual flight test using the computer software. Helicopter flight control Flight test

Conference Proceeding, 77, Meyer, Horst M. DLR-Inst of Flight Mechanics, Braunschweig, Ger, Helicopter testing using the PC-based MFI 90 flight test instrumentation system, Proceedings of the 1995 International Telemetering Conference, ITC'95, Oct 30-Nov 2 1995, Las Vegas, NV, USA Instrument Society of America, Research Triangle Park, NC, USA, 1995, 31, 601-609

DLR realizes flight testing under the rough environmental conditions on board of helicopters. Beside the necessary data about the behavior of the base helicopter the main interest concerns information about the rotor system. After explaining the measuring technique the computer integrated Rotor data acquisition system is presented which communicates with the Central computer inside the helicopter via serial data line. The Central computer that has to gather and process also the signals from the base is a modified PC-type computer. It is demonstrated how to use office PC components for this purpose. These have the advantage to be inexpensive and always and everywhere available. The Central computer is a 486er type now. Necessary modifications for airworthy certification are explained. This technique includes on board recording and telemetry. An intelligent LC display is presented which gives the test pilots the necessary information about their tasks. It is a simply modified notebook controlled only by handling cursor keys. In addition pilots have the chance to fly 'head up' by using an LC display which origins from an LCD projection panel. Flight test instrumentation system Central computers Serial data line Airworthy certification

Journal Long Form, 78, Anon, Helicopter visually coupled system, Aerospace Engineering (Warrendale, Pennsylvania), 1996, 16, 4, 6-10, AEENEP, 0736-2536

The use of helicopter visually coupled systems (VCSs) to improve the ease and accuracy with which helicopter may be flown at low level, both day and night, and in all weather condition, is investigated. A VSC is comprised primarily of a helmet-mounted display (HMD), head tracking system (HTS), turreted electro-optical sensor, and symbol generator. The VCS provides an infrared picture which gives the capability to see at night and in some bad weather conditions much clearer than the human eye. The displayed symbology may be task driven, either manually or automatically, and provides both pilot and gunner all of the information required during most of the mission. The VCS could also allow the crew's direct view of the outside world to be closed during the attack phases of the mission, to prevent potential damage to their eyes from battlefield lasers. Visually coupled systems Helmet mounted display Head tracking system Infrared video picture Helicopter operational visual engagement real time simulation Safety pilot

Journal Long Form, 79, Gibbard, Scott R. //Reid, Lloyd D. Univ of Toronto, Toronto, Ont, Can, Investigation of primary flight control failure in a piloted helicopter, Journal of the American Helicopter Society, 1996, 41, 2, 37-43JHESAK, 0002-8711

The application of fly-by-wire techniques to helicopters allows for a number of advanced control schemes that can be used to enhance performance and safety. An experiment has been carried out in a manned helicopter simulator to evaluate the possibility of making use of such a system to allow the pilot to retain control over his helicopter following catastrophic failure of the lateral cyclic primary control. It was demonstrated that a pilot can switch to pedals as the lateral control input provided that the tail rotor is controlled by an autopilot mode. The feasibility of this process has been evaluated for a range of control system configurations and the corresponding handling qualities ratings are reported. Flight control failure Fly by wire techniques

Journal Long Form, 80, Dunagan, S. E. NASA Ames Research Center, Rotorcraft Aeromechanics Branch, Cali, CA, USA, Long-range Schmidt-Cassegrain laser velocimeter for large wind-tunnel applications : Aerodynamic measurement technology, AIAA Journal, 1996, 34, 3, 515-520AIAJAH

A two-component dual-beam laser velocimeter is designed and fabricated for use in the NASA Ames 40 X 80 ft wind tunnel. The instrument design is predicated on the use of inexpensive, high quality, large-aperture Schmidt-Cassegrain telescope optics to perform both the laser beam focusing and scattered light collection functions. The instrument is configured to measure the streamwise and cross-stream components of velocity and enclosed in a streamlined optical assembly mounted on a two-dimensional traverse on the floor of the test section. Instrumentation Velocity distribution Zoom Experimental study

Journal Long Form, 81, Miyajima, Katsuyuki, Tokyo Metropolitan Inst of Technology, Tokyo, Jpn, Flight simulator study of an advanced stability and control augmentation system for a hingeless rotor helicopter, Transactions of the Japan Society for Aeronautical and Space Sciences, 1996, 38, 122, 394-408, TJASAM, 0549-3811

A stability and control augmentation system designed analytically in Ref. 1 was evaluated on the NASA Ames Flight Simulator for Advanced Aircraft. Linear optimal control theory was applied to determine appropriate feedback gains for the stability augmentation system. The least square design method was then applied to determine partial crossfeed gains for the control augmentation system. The augmentation system thus designed was evaluated experimentally in the piloted simulation tests. Handling qualities of the augmented as well as the unaugmented helicopter were investigated in the following flight tasks involving both visual and instrument flights: nap-of-the-earth maneuvers, VOR approaches and a set of basic maneuvers. Experimental data show that handling qualities of the augmented helicopter were substantially improved as compared with those of the basic helicopter. Stability and control augmentation system Nap of the earth maneuvers Flying qualities Feedback gains Partial crossfeed gains

Journal Long Form, 82, Kotulak, John C. //Morse, Stephen E. Evans U.S. Army Community Hospital, Fort Carson, CO, USA, Oculomotor responses with aviator helmet-mounted displays and their relation to in-flight symptoms, Human Factors, 1995, 37 4, 699-710HUFAA6, 0018-7208

Previous experiments have raised the possibility that abnormal oculomotor functioning could be the substrate for visual problems among aviators who use helmet-mounted displays. However, until the present investigation, no direct evidence linked the two. In our experiments, experienced Apache helicopter pilots, using the same helmet-mounted display that they are in flight, viewed Apache symbology and sensor imagery while we measured their accommodation and vergence eye movements in the laboratory. We found three circumstances that frequently occur in flight in which aviators with visual symptoms had different oculomotor responses than did asymptomatic aviators. Further work needs to be done to determine why symptomatic aviators respond differently from asymptomatic ones. Helmet-mounted displays Oculomotor responses In-flight symptoms

Conference Proceeding, 83, Reid, Anthony, Texas Instruments Inc. Plano, TX, USA, Multiresolution extended Kalman filter to estimate parameters of a passive acoustic signal, Wavelet Applications in Signal and Image Processing III. Part 2 (of 2), Jul 12-14 1995, San Diego, CA, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2569/2, 837-844, 0819419281

This paper investigates the application of a multiresolution extended Kalman filter to estimate signal parameters of a passive helicopter signal impinging upon a simple acoustic array of microphones. This approach circumvents some of the problems associated with the initial phase estimate when using an extended Kalman filter to estimate signal parameters of a passive signal. A multiresolution extended Kalman filter uses a wavelet transform to form filter observations at multi-scale resolutions. These wavelet transformed observations are processed from coarser scales to finer scales to jointly estimate all signal parameters including signal phase. By using multi-resolution observations the extended Kalman filter can tolerate larger initial phase errors than a conventional extended Kalman filter. Once the filter has been initialized using the wavelet transformed bservations, the filter then uses the highest resolution observations (i.e. not wavelet transformed) from that time on. Multiresolution extended Kalman filters Passive acoustic signals Phase errors

Conference Proceeding, 84, Sirieix, Michel B. Societe Anonyme de Telecommunications, Paris Cedex 13, Fr, SAT's infrared equipment using second-generation detectors, Infrared Technology XXI. Part 2 (of 2), Jul 9-13 1995, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2552, 893-900, 0819419117

In 1982 SAT proposed for the first time a second generation detector in the design of FLIRs for the TRIGAT program, since then different types of IR equipment have been developed on the basis of this technology: (1) An infra-red seeker for the MICA missile. (2) Three types of IRST: VAMPIR MB for naval applications, SIRENE for the Army and OSF for the Rafale aircraft. (3) Three thermal imagers: Condor 1 for the mast mounted sight equipping the long range anti tank system, Tiger installed on the sight of the medium range antitank system, and Condor 2 for the pilot sight of the TRIGAT French-German helicopter. Infra-red detectors are MCT IR-CCD focal plane arrays developed by SOFRADIR with the objective of the best standardization possible in spite of different configurations and specifications for each program. In this paper, we intend to present the main features of this technology for these programs and the advantages obtained by comparison with the first generation in terms of performance. Industrialization of these products is starting now, and a specific effort has been made to standardize the components, especially the driving and read out electronics. A set of ASICs has been developed to make compact detection modules including a detector in his dewar, a cooling machine, and a proximity electronic. MICA missile TRIGAT program SOFRADIR

Conference Proceeding, 85, Gaynor, Edwin S. //Puccetti, Perry //Isser, Abraham, DCS Corp. Alexandria, VA, USA, Infrared sensor training with the target identification sensor performance (TISP) operations trainer, Infrared Technology XXI. Part 2 (of 2), Jul 9-13 1995, San Diego, CA, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2552, 514-520, 0819419117

We describe a new pilot tactical training aid recently delivered to selected U.S. Marine Corps helicopter squadrons. The trainer is directed at improving targeting performance on missions supported by cockpit display of FLIR imagery. Particular features of the target identification sensor performance (TISP) trainer reported here include infrared phenomenology training, ground target identification drill, sensor controls operation training, symbology familiarization and performance prediction. Training is accomplished using real infrared imagery modified to reflect varying environmental conditions. Trainees can select the tactical scene and any of nearly 200 environmental combinations. Performance prediction graphs are then presented along with the modified images, thereby illustrating the imagery at the predicted ranges. The infrared phenomenology training further demonstrates the environmental impacts. US Marine Corps Target identification Forward looking infrared imagery

Conference Proceeding, 86, Cardoze, David E. //Arkin, Ronald C. Georgia Inst. of Technology, Atlanta, GA, USA, Development of visual tracking algorithms for an autonomous helicopter, Mobile Robots X, Oct 23-24 1995, Philadelphia, PA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2591, 145-156, 0819419559

A visual target designation and tracking system is being developed within the context of the Autonomous Scout Rotorcraft Testbed Project at Georgia Tech. This paper describes both the algorithms and the hardware being used for this purpose by the Mission Equipment Package Technology Area Team. Preliminary results using two simple tracking

algorithms are presented. Visual target tracking Autonomous Scout Rotorcraft Testbed Project

Conference Proceeding, 87, DuBois, Thomas A. Boeing Defense & Space Group, Secane, PA, USA, Integration challenges for rotorcraft on the digital battlefield, Technologies for Advanced Land Combat, Apr 17-18 95, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, CR59, 97-112, 081941851X

Rotorcraft designed for reconnaissance and light attack missions provide an opportunity to acquire tactical advantage on the future digital battlefield. Their proximity to the battlefield offers the unique potential to both filter and prioritize digital battlefield data with human intelligence. However, as communications hub, rotorcraft information processing is particularly challenging. This paper examines mission requirements for rotorcraft on the digital battlefield, and how those requirements have created the information processing challenges evident today. This paper suggests an approach for applying data fusion techniques to address those information processing challenges. Types and formats of stored on-board data are examined with emphasis on digital map overlay data. In addition, this paper briefly describes the roles of collateral technologies, such as mission equipment package design and simulation, within the development of rotorcraft information processing solutions. Rotorcraft Digital battlefield Land combat

Conference Proceeding, 88, Haggren, Henrik G. //Manninnen, Terhikki //Peralainen, Ilkka //Pesonen, Jukka //Pontinen, Petteri //Rantasuo, Markku, Helsinki Univ. of Technology, Espoo, Finl, Airborne 3D profilometer, Digital Photogrammetry and Remote Sensing '95, Jun 25 1995, St. Petersburg, Russia Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2646, 202-211, 0819420190

Measurements of dimensions of inaccessible objects remains a challenge in spite of new technologies available. The authors of this article approach the problem with a photogrammetric method using a laser-camera combination installed in a helicopter. The method was applied to the topographic measurement of ice fields., Airborne profilometers Laser cameras Three dimensional profilometers Digital photogrammetry

Conference Proceeding, 89, Falkov, Edward J. State Research Inst. of Aviation Systems/GosNIIAS, Moscow, Russia, GosNIIAS airborne platforms for remote sensing, Digital Photogrammetry and Remote Sensing '95, Jun 25 1995, St. Petersburg, Russia, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2646 26-33, 0819420190

The description of the capabilities of Tu-134 and An-2 planes and Mi-6 helicopter testbeds for carrying out remote sensing tasks in the range of 0.4 - 14 micrometer is given. Main features of testbeds are: receipt of synchronous multispectral images with the use of photo-, TV, infrared and laser scanning equipment which is partly installed on gyrostabilized platforms, with registration of data from all optical-electronic devices and navigation equipment into a digital common frame on a high efficient tape recorder; realization of convergent photosurvey and ground objects TV observation in all the upper hemisphere with a possibility of manual or automated (using the correlation algorithm) tracking of selected objects; perfect navigational support, including GPS and GLONASS receivers, inertial system and others and autonomous recording of navigational data. Airborne platforms Multispectral images Aircraft testbeds Helicopter testbeds

Conference Proceeding, 90, Nerius, Kenneth J. Harris Corp, Melbourne, FL, USA, Comanche modular controls and displays system, Proceedings of the 1995 AIAA/IEEE 14th Digital Avionics Systems Conference, DASC, Nov 5-9 1995, Cambridge, MA, USA, IEEE, Piscataway, NJ, USA, 1995, 281-286

The current RAH-66 Comanche Scout/Attack Helicopter in development for the US Army uses an advanced Controls and Displays architecture coupled to an all glass cockpit. Advanced Mission Computers drive state-of-the-art crew station displays. This combination provides unmatched targeting capability while reducing the pilot's and copilot's workload. The Crew Station and the dedicated Display Graphics Subsystem are described in detail. Comanche modular controls Mission computers Crew stations Active matrix liquid crystal display Multifunction display Display graphics subsystem Video distribution module Map generator module

Conference Proceeding, 91, Schultz, Michael R. //Wardle, Thomas J. Naval Air Warfare Cent, Warminster, PA, USA, U.S. Navy advanced crashworthy aircrew survival systems (ACASS) program, Proceedings of the 33rd Annual Symposium SAFE Association, Oct 23-25 1995, Reno, NV, USA Survival Flight Equipment Assoc, Cottage Grove, OR, USA, 1995, 473-487

The need for improved crash survivability in existing U.S. Navy helicopters has emerged over the past four years as one of the highest ranked priorities of the Operational Advisory Group (OAG) for Aircrew Life Support Systems. To translate this generally stated fleet need into specific improvement requirements, the Naval Air Systems Command (PMA-202) established the Advanced Crashworthy Aircrew Survival Systems (ACASS) program, which is being technically executed by the Naval Air Warfare Center, Aircraft Division. Under the ACASS program, key decision making information is being obtained and analyzed to formulate an overall Navy strategy for prioritized, incremental, and cost effective implementations of crashworthiness within the helicopter fleet. Initial analyses of mishap data, inspections of aircraft, and fleet surveys have exposed a wide array of both

platform specific and common crash hazards, including problems with seating, restraint systems, fuel containment, and egress provisions. Thus far the ACASS efforts have led to a series of spin-off initiatives, and have added support to other pre-existing efforts at various stages of the development and acquisition process. These programs include efforts to provide the fleet with improved aircrew restraint inertia reels, air bag systems, crashworthy seats, improved egress training, and improved egress procedures. These and other follow-on efforts are specifically targeted to provide our helicopter pilots, crew, troops, and passengers with a level of protection commensurate with the risk of operating helicopters in a military environment. Advanced crashworthy aircrew survival systems Crash resistance Aircrew life support systems Naval air systems command Naval air warfare center Aircraft structures Restraint systems

Conference Proceeding, 92, Butler, Mark, FPT Industries Ltd, Design, manufacture and qualification of flexible fuel cells, Proceedings of the 33rd Annual Symposium SAFE Association, Oct 23-25 1995, Reno, NV, USA Survival Flight Equipment Assoc, Cottage Grove, OR, USA, 1995, 260-272

The increasing use of helicopters has naturally created demands for improved safety and performance from many of the aircraft's systems. If the passengers and crew are to survive a crash, or even a 'heavy landing', and especially from the effects of a ballistic attack, it is vitally important that the aircraft fuel system is also crashworthy. Traditionally, flexible fuel cells have been employed which were constructed of fabric coated with nitrile rubber, with the emphasis being on constraining the forces involved, particularly in a forced landing. This understandably led to heavy fuel cells that were inflexible and difficult to install. The pressure to reduce weight and to increase maintainability has led to the exploration of new materials and techniques and the development of significantly lighter, more flexible systems. In addition, ballistic-proof fuel systems have been developed together with explosion resistant materials. FPT Industries develops and manufactures its own materials and has played a leading role in the development of new materials and manufacturing technology for flexible fuel cells, to satisfy today's demanding applications. Aircraft fuel systems Flexible fuel cells Explosion resistant materials Ballistic proof fuel systems

Conference Proceeding, 93, Greneker, E. F. Georgia Inst of Technology, Atlanta, GA, USA, Technology for the detection of airborne intruders approaching the high-security asset, Proceedings of the 29th Annual 1995 International Carnahan Conference on Security Technology, Oct 18-20 1995, Sanderstead, Engl, IEEE, Piscataway, NJ, USA, 1995, 159-162

There is growing interest in the United States in the protection of high-value assets from aircraft intrusion. Aircraft technology has improved. Helicopters can serve as an intruder transport, a highly mobile weapon platform, and an escape vehicle after an intrusion has been committed. The helicopter can also serve as a transport for a high-value material asset that may be stolen. Fixed-wing aircraft are also a threat. The suicide mission to destroy an asset or generate adverse publicity is credible. If there is sufficient runway, the fixed-wing aircraft can serve as a transport of intruders into a protected site, an intruder escape vehicle, or a transport for a stolen high-value asset. The runway for a short take-off and landing (STOL) aircraft used as intrusion vehicle can be any cleared area, including roadways only 100 meters in length with obstructions 20 meters high at the end. There may be existing, in-place aircraft detection sensors near most sites that can be used to detect an aircraft's presence and provide early warning. If not, there is another family of sensors that can detect, track, and classify detected aircraft as fixed-wing or helicopter. This second class of sensor can be installed if high-resolution tracking of a target is required. This paper discusses the principles of aircraft detection, reviews some of the technology presently on the market for aircraft detection, and presents test data to show the ranges at which aircraft can be detected by these types of sensors. Aircraft detection Aircraft intruders Fixed wing aircraft Security aircraft intrusion detection system Radar sensors

Conference Proceeding, 94, Tospann, Franz-Jose //Pirkl, Martin //Gruener, W. Daimler-Benz Aerospace, Ulm, Ger, Multifunction 35-GHz FMCW radar with frequency scanning antenna for synthetic vision applications, Synthetic Vision for Vehicle Guidance and Control, Apr 17-18 95, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2463, 28-37, 0819418161

This paper presents an experimental radar at 35 GHz in development at Daimler-Benz Aerospace, Ulm, Airborne Systems Division. This radar uses FMCW Frequency modulation waveforms with a frequency scanning antenna covering an azimuth sector of more than 30 degrees. Several signal processing algorithms, e.g. CFAR and contrast enhancement, have been developed for different applications. Due to the electronic scanning of the radar beam, an update rate of up to 15 pictures per second can be achieved as required for synthetic vision systems in aircraft. High resolution in both range and azimuth make this design suitable for a wide range of applications. The radar is suitable for use in helicopters or fixed-wing aircraft. Helicopter applications are obstacle warning (including wire detection), terrain avoidance, ground mapping and weather detection. Fixed wing aircraft applications are runway detection including detection of obstacles at the runway and taxiways. The demonstrator is used to verify the functionality of this radar design. Technical data and measurement results will be presented. Based on these measurements the radar performance will be evaluated. Terrain avoidance Obstacle warning Synthetic vision

Conference Proceeding, 95, Oertel, Carl-Henrik, DLR Inst. of Flight Mechanics, Braunschweig, Ger, Square tracking sensor for autonomous helicopter hover

stabilization, Synthetic Vision for Vehicle Guidance and Control, Apr 17-18 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2463 82-92, 0819418161

Sensors for synthetic vision are needed to extend the mission profiles of helicopters. A special task for various applications is the autonomous position hold of a helicopter above a ground fixed or moving target. As a proof of concept for a general synthetic vision solution a restricted machine vision system, which is capable of locating and tracking a special target, was developed by the Institute of Flight Mechanics of Deutsche Forschungsanstalt fur Luft- und Raumfahrt e.V. (i.e. German Aerospace Research Establishment). This sensor, which is specialized to detect and track a square, was integrated in the fly-by-wire helicopter ATTHeS (i.e. Advanced Technology Testing Helicopter System). An existing model following controller for the forward flight condition was adapted for the hover and low speed requirements of the flight vehicle. The special target, a black square with a length of one meter, was mounted on top of a car. Flight tests demonstrated the automatic stabilization of the helicopter above the moving car by synthetic vision. Synthetic vision Square testing sensors Autonomous helicopter hover

Conference Proceeding, 96, Werner, Stefan //Buchwieser, Andreas //Dickmanns, Ernst D. Univ. der Bundeswehr Muenchen, Neubiberg, Ger, Real-time simulation of visual machine perception for helicopter flight assistance, Synthetic Vision for Vehicle Guidance and Control, Apr 17-18 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2463, 93-101, 0819418161

A pilot support system performing navigation and control tasks to guide the helicopter autonomously along a flight track based on visual machine perception is currently under development at UBM. The machine perception system uses conventional measurement data as well as CCD image sequences for state estimation, landmark/landing site recognition and tracking. The state estimates are used by a control module to perform the given guidance task. Before real flight tests can be undertaken, intensive testing and optimization of the algorithms is required; this is performed through simulation. The simulation environment allows real-time performance regarding helicopter dynamics, sensor data communication to the machine perception system, control output computation and perspectively mapped synthetic computer images representing the external world. The paper describes the simulation environment for real-time hardware-in-the-loop simulations. As many real hardware components to be used in real flight tests as possible are included within the test environment. The machine perception system design to perform sensor fusion for ego-state estimation is presented; data interfaces to the simulation environment are discussed. A combined feedback/feedforward command generation control modules uses the state estimates for guidance along the planned flight trajectory. Results from real-time simulation runs using simulation data for `ground truth' are described. Visual machine perception Hardware-in-the-loop simulation Synthetic vision

Conference Proceeding, 97, Salt, David, Indal Technologies Inc. Mississauga, ON, Can, Electro-optic precision approach and landing system, Synthetic Vision for Vehicle Guidance and Control, Apr 17-18 95, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2463, 102-114, 0819418161

The ASIST (Aircraft Ship Integrated Secure and Traverse) system is a second generation shipborne helicopter handling system developed by Indal Technologies Inc. (ITI). The first generation of the RAST (Recovery Assist, Securing and Traversing) system has established itself as the most successful shipborne helicopter handling system in the world, with more than 150 shipsets delivered or on order to naval forces sailing all the world's oceans. ASIST completed sea trials by July 31, 1992 and production units are in operation with the Chilean Navy. A significant feature of ASIST is the incorporation of a Helicopter Position Sensing Subsystem (HPSS) which is based on an automatic target detection technique developed at ITI. The HPSS will detect a laser beacon equipped helicopter within one second (usually 0.25 second) of it appearing in the field of view of the system cameras. The system then will track the helicopter and provide real time helicopter position relative to the landing area updated every 1/30 second until it is landed. A Rapid Securing Device (RSD) will also be driven by the position data to track the helicopter at low hover. Once the system has detected that the helicopter has landed on the deck, the RSD automatically approaches the helicopter and secures it. This occurs within two seconds. The RSD and traversing system are then used to align the helicopter with the deck tracks and manoeuvre it into a hanger, all without the need for manned intervention. Recovery assist, security and traversing system ASIST system Rapid securing devices

Conference Proceeding, 98, Hamidi, H. Ebneddin //Ohta, H. Nagoya Univ, Nagoya, Jpn, Helicopter flight controller design using nonlinear transformation, Proceedings of the 34th SICE Annual Conference, Jul 26-28 1995, Hokkaido, Jpn, Society of Instrument and Control Engineers (SICE), Tokyo, Japan, 1995, 1481-1486

In this study synthesis of a helicopter trajectory controller is described. Nonlinear transformation theory has been used in the design of the control system to represent nonlinearities in the model of the system. The singular perturbation theory is used to simplify control system structure and a new algorithm has been synthesized for the inverse nonlinear transformation of the control terms. Problem of modeling errors in the system with nonlinear inverse dynamics theory is investigated. The results of simulation show that the control system could track commanded values under the presence of

modeling errors and disturbances. Helicopter flight controller Nonlinear transformation theory Nonlinear inverse dynamics

Journal Long Form, 99, Kingsbury, Oliver J. Method can improve efficiency of heli-portable seismic operations Oil and Gas Journal, 1995, 93, 46, 105-107 OIGJAV, 0030-1388

There are regions in the world where the only viable method of conducting seismic surveys on land must involve helicopters as a primary means of transport. This results in higher operating costs compared with the more common land and marine surveys. A method is presented to reduce cost and timescale of seismic operations, with emphasis on the design of heliportable drilling machinery. Heliportable seismic surveys Heliportable drilling machinery

Conference Proceeding, 100, Vetter, Alan A. //Shemwell, David M. Laser Guidance, Duarte, CA, USA, Dual use of the laser centerline localizer, Air Traffic Control Technologies, Apr 18-19 1995, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2464, 14-19, 081941817X

The Laser Centerline Localizer (LCL) uses a series of low power, but highly visible laser beams to illuminate approach corridors to provide a pilot on final approach to landing with precise centerline guidance. The LCL was initially developed for aircraft carrier flight operations, but it has dual-use in the civilian sector. The first operational deployment of the LCL was on the U.S.S. Constellation, CV-64, in March 1994. The installation of the LCL on the U.S.S. Constellation is discussed along with the results and conclusions from the flight operations to date. Quantitative analysis from 110 naval aviators who have flown the LCL at sea is presented. Pilot acceptance has been overwhelmingly positive. Civil applications of the LCL are described. The LCL provides definitive traffic separation for parallel runways, which are a common feature at larger airports where the incursion of aircraft into airspace reserved for the other runway is an ongoing concern. The LCL is extremely beneficial and safety enhancing at airports that have no good visual access at night due to terrain. Helicopter landing pads, particularly on oil platforms, greatly benefit from the LCL. Because of its small size, portability, and low power consumption, the LCL is ideal for civil disaster relief operations. Laser centerline localizers Helicopter landing pads Oil platforms

Conference Proceeding, 101, Pieper, J. K. Univ of Calgary, Calgary, Alberta, Can, Application of SLMC: TRC control of a helicopter in hover, Proceedings of the 1995 American Control Conference. Part 2 (of 6), Jun 21-23 1995, Seattle, WA, USA, 1995, 2, 1191-1195

The paper presents the solution of the particular helicopter flight control design problem of translational rate commanded control of the aircraft in hover. This mode of control is appropriate for high precision manoeuvring in extremely adverse environments including poor visual cues and instrumentation. Controller design is accomplished via sliding mode control whereby the controlled system is constrained to lie in a subspace characterized by the intersection of hyperplanes. The paper discusses methods for designing hyperplanes in order to meet handling qualities specifications for the aircraft. Extensive simulations demonstrate the effective control. Sliding mode control Pilot-induced oscillation Control augmentation systems Flight control Hyperplanes Active fly-by-wire control

Journal Long Form, 102, Zelenka, Richard E. //Yee, Zee //Zirkler, Andre, NASA Ames Research Cent, Moffett Field, CA, USA, Flight test of radar altimeter enhancement for terrain-referenced guidance, Journal of Guidance, Control, and Dynamics, 1995, 18, 4, 702-708 JGCODS, 0731-5090

Aircraft operations at low altitude near the terrain require high pilot workload and are inherently of high risk, even in fair weather and nonhostile environments. To reduce crew workload and allow safer flight in this regime, an automated guidance system was developed that presents a low-altitude trajectory to the pilot on a helmet-mounted display. The guidance trajectory is generated by employing a digital terrain elevation map subject to mission requirements and aircraft performance limits. The flight envelope of this system is principally limited by accuracy in above grounded level (AGL) positioning of the aircraft. Errors of the terrain elevation map and airborne navigation systems restricted flight to above 300 ft AGL. In this work, a Kalman filter state estimator has been developed that blends a radar altimeter with the airborne navigation and stored terrain elevation data for improved AGL positioning. This AGL altitude state estimator was integrated in a near-terrain guidance system aboard a U.S. Army helicopter and flight tested in moderately rugged terrain over a variety of flight and system conditions. The minimum operating altitude of this terrain database referenced guidance system was reduced to 150 ft with the addition of this radar altimeter-based Kalman filter state estimator. Radar altimeter Flight test Terrain referenced guidance Kalman filter state estimator Above ground level

Conference Proceeding, 103, Prince, J. Colin //Farrell, J. F. //Woo, H. //Yu, P. //Leerentveld, R. Litton Systems Canada Ltd. Etobicoke, ON, Can, Color AMLCD displays for the EH-101 helicopter, Cockpit Displays II, Apr 19-21 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2462, 234-240, 0819418153

A variety of Active Matrix Liquid Crystal Displays, AMLCDs, are now being deployed in a broad range of aircraft. The most familiar applications are for flight deck instrumentation and passenger entertainment where the benefits of size, weight and legibility of the flat panel display technology are exploited. These benefits are particularly significant in rotor-

wing aircraft where weight is of paramount importance and specifically in those helicopters whose role requires the use of mission displays, this class of display generally being larger than those used for flight deck instrumentation. This paper will describe the features of a set of mission displays which are rendered with AMLCD technology and which are being deployed in the EH-101 helicopter. Color displays EH-101 helicopters Active matrix liquid crystal displays Mission displays

Conference Proceeding, 104, Terry, William S. Loral Federal Systems, Owego, NY, USA, Multimission helicopter information display technology, Cockpit Displays II, Apr 19-21 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2462, 224-233, 0819418153

A new Operator display subsystem is being incorporated as part of the next generation United States Navy (USN) helicopter avionics system to be integrated into the Multi-Mission Helicopter (MMH) which will replace both the SH-60B and the SH-60F in 2001. This subsystem exploits state-of-the-art technology for the display hardware, the display driver hardware, information presentation methodologies, and software architecture. The technologies to be base technologies have evolved during the development period and the solution has been modified to include current elements including high resolution AMLCD color displays that are sunlight readable, highly reliable, and significantly lighter that CRT technology, as well as Reduced Instruction Set Computer (RISC) based high-performance display generators that have only recently become feasible to implement in a military aircraft. This paper describes the overall subsystem architecture, some detail on the individual elements along with supporting rationale, the manner in which the display subsystem provides the necessary tools to significantly enhance the performance of the weapon system through the vital Operator-System Interface. Also addressed is a summary of the evolution of design leading to the current approach to MMH Operator displays and display processing as well as the growth path that the MMH display subsystem will most likely follow as additional technology evolution occurs. Multimission helicopters Information displays Color displays Reduced instruction set computer Subsystem architecture Virtual operator system interface

Conference Proceeding, 105, Nerius, Kenneth J. Harris Corp. Palm Bay, FL, USA, Comanche (RAH-66) crew station display system, Cockpit Displays II, Apr 19-21 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2462 104-112, 0819418153

The current RAH-66 Comanche Scout/Attack Helicopter in development for the U.S. Army uses an advanced Controls and Displays architecture coupled to an all glass cockpit. Advanced Mission Computers (MCs) drive state of the art crew station displays. This combination provides unmatched targeting capability while reducing the pilot's and copilot's workload. Advanced control and display architecture All glass cockpit Advanced mission compouters Crew station displays Targeting capability

Conference Proceeding, 106, Weaver, Thomas L. //Murdock, John K. McDonnell Douglas Aerospace, St. Louis, MO, USA, Aircraft optical cable plant program plan: the approach for the physical layer for fly-by-light control networks, Fly-by-Light: Technology Transfer, Apr 17-18 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2467, 46-57, 081941820X

A program was created with joint industry and government funding to apply fiber optic technologies to aircraft. The technology offers many potential benefits. Among them are increased electromagnetic interference immunity and the possibility of reduced weight, increased reliability, and enlarged capability by redesigning architectures to use the large bandwidth of fiber optics. Those benefits will only be realized if fiber optics meets the unique requirements of aircraft networks. Over the past two decades, considerable effort has been expended on applying photonic technologies to aircraft. Great successes have occurred in optoelectronic components development. In the development of these systems to link those components, known as the cable plant, progress has also been made, but only recently has it been organized in a coordinated, systems-oriented fashion. The FLASH program will expand on the nascent cable plant systems efforts by building upon recent work in individual components, and integrating that work into a cohesive aircraft cable plant. Therefore, the FLASH program will develop the low cost, reliable cables, connectors, splices, backplanes, manufacturing and installation methods, test methods, support equipment, and training systems needed to form a true optical cable plant for transport aircraft, tactical aircraft, and helicopters. Fly-by-light advanced system hardware Tactical aircraft

Conference Proceeding, 107, Enns, Russell //Mossman, David C. McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Maximizing commonality between military and general aviation fly-by-light helicopter system designs, Fly-by-Light: Technology Transfer, Apr 17-18 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2467, 25-33, 081941820X

In the face of shrinking defense budgets, survival of the United States rotorcraft industry is becoming increasingly dependent on increased sales in a highly competitive civil helicopter market. As a result, only the most competitive rotorcraft manufacturers are likely to survive. A key ingredient in improving our competitive position is the ability to produce more versatile, high performance, high quality, and low cost of ownership helicopters. Fiber optic technology offers a path of achieving these objectives. Also, adopting common components and architectures for different helicopter models (while maintaining each models' uniqueness) will further decrease design and production costs. Funds saved (or generated) by exploiting this commonality can be applied to R&D used to

further improve the product. In this paper, we define a fiber optics based avionics architecture which provides the pilot a fly-by-light / digital flight control system which can be implemented in both civilian and military helicopters. We then discuss the advantages of such an architecture. Fly-by-light helicopters

Conference Proceeding, 108, Murdock, John K. McDonnell Douglas Aerospace, St. Louis, MO, USA, FLASH requirements for the high intensity radiated field electromagnetic environment, Fly-by-Light: Technology Transfer, Apr 17-18 95, Orlando, FL, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2467 14-24, 081941820X

The worldwide proliferation of high intensity emitting sources and the more electric aircraft increase the intensity of the Electromagnetic Environment (EME) in which aircraft must operate. A FLASH program HIRF (High Intensity Radiated Field) EME requirement is derived to cover both commercial and military fixed and rotary wing aircraft. This requirement is derived from the radiated susceptibility requirement documents of both the FAA and U.S. military. Specific test data and analysis will show that we can meet this requirement. Fly-by-light advanced system hardware Electromagnetic environment High intensity radiated field

Conference Proceeding, 109, Varadan, Vijay K. //Varadan, Vasundara V. The Pennsylvania State Univ. University Park, PA, USA, Smart electronics with interdigital electrodes, antennas, and MEMS for aerospace structures, Smart Structures and Materials 1995: Smart Electronics, Mar 2-3 95, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2448, 120-128, 0819417971

A remote local and global sensing and control of aerospace structures using advanced polymeric smart materials, MEMS, and built-in antennas is presented. The sensors are fabricated with interdigital transducers printed on a piezoelectric polymer. They in turn are mounted onto an ultrathin Penn State novel RF antenna (patent filed). The sensors are designed to measure both pressure and shear of the fluid flow on aerospace structures. The wave form measurements may be monitored at a remote location either at the cockpit or elsewhere via the antennas in the sensors and an outside antenna. The integrated MEMS actuators, which are comprised of cantilever-, diaphragm-, and microbridge-based MEMS with suitable smart electronics etched onto the structure, are controlled by the built-in antennas through feedback and feedforward control architecture. The integration of such materials and smart electronics into the skin of airfoil is ideal for sensing and controlling drag. The basic idea of this concept involves detection of the point of transition from laminar to turbulent flow and transmitting acoustical energy into the boundary layer so that the low-energy fluid particles accelerate in the transverse direction and mix with the high energy flow outside of the boundary layer. The use of the present smart materials and electronics for active noise control and EMI suppression in aircraft and helicopters is also outlines. Microelectromechanical systems Interdigital electrodes

Conference Proceeding, 110, Schoess, Jeffrey N. //Zook, J. David, Honeywell Technology Ctr, Minneapolis, MN, USA, Smart MEMS for smart structures, Smart Structures and Materials 1995: Smart Electronics, Mar 2-3 95, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2448, 115-119, 0819417971

Future advanced fixed and rotary-wing aircraft, launch vehicles, and spacecraft will incorporate smart MEMS devices to monitor structural integrity and manage overall structural health. These smart structures will be capable of assessing vehicle structural damage in real time and ultimately reconfiguring the vehicle flight control to prevent catastrophic failures. This paper describes an overview of Honeywell's MEM technology for new and aging aircraft applications to assess preflight readiness, in- flight structural integrity, and postflight time-based maintenance. Honeywell's MEMS approach combines silicon micromachining, free-space optical waveguides, high-speed optical interconnects, and supervisory sensor management to monitor structural integrity and health. A unique second-generation polysilicon resonance microbeam sensor is described. It incorporates a micron-level vacuum-encapsulated microbeam to optically sense structural-integrity parameters such as acoustic- mission, strain, and to optically power the sensor pickoff. Its principle of operation and significant payoffs and benefits are summarized. Microelectromechanical systems Polysilicon Structural integrity

Conference Proceeding, 111, Kamath, Gopalakrishna M. //Wereley, Norman M. Univ. of Maryland/Coll. Park, Coll. Park, MD, USA, Development of ER fluid-based actuators for rotorcraft flexbeam applications, Smart Structures and Materials 1995: Smart Structures and Integrated Systems, Feb 27-Mar 3 95, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2443, 120-133, 0819417920

A numerical study of electrorheological (ER) dampers is presented. Two models, the Newtonian and the Bingham plastic models are used to characterize the ER fluid behavior. Damping performance of two damper configurations, the Moving Electrode and the Fixed Electrode configurations, is studied. The effects of electrode gap sizes, the field strength and the ER fluid model used are quantified. The study provides a basis for design of ER- fluid based dampers. Flexbeams Electrorheology

Journal Long Form, 112, Doherr, Karl-Friedrich, DLR, Braunschweig, Ger, Stable cross-type parachute with inflation aid Journal of Aircraft 1995, 32, 4, 894-896 JAIRAM, 0021-8669

The reduction of the minimum altitude needed for a safe release of personnel and payloads from low-plying air-craft is a real challenge to the parachute designer. This paper elucidates a stable cross-type parachute of 13.85-m constructive diameter with an inflation aid for quick and reliable inflation that was developed as main canopy for low-altitude jumping from an aircraft or helicopter. Also, a 9-m version of the so-called LAP-LEONARDO parachute that was designed as a reserve canopy and is also considered as a rescue parachute for pilot is presented. Canopy Rate of descent Inflation aid Helicopter pilots

Journal Long Form, 113, Zhao, Yiyuan //Chen, Robert T. N. Univ of Minnesota, Minneapolis, MN, USA, Critical considerations for helicopters during runway takeoffs, Journal of Aircraft 1995, 32, 4, 773-781, JAIRAM, 0021-8669

This article presents optimal runway takeoff trajectories of a multiengine helicopter in the event of one engine failure. A point-mass model representative of the UH-60A helicopter is employed. Pilot response delays are ignored. Two optimal control problems are formulated for both continued takeoff and rejected takeoff after a single engine failure. Subject to specified safety conditions, the first formulation minimizes the runway length required for a given takeoff weight, whereas the second maximizes the takeoff weight for a given runway length in continued takeoff and for an unspecified runway length in rejected takeoff. Constraints on thrust angle, and thrust magnitude are included. For the continued takeoff, an optimal choice of the takeoff safety speed is determined to be about 15 ft/s above the initial airspeed at engine failure. Maximum takeoff weight is dictated by the remaining power after one engine failure if the runway length is sufficient, and is determined by the available runway length otherwise. For the rejected takeoff, the minimum runway length is a function of initial conditions at engine failure, and is roughly independent of takeoff weights. These results replicate some key characteristics of those from flight tests reported in the literature. Optimal runway takeoff trajectories Point mass model Pilot response delays Maximum takeoff weight Flight tests

Journal Long Form, 114, Anon, Blimps are back, Compressed Air, 1995, 100, 5, COAIBB, 0010-4426

Both manned and unmanned blimps have tremendous future. They are being used for military surveillance, environmental protection, fishing surveillance, and testing atmospheric and marine conditions. They can also take and measure samples in flight. Moreover, they are being considered for patrolling drug smuggling, monitoring traffic, and spotting criminals breaking into buildings or cars and relaying that information to squad cars. Finally, they provide television coverage, advertising and promotion, cruising for tourists, and rides of fairs and other fun events. Aerostats Lighter than air flight Fly by light pneumatic actuation control system Automatic venting Vectorable thrust propeller Surveillance Promotional blimps Hovering ability Fuel efficiency

Conference Proceeding, 115, Sugeno, M. //Hirano, I. //Nakamura, S. //Kotsu, S. Lab for Int Fuzzy Engineering Research, Yokohama, Jpn, Development of an intelligent unmanned helicopter, Proceedings of the 1995 IEEE International Conference on Fuzzy Systems. Part 5 (of 5), Mar 20-24 1995, Yokohama, Jpn, IEEE, Piscataway, NJ, USA, 1995, 5, 33-34

This paper describes the current status of and recent results from LIFE and the Sugeno Laboratory project on autonomous control of an unmanned helicopter. A fuzzy-logic-based control system has been developed that enables single inputs (e.g. voice commands) such as take off or turn left, to replace the aircraft's normal set of rudder, collective, longitudinal cyclic, and lateral cyclic control inputs. This development has enabled us to demonstrate that a novice can use such a system to effectively control an unmanned helicopter without prior knowledge of the vehicle's flight dynamics. A set of sensors including an inertial flight measurement unit, microwave speed meters, a laser height meter, and a magnetic azimuth sensor have been installed on the aircraft to provide measurements of position, attitude, and higher-order kinematic information. In addition, a movable CCD camera and on-board image processing unit have been added to extract information about the helicopter's visual environment. Intelligent unmanned helicopter Inertial flight measurement unit Helicopters visual environment Magnetic azimuth sensor Laser height meter

Journal Long Form, 116, Alway, Curt, Avionics upgrades enhance aircraft and aircrew capabilities, Defense Electronics, 1995, 27, 7, 18-21 DEELDH, 0278-3479

The advances in avionics is perhaps the most important defining aspect of today's aircraft compared to aircraft of the past. Today, a number of avionics programs and upgrades geared to improve aircraft performance and ease crew workload are now available. Among the programs are the Joint Tactical Information Distribution System (JTIDS), Advanced Tactical Airborne Reconnaissance System (ATARS) and the Rotorcraft Pilot's Associate (RPA). Aircraft seeing upgrades and enhancements include fighters such as F-15, F-14D and other aircrafts which include E-2C and E-3, the Marine Corp. tactical air operations module and helicopters which include AH-64 Apache and the H-60 Blackhawk. Joint tactical information distribution system Advanced tactical airborne reconnaissance system Data link Advanced fighter technology demonstrator Medium altitude electrooptical sensors

Conference Proceeding, 117, Stevenson, Gary //Verdun, Horacio R. //Stern, Peter H. //Koechner, Walter, Fibertek Inc. Herndon, VA, USA, Testing the helicopter obstacle

avoidance system, Applied Laser Radar Technology II, Apr 20 1995, Orlando, FL, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2472, 93-103, 0819418250

This paper summarizes test results of the Helicopter Laser Radar (HLR) System which has been developed at Fibertek, Inc. The HLR program is under the direction of the U.S. Army Night Vision and Electronic Sensors Directorate, Air Systems Division, as part of the Army Helicopter Obstacle Avoidance System (OASYS) program. The HLR system is a direct detection laser radar system using a diode-pumped solid-state laser operating at 1.54 micrometer. A diode-pumped system offers small size, robust range performance, small output aperture, and a short pulse length for high range resolution. The output wavelength was chosen for extended eyesafety limits and covertness. Helicopter laser radar system Obstacle avoidance system Direct detection laser radar system

Journal Long Form, 118, Montgomery, James F. //Fagg, Andrew H. //Bekey, George A. Univ of Southern California, USC AFV-I: a behavior-based entry in the 1994 international aerial robotics competition, IEEE Expert, 1995, 10, 2, 16-22, IEEXE7, 0885-9000

The annual International Aerial Robotics Competition for Unmanned Vehicle Systems (AUVS) requires flying robots to find and control objects and transport them for one location to another. The robots must perform these tasks under hazardous conditions, without human guidance, and within a fixed time limit. In this competition, the University of Southern California's Autonomous Flying Vehicle-I (AFV-I) finished first. The AFV-I uses a behavior-based control architecture, which partitions the control problem into a set of loosely coupled computing behaviors. These behaviors interact to achieve the robot's overall goal. The behaviors are organized hierarchically, with low-level, reflexive behaviors responsible for craft survival and high-level behaviors responsible for tasks as navigation and object location. Flying robots Object location Field of view Behavior based controller

Conference Proceeding, 119, Schoess, Jeffrey N. //Paul, Clare A. Honeywell Inc. Minneapolis, MN, USA, Smart fastener technology for aging aircraft, Smart Structures and Materials 1995: Smart Sensing, Processing, and Instrumentation, Feb 27-Mar 1 95, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2444, 192-197, 0819417939

Hidden and inaccessible corrosion in aircraft structures is the number 1 logistics problem for the Air Force, with an estimated maintenance cost of greater than one billion dollars per year. The smart aircraft fastener evaluation (SAFE) system is being developed to detect and characterize corrosion factors in hidden locations of aircraft structures. The SAFE concept is a novel `in-situ' measurement approach that measures and autonomously records several environmental factors (i.e. pH, temperature, chloride) associated with corrosion. The SAFE system integrated an electrochemical-based microsensor array directly into the aircraft structure to measure the evidence of active corrosion as an in-situ measurement without reducing aircraft structural integrity. The long term-payoff for the SAFE system will be in predictive maintenance for fixed and rotary wing aircraft structures, industrial tanks, and fugitive emissions applications such as control valves, chemical pipeline vessels, and industrial boilers. Predictive maintenance capability, service and repair will replace the current practice of scheduled maintenance to substantially reduce operational costs. Microsensor array Smart aircraft fastener evaluation (SAFE) system

Conference Proceeding, 120, Baldwin, Chris //Sirkis, James S. //Rossmanith, Thomas, Univ. of Maryland/Coll. Park, Coll. Park, MD, USA, Fiber optic sensors for rotating components, Smart Structures and Materials 1995: Smart Sensing, Processing, and Instrumentation, Feb 27-Mar 1 95, San Diego, CA, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2444, 106-114, 0819417939

Rotating components, such as beams and blades, experience vibrations while rotating. Many blades, such as the ones used in rotorcraft, machine tools and turbines, experience fatigue failure due to the vibration of the rotating blade; therefore, optical sensors could indicate when the strain increases to unsafe limits. This paper describes two techniques of implementing optical fibers on rotating components. The first technique to be examined uses an optical slip ring to transmit the light signal from the rotating frame to a stationary photodetector demodulation circuit, that will determine the strain in the beam. The second technique uses an integrated chip mounted on the rotating frame, that records the signal. The signal recorded from the sensor during rotation is downloaded once the rotation has stopped. Preliminary results from the optical slip ring are presented. These results show difficulties in the alignment of such a device. Fatigue failure Optical slip ring Photodetector demodulation circuits Integrated chips

Conference Proceeding, 1, Fowler, Leslie P. //Cole, Daniel G. //Robertshaw, Harry H. //Giurgiutiu, Victor, Virginia Polytechnic Inst. and State Univ. Blacksburg, VA, USA, Individual feedforward-feedback control of a flexible rotor blade: a comparison of approaches, Smart Structures and Materials 1995: Mathematics and Control in Smart Structures, Feb 27-Mar 1 95, San Diego, CA, USA Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995, 2442, 423-431, 0819417912

Various control methods of rotor blade vibration reduction based on individual blade control are presented and compared. The benchmark model used is based on a four-bladed helicopter at hover conditions. In this paper, three control strategies are investigated: LQR method of feedback control, feedforward control, and hybrid control (a combination of feedback and feedforward control). It was found that the LQR method

provided substantial improvements in the system and very low gains. Feedforward control was found to be somewhat less effective and the hybrid control method, which combines both feedforward and LQR feedback methods, was proven to be the most effective method. Feedforward control Flexible rotor blades Four bladed helicopters

Conference Proceeding, 2, Kugarajah, T. //Krishnaprasad, P. S. //Dayawansa, Wijesuriya P. Univ. of Maryland/Coll. Park, Coll. Park, MD, USA, Identification and intelligent control of 2D smart composite, Smart Structures and Materials 1995: Mathematics and Control in Smart Structures, Feb 27-Mar 1 95, San Diego, CA, USA, Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1995 2442, 231-240, 0819417912

We investigate the prospects for intelligent control of smart composites (containing sensors, actuators, power supply, and signal conditioning) that are envisioned for applications in rotorcraft systems (rotor blades, power shafts, fuselage shell). This paper is concerned with multi-dimensional wavelets and relevant heuristic procedures for fast and parsimonious identification. We also discuss some control techniques based on the idea of a homogeneous system model. Intelligent control Two dimensional smart composites

Conference Proceeding, 3, Peters, David A. //Barwey, Dinesh, Washington Univ, St. Louis, MO, USA, General theory of rotorcraft trim, Proceedings of the 36th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference and AIAA/ASME Adaptive Structures Forum. Part 4 (of 5), Apr 10-13 1995, New Orleans, LA, USA, AIAA, New York, NY, USA, 1995, 4, 2558-2590

In this paper we offer a general theory of rotor-craft trim. The theory is set in the context of control theory. It allows for completely arbitrary trim controls and trim settings for multi-rotor aircraft with tests to ensure that a system is trimmable. In addition, the theory allows for `optimal trim' in which some variable is minimized or maximized rather than set to a specified value. The theory shows that sequential trim cannot work for free flight. The theory is not tied to any particular trim algorithm; but, in this paper, it is exercised with periodic shooting to show how free-flying rotorcraft can be trimmed in a variety of ways (zero yaw, zero pitch, zero roll, minimum power, etc.) by use of the general theory. The paper also discusses applications to harmonic balance and auto-pilot trim techniques. Rotorcraft trim Trim control Trim settings Optimal trim

Journal Long Form, 4, Duggins, R. K. //Baird, J. P. Australian Defence Force Acad, Canberra, Aust, Aeronautical engineering degree course designed for prospective pilots, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, 1995, 209, 2, 161-163 PMGEEP, 0954-4100

A new three-year Bachelor of Technology (BTech) degree course in aeronautical engineering has been developed and introduced at the Australian Defence Force Academy (ADFA). With this course, a prospective pilot goes to on to a post-graduation flying training at a reasonably early age in addition to having the opportunity to major in aeronautical engineering. Pilot education Prospective pilots Bachelor of technology

Journal Long Form, 5, Fletcher, Jay W. Ames Research Cent, Moffett Field, CA, USA, Identification of UH-60 stability derivative models in hover from flight test data, Journal of the American Helicopter Society 1995, 40, 1, 32-46, JHESAK, 0002-8711

A fourteen degree of freedom model which characterizes the open loop UH-60 flight dynamics in hover is identified from flight test data using a frequency-response-error identification method. The model includes rigid body fuselage dynamics, regressing rotor flap and lead-lag dynamics, main rotor inflow, rotor RPM, and engine/governor dynamics and is applicable in the frequency range of 0.1 to 20 rad/sec. The stability and control derivative model is iteratively fit to a set of flight identified frequency responses. Parameters are iteratively eliminated from the model structure based on robust metrics of parameter insensitivity and correlation. The final minimally parameterized model is driven with dissimilar flight test measured inputs and the outputs are compared to the flight measured responses to verify that the model adequately characterizes the aircraft dynamic response to pilot inputs in the frequency range of interest and has good predictive capabilities. When the model parameters are compared with theoretical results, the identified flapping dynamics are in accord with theory except for the coupling terms. When the time and frequency responses of the model are compared to those of two blade element simulation models of the UH-60, the identified model predicts the on-axis response of the helicopter as well as the other models and has superior off-axis fidelity. Open loop UH-60 flight dynamics Frequency response error identification method

Journal Long Form, 6, Foxwell, David, Canada looks to multi-role support vessel, Naval Architect, 1995, E177 NVARA3, 0306-0209

The Canadian Department of National Defense has started preliminary studies of a multi-role support vessel (MRSV) that could replace the Maritime Command's three auxiliary oiler replenishment vessels (AORs) and provide an sealift capacity early in the next century. The requirement for an MRSV or similar capability has been recognized in a Statement of Capability Deficiency, as a formal requirement in Canada's Defense Service Plan. The main emphasis in the development of the MRSV concept has been on affordability, through the adoption of commercial standards wherever possible and a performance-based procurement specification. Multirole support vessel Auxiliary oiler replenishment vessels Disaster relief exercises Sealift capacity Performance based

procurement specification Superstructure Environmental clean up missions Evacuation duties

Journal Long Form, 7, Killeen, Patrick G. Geological Survey of Canada, Speeding up exploration, Canadian Mining Journal, 1995 116, 1, S2 CAMJA9, 0008-4492

Coupled with ground surveys, airborne surveys can provide details on potential mining sites rapidly and at a lower cost, thereby shortening the required exploration program. Airborne surveys are made possible through the three developments in geophysical technology - advances in GPS navigation technology, (b) miniaturization of geophysical survey instrumentation and (c) system automation. In addition, advances in computer technology has made rapid in-field processing a reality. Geophysical survey implementation Airborne surveys

Journal Long Form, 8, Hess, R. A. Univ of California, Davis, CA, USA, Rotorcraft handling qualities in turbulence Journal of Guidance, Control, and Dynamics 1995, 18, 1, 39-45, JGCODS, 0731-5090

Rotorcraft are often required to perform tasks in environments where atmospheric disturbances can significantly affect performance and vehicle handling qualities. Establishing requirements for rotorcraft handling qualities in turbulence is thus of prime importance, particularly to the military. An analytical study is described that addresses this issue. First, a simplified approach to modeling the aerodynamic effects of turbulence on rotorcraft is presented. A structural pilot model employing a handling-qualities sensitivity function is next used to quantify handling qualities. Next, an hypothesis regarding the manner in which turbulence affects vehicle handling qualities is proposed. Finally, an example of the analytical approach is presented involving the longitudinal hover task of an AH-1G rotorcraft. In addition to the unaugmented vehicle, three levels of stability augmentation are considered, each involving different levels of feedback to achieve their goals. AH-1G Rotorcraft Handling qualities

Conference Proceeding, 9, Trimble, G. M. //Markett, R. E. Lockheed Missiles and Space Co, Sunnyvale, CA, USA, Distribution of guidance, navigation, and control functionality in the explosive ordnance disposal autonomous underwater vehicle robotic work packages program, Proceedings of the 1994 IEEE Symposium on Autonomous Underwater Vehicle Technology, Jul 19-20 1994, Cambridge, MA, USA, IEEE, Piscataway, NJ, USA, 1994, 1-6

Control systems which optimally integrate navigation and orientation information and vehicle characteristics are required to support vehicle transit, search, approach, and hovering for inspection in the relocation and interaction potentially hazardous underwater objects. The Explosive Ordnance Disposal Autonomous Underwater Vehicle Robotic Work Packages Program has developed a unique distribution of guidance, navigation, and control functions which facilitates the autonomous operation of small multi-thrustered Unmanned Underwater Vehicles while maintaining portability across various vehicle platforms which supply varying navigation information and employ differing control regimes. The unique distribution of these functions and shared mode-directed access to sensor information between a subsumptive mission function executive processor and a dedicated high-rate vehicle control processor is detailed. The implementation of the core navigation component suite, including three-axis Motion Reference Unit (MRU), compass, depth sensor and a long-baseline acoustic positioning system and it's interaction with the guidance algorithms and control system is described. Incorporation of relative positioning information from an Ahead Looking Sonar to support sensor-based servoing in the reacquisition and inspection of an object complete the paper. Guidance navigation and control functionality Closed loop controller Unmanned underwater vehicles Motion reference unit Acoustic positioning system Ahead looking sonar

Conference Proceeding, 10, Kolbe, Ray //Friedlander, Carl, ISX Corp, Westlake Village, CA, USA, Structuring knowledge representation for the Rotorcraft Pilot's Associate Program, Proceedings of the 1994 IEEE International Conference on Systems, Man and Cybernetics. Part 3 (of 3), Oct 2-5 1994, San Antonio, TX, USA 1994, 3, 2097-2101

ISX Corp continues to develop and extend the knowledge representation forms developed in its Pilot's Associate program. The Knowledge Base Editing Tool (KBET) and the use of KRSL represent both a culmination of its prior efforts in Knowledge Acquisition (KA) and knowledge representation and its most progressive course to defining generic approaches for knowledge representation especially for knowledge captured in a tactical domain. In particular, KBET has been devised to elicit knowledge directly from the domain expert. This tool is not meant to replace the knowledge engineer but to save effort and time for both the knowledge engineer and the domain expert. This savings comes as a result of providing direct interaction between the domain expert and the underlying (internal) knowledge representation supported by the tool. Knowledge based editing tool Plan goal graph Operational sequence diagram Decision trees Knowledge representation specification language Rotorcraft pilot

Conference Proceeding, 11, Becker, Robert C. //Almsted, Larry D. Honeywell Technology Cent, Minneapolis, MN, USA, Flight test evaluation of a 35 GHZ forward looking altimeter for terrain avoidance, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC), Oct 30-Nov 3 1994, Phoenix, AZ, USA, IEEE, Piscataway, NJ, USA, 1995, 586-589

Honeywell has conducted a series of flight tests of a 35 GHz digital microprocessor controlled forward looking radar altimeter. A Bell 206L Jet Ranger helicopter was used to evaluate the capability of the sensor as a detector of various types of terrain collision hazards. The sensor was composed of a covert, spread spectrum radar altimeter processor driving a 35 GHz converter and antenna assembly mounted on a steerable platform. Excellent correlation between predicted performance and observed performance was obtained. Forward looking radar altimeters Flight test Radar altimeter processors

Conference Proceeding, 12, Lefevre, Russell J. //Kirk, John C. Jr //Durand, Raymond L. Technology Service Corp, Santa Monica, CA, USA, Obstacle avoidance sensors for automatic Nap-of-the-earth flight, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC), Oct 30-Nov 3 1994, Phoenix, AZ, USA, IEEE, Piscataway, NJ, USA, 1995, 580-585

This paper describes a 94 GHz active radar system designed to generate an accurate, three dimensional representation of the terrain and obstacles in the flight path of a helicopter. The data is to be used to provide signals to the guidance and control systems for automatic Nap-of-the-Earth (ANOE) Flight. The heart of the radar is the digital signal processor. The developmental digital signal processor architecture is PC based and uses Commercial Off-the-Shelf (COTS) processing elements. The design is extremely flexible. It utilizes a commercial software analysis package to implement a virtual radar control panel as well as provide a display of the processed signals. This approach allows for rapid reconfiguration to efficiently incorporate on-going test results. Automatic nap of the earth flight Terrain Commercial off the shelf processing elements Radar control panel

Conference Proceeding, 13, Barron, Bruce, McDonnell Douglas Helicopter Systems, OMNI directional airspeed sensing, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC), Oct 30-Nov 3 1994, Phoenix, AZ, USA, IEEE, Piscataway, NJ, USA, 1995, 568-573

Measurement of airspeed is one of the basic parameters required in the operation of an aircraft. A number of traditional sensing methods are available for fixed wing aircraft. Rotorcraft, with their ability to hover as well as fly sideways and even backwards requires different sensing techniques. Airspeed Sensing methods Rotorcraft Pilots Pneumatic load feel systems Automatic flight control systems Omni directional airspeed sensing

Conference Proceeding, 14, Duley, Jacqueline A. //Miller, Christopher A. //Schultz, Eileen //Hannen, Matthew, Honeywell Technology Cent, Human resource-based crew station design methodology, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC), Oct 30-Nov 3 1994, Phoenix, AZ, USA IEEE, Piscataway, NJ, USA, 1995, 233-238

We report on the use of human resource based simulation tools to initiate performance evaluation of crew station designs very early in the design cycle. These tools, CREWCUT and W/Index, use a multiple resource model (Wickens, 1984) of human attention to represent the levels of conflict a human operator incurs when performing tasks in a hypothetical crew station. While similar to workload-based crew station evaluation, our approach differs in that it is grounded in the physical layout of the proposed cockpit and the physical capacities of a human operator, rather than in abstract or subjective notions of workload. Also, we use our methodology for initial design guidance rather than for later evaluation (e.g. TLX, SWAT). Results show extremely rapid capability to study performance effects of multiple crew station design. Human resource based simulation tools Crew station designs Design cycle Human operator Workload

Conference Proceeding, 15, Boyd, J. //Butash, T. //Grizzle, W. //Taylor, R. Loral Federal Systems - Owego, LAMPS MK III block II simulation for advanced algorithm development, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC), Oct 30-Nov 3 1994, Phoenix, AZ, USA IEEE, Piscataway, NJ, USA, 1995, 198-205

This paper provides a description of a simulation being developed as a testbed for the development and performance evaluation of multiple Multi-Sensor Correlation (MSC) algorithms. The selected application platform is the U.S. Navy LAMPS MK III Helicopter Avionics System. This system will undergo a major modification, the Block II Upgrade, which includes enhanced sensor subsystem and processing capabilities that will ultimately incorporate advanced operator assistance algorithms, with an emphasis on MSC. Multisensor correlation algorithms Helicopter avionics system Advanced operator assistance algorithms Acoustic target tracking Acoustic classification Emitter to platform correlation

Conference Proceeding, 16, McBryan, Bernie //Hall, Jim, McDonnell Douglas Helicopter Systems, Mesa, AZ, USA, Engineering approach for rotorcraft pilot's associate cognitive decision aiding systems development, Proceedings of the 1994 IEEE/AIAA 13th Digital Avionics Systems Conference (DASC) Oct 30-Nov 3 1994, Phoenix, AZ, USA, IEEE, Piscataway, NJ, USA, 1995, 76-81

This paper describes our concurrent engineering approach for the Rotorcraft Pilots Associate (RPA) program. The process integrates knowledge acquisition, rapid prototyping, and evaluation into a system development process. The approach is an iterative process which gathers knowledge, uses rapid prototyping to develop Cognitive Decision Aiding System software, uses simulation and embedded measures of effectiveness and measures of performance to evaluate the Cognitive Decision Aiding System mission effectiveness. Improvement areas identified in the evaluation feed the

next iteration. Army helicopter pilots/copilot-gunners are the primary domain experts for Cognitive Decision Aiding knowledge acquisition and are heavily involved in the crew interface design. This 'end user' involvement in the design process ensures feedback early enough to impact development and produces an end product that meets the customers needs. Rotorcraft pilots associate program Cognitive decision aiding system software

Journal Long Form, 17, Hansford, Robert E. Westland Helicopters Ltd, Somerset, Engl, Considerations in the development of the coupled rotor fuselage model, Journal of the American Helicopter Society, 1994, 39, 4, 70-81, JHESAK, 0002-8711

A collaborative programme between Westland Helicopters Limited and the Defence Research Agency has culminated in the first software release of the Coupled Rotor Fuselage Model (CRFM). The constituent modules of this new code are described and associated examples are provided to illustrate the advantages of CRFM to enhance rotorcraft modelling. The rotor dynamics representation is based on a complex rotor mode analysis which is designed to accommodate a wide range of hub configurations and is coupled to the fuselage dynamics to include hub motions. Algorithms for the timewise solution of modal response are reviewed and a new technique is described which provides a more accurate spanwise Force Integration procedure to determine rotor loads. A main feature of CRFM is to extend simulation to manoeuvring flight conditions. To achieve this, a pilot control logic is discussed to realistically fly three dimensional manoeuvres, and a new wake model is included to address the first order implications of manoeuvring flight on the wake geometry. Wake geometry Manoeuvring flight Pilot control logic Fuselage dynamic Hub motion Complex rotor mode analysis Rotor loads Force integration procedure Wake model

Journal Long Form, 18, Becker, Robert C. //Almsted, Larry D. Honeywell Technology Cent, Minneapolis, MN, USA, Flight test evaluation of a 35 GHz forward looking altimeter for terrain avoidance, IEEE Aerospace and Electronic Systems Magazine, 1995, 10, 2, 19-22 IESMEA, 0885-8985

Honeywell has conducted a series of flight tests of a 35 GHz digital microprocessor controlled forward looking radar altimeter. A Bell 206L Jet Ranger helicopter was used to evaluate the capability of the sensor as a detector of various types of terrain collision hazards. The sensor was composed of a covert, spread spectrum radar altimeter processor driving a 35 GHz converter and antenna assembly mounted on a steerable platform. Excellent correlation between predicted performance and observed performance was obtained. Terrain avoidance Forward looking altimeter Flight tests Radar altimeter processor

Journal Long Form, 19, Isenstein, Barry, Mercury Computer Systems Inc, Eye to the future, Defense Electronics, 1995, 27, 2, 23-24DEELDH, 0278-3479

Innovative Configuration Incorporated (ICI), through the funding of NASA SBIR, is developing a technology that aims to provide future helicopters with computerized 'eyes'. The novel technology uses stereo vision sensors with functions similar to that of human eye. The sensors possess the ability to collect, compute and display critical information. To make this type of information flow possible, the developers use embedded and compact multicomputers containing processors having the ability to process real-time data. ICI adopts the algorithm and associated chip set invented by Jay Karmarkar, ICI president, and real-time computers from Mercury Computer System. Long-term benefits of the two-senor-based stereo vision systems are outlined. Stereo vision sensors VLSI chips

Journal Long Form, 20, Takahashi, Marc D. NASA Ames Research Cent, Moffett Field, CA, USA, H$-$INF$/ helicopter flight control law design with and without rotor state feedback Journal of Guidance, Control, and Dynamics 1994, 17, 6, 1245-1251, JGCODS, 0731-5090

An H$-$INF$/ formulation to design pitch-roll flight control laws for hovering helicopter is proposed. Using this formulation, control law designs were developed to examine the effect of using rotor state feedback. Two laws developed for an articulated helicopter math model in low-speed flight include a compensator using rigid-body measurements and one using body plus rotor statements. The design with no rotor state feedback has the potential to pass approximately twice as much noise to the actuators near the 1/rev frequency as the design with rotor state feedback. In addition, the response of the controller with no rotor state feedback was more sensitive to gain variations. Due to this sensitivity, the design with no rotor state feedback showed more high-frequency oscillation in roll. Flight control law design Weight functions Crossover frequency Rotorcraft

Journal Long Form, 21, Pearson, J. T. //Goodall, R. M. //Lyndon, I. Loughborough Univ of Technology, Leicestershire, UK, Active control of helicopter vibration, Computing & Control Engineering Journal 1994, 5, 6, 277-284, CCEJEL, 0956-3385

The reduction of helicopter vibration is of great importance to the helicopter industry and considerable effort has been devoted to research into active methods for vibration reduction. This article describes how active control techniques can offer good vibration reduction over significant areas of the fuselage and also provide the capability to adapt to changing speed, rotor conditions and structural dynamics. There are three main areas on the helicopter where active vibration control techniques can be applied: at the rotor, at the main gearbox to fuselage interface, and within the fuselage itself. The last area is termed the active control of structural response (ACSR) and is considered in more detail. Finally, the performance of the ACSR technique in minimizing vibration in helicopter structures is

analyzed using results which demonstrate the performance potential under differing conditions. Active vibrational control Structural dynamics Active control of structural response

Journal Long Form, 22, Bittanti, Sergio //Moiraghi, Luca, Politecnico di Milano, Milano, Italy, Active control of vibrations in helicopters via pole assignment techniques IEEE Transactions on Control Systems Technology 1994, 2, 4, 343-351IETTE2, 1063-6536

This paper is motivated by the problem of active control of vibrations in helicopter A129 of Agusta S.p.A. Taking into account the specific features of the A129 rotor, whose model is characterized by two nonminimum phase zeroes, a new method for active control is proposed. Based on simple pole-placement considerations, the method presents a number of advantages. First, it enables harmonic cancellation without perturbing the low frequency dynamics. In other words, the control system does not affect the overall dynamics of the flight as decided by the pilot. Moreover, it supplies a stable controller (an important issue for fault tolerance requirements). Second, the controller design computations are extremely simple. The performances achievable with such a controller are tested by a number of simulations on an A129 rotor model., Adaptive control technique Pole assignment techniques Active controllers

Book Whole, 23, Lewandowski, Ronald J. (Ed.) //Stephens, Wendell (Ed.) //Haworth, Loran A. (Ed.), Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1994, 2218382p, 0819415227

This conference proceedings contain 38 papers. Topics covered include: Head-mounted display technology and hardware; Head-mounted display human factors & testing; Flight evaluations of flight-worthy helmet-mounted information display systems; Helmet-mounted display symbology design requirements and lessons learned; System integration issues for helmet-mounted display symbology; and, Design issues for helmet-mounted information displays. EiREV Vision Image processing Image sensors Optical variables measurement Goggles Design Testing Diffraction Electrooptical devices Evaluation Computer graphics

Journal Long Form, 24, Schwartz, Alan W. //Reader, Kenneth R. //Rogers, Ernest O. David Taylor Research Cent, Bethesda, MD, USA, Unmanned air vehicle concept with tipjet drive Journal of the American Helicopter Society, 1994, 39, 3, 67-74, JHESAK, 0002-8711

A new concept is developed for an unmanned aerial vehicle (UAV) configured with a tipjet-driven, two-bladed, stoppable rotor and circulation control airfoils. The vehicle's high-aspect ratio wing 'converts' to a tipjet-driven helicopter rotor for vertical takeoff and landing (VTOL). The conceptual design is presented for a 1200-lb Tipjet VTOL UAV that is suitable for performing various Navy UAV missions. Vehicle performance predictions are included for the key flight regimes of hover, low-speed rotary-wing flight, and conversion between rotary-wing and fixed-wing flight. Results of standard mission performance analyses indicate that the 1200-lb Tipjet VTOL UAV is a viable candidate vehicle for the designated Navy UAV missions. Moreover, the Tipjet concept is directly applicable to much larger UAVs that will greatly enhance naval warfare capabilities. Unmanned aerial vehicle Tipjet driven rotor systems Rotary wing flight Circulation control airfoils Vehicle performance predictions Design analysis Hover Low speed rotary wing flight Fixed wing flight Circulation control

Conference Proceeding, 25, Kemppinen, Martti //Pallonen, Jorma //Hallikainen, Martti, Helsinki Univ of Technology, Espoo, Finl, 93 GHz airborne imaging radiometer, Proceedings of the 1994 International Geoscience and Remote Sensing Symposium. Vol 4 (of 4), Aug 8-12 1994, Pasadena, CA, USA IEEE, Piscataway, NJ, USA, 1994, 4, 2243-2245

A 93 GHz conically scanning imaging radiometer is under construction at HUT. The system consists of a sensor unit to be mounted under a Bell Jetranger helicopter and a control electronics unit to be strapped on the helicopter's back seat. The new features of the compact instrument are the ability to follow any conical scan path, the airborne liquid nitrogen cooled cold calibration as well as the flat panel color display featuring a real-time false colour image and video image window. Airborne imaging radiometer Flat panel color display Real time colour image Video image window

Journal Long Form, 26, Whitlock, Charles H. //LeCroy, Stuart R. //Wheeler, Robert J. Natl Aeronautics and Space Administration, Hampton, VA, USA, Narrowband angular reflectance properties of the alkali flats at White Sands, New Mexico, Remote Sensing of Environment, 1994 50, 2, 171-181 RSEEA7, 0034-4257

Results from helicopter measurements of the angular properties of surface reflectance for the alkali flats regions of the White Sands Missile Range are presented for the wavelength interval of 0.4 to 0.85 $mu@m. This work was performed to allow accurate radiative transfer calculations over the region. Detailed tables and interpolation equations are given that permit other investigators to perform satellite calibrations over the alkali flats site. The effects of wavelength and soil moisture on narrowband angular reflectance are also investigated. Although there is a spectral variation in surface albedo, there is little spectral effect in Anisotropic Factor except in the forward-scattering peak at solar zenith angles greater than 60$DGR@. The magnitude of the forward-scattering peak is also sensitive to soil moisture, with wet conditions causing a larger peak. The significance of this result is that angular reflectance properties at the center of the alkali flats usually will be different

than those at the flats edge because moisture differences typically exist. Narrowband angular reflectance Alkali flats Soil moisture Anisotropic factor Radiative transfer model

Conference Proceeding, 27, Jankovitz, Jack //Mack, Robert E. NRaD Warminster, Warminster, PA, USA, Utilization of a commercial instrument for the CH-46 helicopter, Proceedings of the 50th Annual Meeting, Jun 6-8 1994, Colorado Springs, CO, USA, Inst of Navigation, Alexandria, VA, USA, 1994, 345-352

The CH-46 Helicopter is being upgraded with GPS navigation capability. The navigation system will be compliant with a document known as the Chief of Naval Operations (CNO) GPS Integration Guidance. This document (presently in draft stage) affects all Navy, Marine Corps and Coast Guard users who must fly in the National Airspace System (NAS) with GPS as a primary sensor for navigation data. It provides navigation requirements for those users (reference 1). As part of the navigation upgrade for the CH-46, two active matrix, color, liquid, crystal, flat panel displays are being added to the new navigation system, giving the CH-46 the distinction of being the first Marine helicopter to receive flat panel technology instruments for primary navigation. These instruments have been designed for use by commercial aircraft and, up to now, have never been used in military applications. This paper discusses the new display instruments and how the display instruments will satisfy the CNO GPS Integration Guidance. A portion of the discussion involves the adaptation of the instruments to the unique requirements of the CH-46 helicopter. Chief of naval operations National airspace system Flat panel technology Flight management subsystem Flat panel displays Horizontal situation indication Land based navigation aids

Conference Proceeding, 28, Hein, Gunter //Eissfeller, Bernd //Pielmeier, Jurgen, Univ FAF, Future developments in digital photoflight navigation: visual aided mission planning and satellite aided navigation copilot, Proceedings of the 7th International Technical Meeting of the Satellite Division of the Institute of Navigation. Part 2 (of 2), Sep 20-23 1994, Salt Lake City, UT, USA, Inst of Navigation, Alexandria, VA, USA, 1994, 2, 1107-1115

At the Institute of Geodesy and Navigation, a complete integrated digital photo navigation system is under development. The aim of the system is to support the customer through computer integration from project planning via photoflight guidance to post-mission data evaluation. The system consists of two major parts, the 'off-line' mission planning program VAMP (visual aided mission planning) and the 'on-line' mission navigation system SANC (satellite aided navigation copilot). The VAMP program is based on Windows 3.1 and integrates the capabilities of project planning with photoflight and VFR-flight planning on an underlying object-oriented GIS-database, running on standard PC hardware. The SANC system enables realtime DGPS position, velocity and attitude determination and navigation in different modi, according to the required precision level, dependent on photogrammetric map scale. With this navigation system, only the pilot is necessary for carrying out a photogrammetric mission. Digital photoflight navigation Visual aided mission planning Satellite aided navigation copilot Photogravimmetry

Conference Proceeding, 30, Buell, Heinz //Hunton, Andrew J. GEC Marconi Electronic Systems Corp, Synergistic effects of Doppler radar/GPS navigation integration and the development of an advanced navigation system for helicopter applications, Proceedings of the 1994 National Technical Meeting, Jan 24-26 1994, San Diego, CA, USA, Inst of Navigation, Alexandria, VA, USA, 1994, 821-830

The advantages of combining GPS and Doppler radar into a single system are numerous, the most powerful involving the synergistic effects of continuous, accurate navigation during long duration, hostile missions. The approach taken to integrate GPS into the AN/ASN-128 helicopter Doppler Navigation System that is currently under development is discussed. The system architecture and hardware subsystems are described, including the performance characteristics of the Doppler radar and embedded GPS receiver. The expanded operational features of the combined system are discussed, with concentration on low-impact GPS-compatible human interfaces, avionics retrofit and enhanced operational features. Candidate mixing techniques for combining GPS and Doppler radar sensor information are briefly examined. Satellite constellation Sensor fusion processor Pilot training Navigation systematic errors

Conference Proceeding, 31, Wilson, Glenn F. //Hankins, Thomas, AL/CFHP, Wright-Patterson AFB, OH, USA, EEG and subjective measures of private pilot workload, Proceedings of the 38th Annual Meeting of the Human Factors and Ergonomics Society. Part 2 (of 2), Oct 24-28 1994, Nashville, TN, USA, Human Factors and Ergonomics Society, Inc. Santa Monica, CA, USA, 1994, 2, 1322-1325

Complex systems can place high levels of mental demand on human operators and methods of assessing these demands are needed. Subjective and performance metrics are typically employed while psychophysiological assessment has been used to a more limited extent. In this study, civilian pilots flew a single engine propeller aircraft on a flight profile designed to produce several levels of cognitive workload using VFR and IFR conditions. Subjective and brain wave (EEG) measures were used to assess mental workload. EEG theta band activity was sensitive to a wider range of workload levels and was more sensitive than the alpha and beta bands or the subjective reports. The alpha and beta bands reliably discriminated between ground and flight segments as did the subjective data. Private pilot workload Subjective measures Visual flight rules Instrument flight rules

Journal Long Form, 32, Cagley, James R. Cagley & Associates, Rockville, MD, USA, Restoring freedom at the capitol dome, Civil Engineering (New York) 1994, 64, 6, 57-59, CIEGAG, 0885-7024

The statue of freedom sat atop the U.S. Capital dome for the past 130 years. Recently, the historic statue dangled from a helicopter. It was then removed, repaired, restored and put back, ready to face another century because engineers delt creatively with problems for which there were no standard solutions. The entire project team - ironworkers, riggers, memebers of the Architect of the Capitol's staff, the conservator's staff, the helicopter crew, the Cagley & Associates staff and Architect of the Capitor White - made this project look simple and easy. The statue will now survive for future generations. Statue of Freedom Capital Dome Skycrane helicopter

Journal Long Form, 33, Lavitt, Michael O. Grabber eases lift burden for helicopter operators, Aviation Week and Space Technology (New York), 1994, 141, 14, 74, AWSTAV, 0005-2175

Heli Tech (Eugene, OR) has developed a new handling system which is giving helicopter operators an unprecedented flexibility to lift a wide variety of external loads without the aid of a groundcrew. The Grabber hangs below the helicopter from a cable. A 2 1/2-hp, four-cycle gasoline engine drives the hydraulic system that actuates the jaws to grab logs, poles, debris or other loads. With a frame made of milled steel and jaws of high-strength steel, the device measures 26 $MUL 29 $MUL 46 in. The pilot directs the Grabber as he would a standard hook, and controls opening and closing of the jaws with a cyclic-mounted, three-position, center-off spring switch. This arrangement is claimed to give pilots precise control. Grabber Helicopter operators

Journal Long Form, 34, Reid, Lloyd D. //Rajagopal, Pavan //Graft, Wolf O. Univ of Toronto, Toronto, Ont, Can, Flight control system mode transitions influence on handling qualities and task performance, Journal of Aircraft 1994, 31, 5, 1037-1042, JAIRAM, 0021-8669

The paper presents a flight research simulator modified with a digital flight control system (FCS) and a side arm controller to model a fly by wire helicopter. The simulator is used to investigate the influence of mode transition type and mode pair on pilot/helicopter response for formation flying and precision hover. A FCS mode selection algorithm was developed to carry out the commanded mode transitions. Results of the study acquired in the form of Cooper-Harper handling qualities ratings (HQR) and station keeping performance measurements showed that the mode pair affected both the HQR and performance while type of mode transition did not affect the results. Flight control system Side arm controller Task performance Transition mode Handling qualities rating Stationkeeping Mode pair

Journal Long Form, 35, Schreyer, H. //Boehm, H.-D. V. //Svedevall, B. Eurocopter Deutschland GmbH, Munchen, Ger, Integrated helmet system with image intensifier tubes Displays, 1994, 15, 2, 98-105 DISPDP, 0141-9382

A second-generation anti-tank helicopter, Tiger equipped with a thermal imager intended to achieve the possibility of flying round the clock, and an IHS in the PAH 2 enabling the pilot to use an additional sensor in the visible and near infra-red spectrum is presented. The Eurocopter was the first one to demonstrate the testing of this helmet in their laboratory, later a plan to integrate the C-prototype into a BK 117 helicopter for system integration tests was realized. Various parameters enumerated in the article were tested in the laboratory. The CRT channels were also examined. Properties and requirements of the helmet, test procedure together with the results are presented. Integrated helmet system Helmet mounted sight and display Pilot visionic system Thermal imager

Journal Long Form, 36, Cameron, Alexander A. GEC Marconi Avionics, Kent, Engl, 24-hour helmet-mounted display Displays, 1994, 15, 2, 83-90 DISPDP, 0141-9382

Helmet-mounted displays (HMDs) optimized for night flying are now available from several manufacturers, as are HMDs optimized for day applications. In general day and night operations require HMDs with different attributes. Daytime use requires an HMD to be monocular, with up to 25$DGR field of view, symbols only, very lightweight (3-3.5 lbs), high real-world transmission and high display brightness. At night, an HMD must be binocular, with greater than 40$DGR field of view, forward-looking infra-red display, symbology overlay, integrated night vision, lightweight (4.5 lbs max), reduced real world transmission and low brightness display. However, many mission scenarios require the HMD to be used in both day and night conditions in the course of a single mission and therefore require the HMD to provide a 24-hour capability. This paper describes design solutions for 24-hour HMDs for both fixed wing and rotary wing applications, using state of the art technology. Helmet mounted display Night vision Visor projected display Forward looking infrared imagery Line of sight

Conference Proceeding, 37, Pieper, J. K. //Baillie, S. //Goheen, K. R. Univ of Calgary, Calgary, Alberta, Can, Linear-quadratic optimal model-following control of a helicopter in hover, Proceedings of the 1994 American Control Conference. Part 3 (of 3), Jun 29-Jul 1 1994, Baltimore, MD, USA, American Automatic Control Council, Green Valley, AZ, USA, 1994, 3, 3470-3474

Presented are the results of a study of the application of linear quadratic optimal model following control design applied to a Bell 205 helicopter in hover. The objectives of the study were to achieve good performance and stability robustness via simulations using

nominal and perturbed systems and to study the tuning procedure through extensive design analyses where effects on the closed loop system of variations in selected tuning parameters were studied. Hover Closed loop system Flight control augmentation systems Pilot induced oscillations Cross coupling Error dynamics Model fidelity

Journal Long Form, 38, Chiba, Osamu //Naito, G. //Kobayashi, F. //Toritani, H. Kochi Univ, Kochi, Jpn, Wave trains over the sea due to sea breezes, Boundary-Layer Meteorology, 1994, 70, 4, 329-340, BLMEBK, 0006-8314

Meteorological observation by a helicopter was carried out to investigate the structure of sea breezes over the coastal area of Tosa Bay in Shikoku island, Japan. Several groups of wave trains were found over the sea during a flight made on 25 November 1992. Not only the terrain barrier but the remaining cold air pools formed in valleys hindered further advance of the sea breeze inland, so that the presence of such wave trains may appear to be due to the effect of the secondary flow which supplies moister and cooler air from behind the sea breeze front. Wave trains Sea Sea breeze Sea breeze structure Secondary flow

Journal Long Form, 39, Lawes, S. T. //Clarke, T. Univ of York, York, Engl, Large-scale transputer network application: the aero-mechanical simulation of a single-rotor helicopter for control system design, Transactions of the Institute of Measurement and Control 1994, 16, 1, 17-24, TICODG, 0142-3312

The proposed role for future advanced rotorcraft requires superior agility and enhanced safety, coupled with a reduced pilot workload. More elaborate flight control systems will therefore be required which will have to be digitally implemented. New design methodologies will be required, in turn necessitating the development of new tools. One such tool will be a more complex real-time simulation of helicopter dynamics. This paper describes a generic real-time computer model of helicopter dynamics that eliminates the need for simplifying assumptions to enable real-time operation. A concurrent approach is used that exploits the natural parallelism of the helicopter dynamics. Implemented on a transputer network, the model exhibits ideal qualities as a development tool for advanced helicopters and their systems. Large scale transputer network Aeromechanical simulation Flight control systems

Journal Long Form, 40, KrishnaKumar, K. //Sawhney, S. //Wai, R. Univ of Alabama, Tuscaloosa, AL, USA, Neuro-controllers for adaptive helicopter hover training IEEE Transactions on Systems, Man and Cybernetics 1994, 24, 8, 1142-1152, ISYMAW, 0018-9472

This paper presents an application of artificial neural networks in adaptive helicopter hover training of novice student pilots. The design of the adaptive trainer utilizes the hypothesis that novices can be trained to fly a helicopter system automatically (with no human interaction) if the helicopter system adapts to the learning curve of the student. Two different techniques based on the above approach are presented. In the first technique, the helicopter system actively enforces optimality by augmenting the novice's control inputs by amounts necessary to satisfy desired performance criteria. The second technique uses relaxed performance criteria that are not initially optimal, but approach optimality in a graded fashion, based on the learning curve of the student. Adaptive neuro-controllers, together with a critic model, are used to implement the adaptive helicopter system. The results using simulated student models verify the approach adopted, and show that the adaptive neuro-controllers allow the helicopter system to adapt to the novice's learning curve. Novice student pilots Pilot training Learning curve

Journal Long Form, 41, Purgold, Gerald C. //Whitlock, Charles H. //Wheeler, Robert J. //LeCroy, Stewart R. NASA Langley Research Cent, Hampton, VA, USA, Multiwavelength airborne radiometer scanner (ARS) for measuring surface bidirectional reflectance characteristics, Remote Sensing of Environment, 1994, 47, 3, 322-330 RSEEA7, 0034-4257

The development and application of the Airborne Radiometer Scanner (ARS), a helicopter-borne multiwave-length radiometer scanner to obtain directional reflectance data over natural Earth Targets, is reported. The rationale for the methodology used in the design and a datailed description of the instrument are described. Techniques used to maintain a desired heating in crosswinds without introducing unwanted pitch or roll moments into the platform are included. The system overcomes some of the limitations of previous methods used to characterize surface directional reflectance. Samples of results from a pilot experiment conduced over the alkali flats region of the While Sands Missile Range, New Mexico, are briefly reviewed. Airborne radiometer scanner (ARS) Surface bidirectional reflectance Multiwavelength airborner radiometer Helicopter-borne multiwave-length radiometer scanner

Conference Proceeding, 42, Holland, O. F. Versatile data acquisition system for helicopter flight trials, Proceedings of the 3rd Australasian Instrumentation and Measurement Conference, Apr 26-29 1994, Adelaide, Aust Publ by IE Aust, Crows Nest, NSW, Aust, 1994, 437-441

A data acquisition system is described that has been designed to meet the requirements of the Royal Australian Navy in conducting various helicopter flight trials. The system is designed around an industrial personal computer and provides for programmable configuration of selected channels and signal conditioning parameters. A wide range of data is acquired from analogue inputs, digital inputs, synchro inputs and the aircraft MIL-

STD-1553 serial bus. Real-time calculations are performed on the data and selected information is displayed to the pilot during the trial. Helicopter flight trials Programmable configuration Signal conditioning parameters

Conference Proceeding, 43, Zelenka, Richard E. NASA, Moffett Field, CA, USA, Flight test development and evaluation of a kalman filter state estimator for low-attitude flight, Proceedings of the IEEE Conference on Control Applications. Part 2 (of 2), Sep 13-16 1993, Vancouver, BC, Can Publ by IEEE, Piscataway, NJ, USA, 1993, 2, 783-790, 0780309081

A Kalman filter state estimator has been developed which blends airborne navigation, stored terrain elevation data, and a radar altimeter in estimating above-ground-level (AGL) altitude. This AGL state estimator was integrated in a near-terrain guidance system aboard a research helicopter and flight tested in moderately rugged terrain over a variety of flight and system conditions. The minimum operating altitude of the terrain database referenced guidance system was reduced from 300 ft to 150 ft with the addition of this Kalman filter state estimator. Low altitude flight Kalman filter state estimator

Conference Proceeding, 44, Coppenbarger, R. A. //Cheng, V. H.L. NASA Ames Research Center, Moffett Field, CA, USA, Simulation evaluation of a pilot interface with an automated rotorcraft obstacle avoidance system, Proceedings of the IEEE Conference on Control Applications. Part 2 (of 2), Sep 13-16 1993, Vancouver, BC, Can, Publ by IEEE, Piscataway, NJ, USA, 1993, 2, 649-657, 0780309081

This paper first describes the inner loop Automated Nap-of-the-Earth Guidance and Control System (ANGCS) and the associated PDG interface, followed by the findings from the fixed-base simulation. The simulation was designed to assess pilot-in-the-loop performance of the PDG-ANGCS technology and determine its effectiveness at reducing pilot workload. Head-up symbology, including inertial course information and critical aircraft states, was presented to the pilot through an Integrated Helmet and Display Sighting System (IHADSS) with head tracking. A typical NOE obstacle course was flown both manually and with the PDG system at various airspeeds and visibility conditions for a comparative performance and workload study. Pilot interface Rotorcraft obstacle avoidance system Pilot directed guidance (PDG) Automated nap of the earth guidance and control system (ANGCS)

Journal Long Form, 45, Zintsmaster, Logan R. Kaiser Electronics, San Jose, CA, USA, Wide-eye$+TM$/helmet mounted display system for rotorcraft applications, IEEE Aerospace and Electronic Systems Magazine 1994, 9, 3, 6-11 IESMEA, 0885-8985

This paper describes the Kaiser Electronics developed WIDE-EYE Helmet Mounted Display System that uses a Kaiser unique Aircraft Retained Unit/Pilot Retained Unit (ARU/PRU) helmet display unit design. The overall system block diagram is presented and each major subsystem is described in detail. Extensions to the basic design to add full color capability are also described. Helmet mounted display system Full color capability Aircraft retained unit (ARU) Pilot retained unit (PRU)

Journal Long Form, 46, Sirevaag, Erik J. //Kramer, Arthur F. //Wickness, Christopher D. //Reisweber, Mark //Strayer, David L. //Grenell, James F. Univ of Illinois, Urbana, Il, USA, Assessment of pilot performance and mental workload in rotary wing aircraft, Ergonomics 1993, 36, 9, 1121-1140, ERGOAX, 0014-0139

This research examined the processing demands imposed upon experienced pilots by two different communication formats, digital and verbal, in a high fidelity simulation of an advanced multi-function helicopter. The mental workload imposed by the type and magnitude of communications was assessed by a battery of subjective, performance, secondary, and physiological measures. The performance data indicated that the pilots had difficulty adhering to the Nap of the Earth altitude criterion with high communication demands, particularly with the digital communication system. The results are discussed in terms of the structural and capacity demands of the communications systems that were proposed for the advanced multi-function helicopter. Pilot performance Mental workload Rotary wing aircraft Heart rate variability (HRV) Event related brain potentials

Conference Proceeding, 47, Cameron, Alexander A. GEC-Marconi Avionics Ltd. Rochester, Kent, UK, 24-hour helmet-mounted display, Display Systems: High-Resolution and Large Screen Displays and Helmet, Head-Up, and Head-Down DisplaysMunich, Ger, Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1993, 1988, 181-192, 0819412376

Helmet mounted displays optimized for night flying are now available from several manufacturers as are HMDs optimized for day applications. In general day and night operations require HMDs with different attributes. However, many mission scenarios require the HMD to be used in both day and night conditions in the course of a single mission and therefore require the HMD to provide a 24 hour capability. This paper describes designs solution for 24 hour HMDs for both fixed wing and rotary wing applications, using current state of the art technology. Helmet-mounted displays Rotary-wing aircraft Fixed-wing aircraft Night flying HMDs

Conference Proceeding, 48, Kraus, Jean-Marc //Schroer, Gerd, SEXTANT Avionique and VDO-Luftfahrtgeraete Werk, St. Medard en Jalles Cedex, Fr, Helmet-mounted displays for rotary-wing aircraft: operational requirements and technical approach,

Display Systems: High-Resolution and Large Screen Displays and Helmet, Head-Up, and Head-Down DisplaysMunich, Ger, Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1993, 1988 148-159, 0819412376

The Helmet-Mounted Display (HMD) concept is now widely used to meet the ever increasing mission requirements of modern helicopters especially for the very demanding tasks of night navigation, piloting, and use of armaments. However, a careful review of the system and ergonomic issues has to be undertaken in order to define a product that will be accepted by the aircrew and efficient in the battle field environment. Special attention must be paid in the specifications and implementation of the image sensors used to display the external scene in front of the eyes of the aircrew members. A technical approach, including various designs and the most significant performances, is described. Rotary-wing aircraft Helmet-mounted displays Night navigation Piloting Air crews

Book Whole, 49, Cowan, Matthew D. (Ed.) //Bartlett, Christopher T. (Ed.), Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1993, 1988250p, 0819412376

Proceedings incorporates 26 papers. The material is arranged into five sessions. These deal with: 3-D systems; imaging devices; human factors and systems issues; display technologies; as well as helmet-mounted displays. EiREV large-screen displays High-resolution displays Helmet-mounted displays Liquid-crystal resonators 3-D displays Head-up displays Head-down displays Ferroelectric displays

Journal Long Form, 50, Okuno, Yoshinori //Kawachi, Keiji, National Aerospace Lab, Tokyo, Jpn, Optimal control of helicopters following power failure, Journal of Guidance, Control, and Dynamics 1994, 17, 1, 181-186, JGCODS, 0731-5090

Helicopter control procedures following power failure were investigated theoretically by applying optimal control theory. The calculated height-velocity boundaries showed good correlation with flight test results. However, several differences were observed between the optimal solutions and pilot's control usage, especially in the timing and amplitude of the collective flare before touchdowns. In addition, parameters such as pilot reaction delay, collective setting during descent, the location and available field length of the landing site, and wind speed were found to have a significant effect on the success of the emergency landing. Some of these effects are not currently taken into account during certification flight tests. Pilot reaction delay Collective setting High velocity boundaries Power failure Autorotation

Journal Long Form, 51, Harris, E. L. //Rindall, B. D. //Tarko, N. J. //Norris-Elye, O. C. Havenfield Corp, Miami, FL, USA, Effects of Helicopter on DC fields and ions, IEEE Transactions on Power Delivery, 1993, 8, 4, 1837-1841 ITPDE5, 0885-8977

When a plan was initiated to utilize a helicopter to perform work on an energized, high voltage dc transmission line by bonding the helicopter to the conductor, it was necessary to determine what effect, if any, the helicopter would have on the dc fields and ions. In addition, it was necessary to determine the possible effect on helicopter instrumentation and communications. A test site and research facility at Lundar, Manitoba, Canada, provided the ideal location for making these tests. As a result, the information obtained determined that a helicopter-airborne platform could safely be used to perform the work. DC fields Lundar, Manitoba

Conference Proceeding, 52, Morris, Edwin E. Martin Marietta, Utica, NY, USA, Advanced Air Defense Electro-Optical Sensor, Infrared Technology XIXSan Diego, CA, USA, Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1993, 2020 68-75, 0819412694

The Advanced Air Defense Electro-Optical Sensor (AADEOS) is an Advanced Technology Demonstration (ATD) Program ground-based Infrared Search and Track (IRST) system intended for use by U.S. Army Forward Area Air Defense (FAAD) units. It is designed to provide automatic detection and tracking of rotary wing and fixed-wing aircraft. The AADEOS has been built and is currently being evaluated at Fort A. P. Hill, Virginia. The evaluation includes collecting IRST video data of military aircraft and background clutter used to train target/clutter discrimination algorithms. The operational performance of the system (i.e. the declaration range and false alarm rate) is being estimated. Advance air defense electro-optical sensors Infrared search and track systems Background clutter False alarms

Conference Proceeding, 53, Sridhar, Banavar //Suorsa, Raymond E. NASA Ames Research Cent, Moffett Field, CA, USA, Computer architectures for a real-time passive ranging algorithm, Proceedings of the IEEE/AIAA 12th Digital Avionics Systems Conference, Oct 25-28 1993, Fort Worth, TX, USA, Publ by IEEE, Piscataway, NJ, USA, 1993, 292-297, 0780313445

The complexity of rotorcraft missions involving operations close to the ground result in high pilot workload. In order to allow a pilot time to perform mission-oriented tasks, sensor-aiding and automation of some of the guidance and control functions is highly desirable. Images from an electro-optical sensor provide a covert way of detecting objects in the flight path of a low-flying helicopter. Passive ranging consists of processing a sequence of images using techniques based on optical flow computation and recursive estimation. The passive ranging algorithm has to extract obstacle information from

imagery at rates varying from five to thirty or more frames per second depending on the helicopter speed. Electro-optical sensors Optical flow computation Recursive estimation Passive ranging algorithm

Conference Proceeding, 54, Terry, William S. //Terry, Jody K. //Cable, CDR Larrie G. IBM Corp, Owego, NY, USA, From data to information; data reduction for operator workload management, Proceedings of the IEEE/AIAA 12th Digital Avionics Systems Conference, Oct 25-28 1993, Fort Worth, TX, USA Publ by IEEE, Piscataway, NJ, USA, 1993, 75-80, 0780313445

Modern multi-mission naval aircraft must operate in increasinly complex mission environments with potentially large numbers of air, surface, and undersea contacts. While operating under strict rules of engagement, the operators of the aircraft must be able to readily sort through the considerable volume of data to locate and suitably interact with the contacts of interest interspersed in the environment. This paper will present the concepts and methodologies which IBM and the US Navy are providing in the Block II upgrade for the light airborne multipurpose system (LAMPS) MK III Weapon System to achive the mission objectives and assist the crew through workload reduction. Operator workload management Light airborne multipurpose system (LAMPS) Airborne multipurpose system LAMPS ship segment (LSS) LAMPS MK weapon system

Conference Proceeding, 55, Zintsmaster, Logan R. Kaiser Electronics, San Jose, CA, USA, Wide-Eye helmet mounted display system for rotorcraft applications, Proceedings of the IEEE/AIAA 12th Digital Avionics Systems Conference, Oct 25-28 1993, Fort Worth, TX, USA, Publ by IEEE, Piscataway, NJ, USA, 1993, 27-31, 0780313445

This paper describes the Kaiser developed WIDE-EYE Helmet Mound display system that uses a kaiser unique aircraft retained unit/ pilot retained unit (ARU@$DIV@PRU) helmet display unit design. The overall system block diagram is presented and each major subsystem is described in detail. Extensions to the basic design to add full color capability are also described. Helmet mounted display system (HMD) Rotorcraft applications Wide eye system diagram RAH-66 Comanche Helmet integrated display Display Electronics unit (DEU)

Conference Proceeding, 56, Sheppard, John W. ARINC Research Corp, Testing fully testable systems: A case study, Proceedings of the 24th IEEE International Test Conference Oct 17-21 1993, Baltimore, MD, USA, Publ by IEEE, Piscataway, NJ, USA, 1993, 268, 0780314298

The Blackhawk Stability Augmentation System (SAS), is a subsystem of the Automatic Flight Controls System (AFCS). The AFCS is a system that provides inputs to the Flight Control System to assist the pilot in handling the helicopter. The author performed a testability analysis on the SAS in several iterations, starting with the manufacturer-documentated test procedures and proceeding to a recommended set of procedures. The analysis revealed that the system fault-isolation capability was 100% This indicated that the system was fully testable and we should not have seen the fielded problems that were reported. Blackhawk Stability Augmentation System (SAS) Automatic flight control system (AFCS)

Conference Proceeding, 57, Weiland, Monica Z. //Convery, Brain A. //Zaklad, Allen L. //Zachary, Wayne W. //Fry, Clarence A. //Voorhees, James W. CHI Systems, Inc. Spring House, PA, USA, Active man machine interface for advanced rotorcraft, Proceedings of the 37th Annual Meeting of the Human Factors and Ergonomics Society. Part 2 (of 2)Seattle, WA, USA, Publ by Human Factors and Ergonomics Society, Inc. Santa Monica, CA, USA, 1993, 2, 1032

The proliferation of digital avionic information presented to pilots has produced a critical need for intelligent avionic information management, particularly in the area of Caution, Warning, and Advisory (CWA) systems. This demonstration illustrates the role of an Active Man Machine Interface (AMMI) in the context of CWA systems in rotorcraft of the future. The basis of the AMMI's intelligence demonstrated here is provided by a cognitive model that 1) prunes the alert stream to only those messages that have meaning to the pilot depending on the tactical context, and 2) provide context-sensitive advice on the basis of the tactical context. The CWA AMMI is currently being designed using COGNET, an cognitive modeling methodology (Zachary, 1989), and implemented using BATON, a set of software tools used to implement and embed COGNET models into existing systems (Zachary et al, 1991). Rotorcraft Digital avionic information Active man machine interface

Conference Proceeding, 58, Kennedy, Robert S. //Berbaum, Kevin S. //Smith, Martin G. Methods for correlating visual scene elements with simulator sickness incidence, Proceedings of the 37th Annual Meeting of the Human Factors and Ergonomics Society. Part 2 (of 2)Seattle, WA, USA, Publ by Human Factors and Ergonomics Society, Inc. Santa Monica, CA, USA, 1993, 2, 1252-1256

Simulator sickness occurs in a large number of Army, Navy, and Marine Corps simulators, and is most prevalent in moving-base, rotary-wing devices which employ cathode ray tube (CRT) video displays as opposed to fixed-wing, dome-display trainers with no motion base. Based on data from a factor analysis of over 100 Navy and Marine Corps pilot simulation exposures, a new scoring procedure was applied to two helicopter simulators with similar rates of simulator sickness incidence. Preliminary work was begun to record

the visual scene by video frame-by-frame decomposition and automated scoring algorithms were developed. The findings are discussed from the standpoints of (1) recommendations for future design and use of simulators, and (2) the metric advantages and other merits of the 'field experiment' methodology to address human factors problems with simulator sickness. Simulator sickness Visual scene elements Human factors Metrics

Conference Proceeding, 59, Zacharias, Greg L. //Riley, Edward W. //Gonsalves, Paul G. Charles River Analytics, Intelligent flight trainer for initial rotary wing training, Proceedings of the Aerotech Conference, Sep 27-30 1993, Costa Mesa, CA, USA, Publ by SAE, Warrendale, PA, USA, 1993, 49-611560914289

This paper summarizes an effort to develop and demonstrate an Intelligent Flight Trainer (IFT) for Initial Entry Rotary Wing (IERW) training. Demonstration of concept feasibility relies on an Intelligent Tutoring System (ITS) architecture incorporating Adaptive Training to progressively improve student pilot proficiency. The IFT structure includes: a teacher model which includes algorithmic and expert system assessments of student performance; a domain expert model which maintains knowledge of maneuver criteria and strategies; and a student model which reflects student proficiency. Under an initial feasibility effort we implemented the IFT, integrated it with the UH-1 Training Research Simulator (UH-1TRS) at Fort Rucker, and demonstrated real-time operation in teaching student pilots elementary hover maneuvers. Follow-on development and validation will extend the IFT to a full-scope IERW trainer, validate its effectiveness, and specify requirements for developing it into an add-on module for existing simulators. Intelligent flight trainer Initial rotary wing training Intelligent tutoring systems Domain expert model Student model Student pilot proficiency

Book Whole, 60, Shapiro, Diane C. (Ed.) //Norman, R. Michael (Ed.), Publ by SAE, Warrendale, PA, USA, 1993, 162p, 1560914289

This conference proceedings contains 19 papers on advances in flight simulation and training technology. Advances in simulation technology for both training and R&D applications include helmet-mounted information displays, neurocontrollers, automated training systems, and simulation for space-based systems. Advances in training methodology include advanced flight deck transition training, new training tools, and effective low-cost alternatives for part-task training. With the ever-increasing emphasis on human factors in cockpit and cabin design, the papers on research, advances, and certification criteria in that field are highly pertinent. Other papers describe how several universities have restructured their aerospace engineering curricula to meet the changing needs of industry into the next century. Aerospace education Flight training Flight simulation Aircraft cabin design Intelligent flight trainers Adaptive helicopter training Orbital extravehicular activity simulation Computer based aviation training EiREV

Conference Proceeding, 61, D'Cruz, Lynne Maree //Seth, Shashi //Xie, Binyun //Garg, Richa, ViGYAN, Inc, Hampton, VA, USA, Expert system for navigation in hazardous weather conditions: Pilot weather advisor, Proceedings of the 5th Australian Aeronautical Conference. Part 1 (of 2), Sep 13-15 1993, Melbourne, Aust Publ by IE Aust, Crows Nest, NSW, Aust, 1993, 1 131-135

In an effort to combine navigation, and in flight weather information to evolve a total flight management system, we are tackling with the issues of providing usable information to the pilot in the cockpit of aircraft. We are currently involved in the design and development of such a system, called the Pilot Weather Advisor. This paper describes the research effort directed towards the development of an Expert System to help pilots navigate in hazardous weather conditions. The expert system advises on paths outside of any hazardous regions, automatically detected by analysis of radar and surface observations along the flight path of the aircraft. This problem can be visualized as a robot navigation problem in 2-D, with the aircraft as the robot and the radar areas as objects. Several robot navigation algorithms lend themselves naturally to this problem. These include the VGRAPH algorithm and the A* Algorithm. We have provided an overview of applying a combination of these algorithms to our problem. We also discuss the idea of representing our knowledge-base of Visual Flying Rules (VFR) and Instrument Flying Rules (IFR) by embedding it within `hypertext'. Hazardous weather conditions Pilot weather advisor Visual flying rules Instrument flying rules

Conference Proceeding, 62, Meredith, D. L. //Karr, C. L. //Krishna Kumar, K. Univ of Alabama, Tuscaloosa, AL, USA, Use of genetic algorithms in the design of fuzzy logic controllers, Proceedings of the 3rd Workshop on Neural Networks: Academic/Industrial/NASA/DefenseAlabama, AL, USA, Publ by Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA, 1993, 1721, 549-555, 1565550072

The U.S. Bureau of Mines is currently investigating ways to combine the control capabilities of fuzzy logic with the learning capabilities of genetic algorithms. Fuzzy logic affords a mechanism for providing conventional expert systems with the uncertainty inherent in most control problems. Although fuzzy logic-based expert systems have been used successfully for controlling a number of physical systems, the selection of acceptable fuzzy membership functions has generally been a subjective decision. In this paper, high-performance fuzzy membership functions for a fuzzy logic controller that manipulates a mathematical model simulating a helicopter hovering in a turbulent wind condition are chosen using a genetic algorithm, a search technique based on the mechanics of natural genetics. The membership functions chosen by the genetic algorithm provide for a more efficient fuzzy logic controller for the hovering helicopter than membership functions selected by the authors. Thus, genetic algorithms represent a potentially effective and structured approach for learning fuzzy membership functions.

Fuzzy logic controllers Genetic algorithms Logic-based expert systems Fuzzy membership functions Hovering helicopters

Conference Proceeding, 63, Smith, Phillip N. //Sridhar, Banavar //Suorsa, Raymond E. NASA Ames Research Center, Moffett Field, CA, USA, Multiple-camera/motion stereoscopy for range estimation in helicopter flight, Proceedings of the 1993 American Control Conference Part 2 (of 3), Jun 2-4 1993, San Francisco, CA, USA, Publ by IEEE, Piscataway, NJ, USA, 1993, 1339-13430780308611

Pilot aiding to improve safety and reduce pilot workload to detect obstacles and plan obstacle-free flight paths during low-altitude helicopter flight is desirable. Computer vision techniques provide an attractive method of obstacle detection and range estimation for objects within a large field of view ahead of the helicopter. Previous research has met considerable success by using an image sequence from a single moving camera in solving this problem. The major limitations of single camera approaches are that no range information can be obtained near the instantaneous direction of motion or in the absence of motion. These limitations can be overcome through the use of multiple cameras. This paper presents a hybrid motion/stereo algorithm which allows range refinement through recursive range estimation while avoiding loss of range information in the direction of travel. A feature-based approach is used to track objects between image frames. An extended Kalman filter combines knowledge of the camera motion and measurements of a feature's range and to predict its location in future images. Performance of the algorithm will be illustrated using an image sequence, motion information, and independent range measurements from a low-altitude helicopter flight experiment. Motion stereoscopy Range estimation Obstacle free flight Image sequence

Conference Proceeding, 64, Balick, Lee K. //Golanics, Charles J. //Shines, Janet E. //Biggar, Stuart F. //Slater, Philip N. EG&G Energy Measurements Inc. Las Vegas, NV, USA, In-flight calibration of a helicopter-mounted Daedalus multispectral scanner, Calibration of Passive Remote Observing Optical and Microwave Instrumentation, Apr 03-05 1991, Orlando, FL, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1991, 1493, 215-223, 0819406023

A convenient technique that has been used to calibrate, in-flight, a helicopter-mounted Daedalus multispectral scanner is described. It used four large canvas panels laid out in a square with a Spectralon panel as a reference. A calibrated Barnes modular multispectral radiometer, carried on a 2.2-m boom, was rotated around a 2.5-m high tripod at the center of the square. The radiometer sampled the four large panels and the Spectralon panel once every two minutes. Atmospheric spectral transmittance measurements were made using a filter radiometer on an autotracking mount during the morning of the flight. The reflectance and optical depth data were used in an atmospheric radiative transfer code to predict the spectral radiances at the scanner. The calibration was completed by comparing the image digital counts to the predicted spectral radiances. Daedalus Multispectral Scanner Atmospheric Spectral Transmittance Atmospheric Correction Filter Radiometer Optical Depth Spectral Calibration

Conference Proceeding, 65, Smith, Scott M. NASA-Ames Research Center, Moffett Field, CA, USA, Rotor Fatigue monitoring data acquisition system, Proceedings of the 39th International Instrumentation Symposium, May 2-6 1993, Albuquerque, NM, USA, Publ by Instrument Society of America, Research Triangle Pk, NC, USA, 1993, 37-46, 1556174586

The 40 by 80 foot wind tunnel of the National Full Scale Aerodynamics Complex (NFAC) had a requirement to monitor rotor fatigue during a test. This test is subjected various rotor components to stress levels higher than their structural fatigue limits. A data acquisition system was developed to monitor the cumulative fatigue damage of rotor components using National Instruments hardware and LabVIEW software. A full description of the data acquisition system including its configuration and salient features, is presented in this paper, High speed rotorcraft Software package LabVIEW

Conference Proceeding, 66, Doggett, Robert V Jr //Rosser, David, C. Jr //Byrant, Charles, S. Jr, NASA Langley Research Center, Hampton, VA, USA, Data acquisition for aeroelastic testing at the NASA Langley transonic dynamics facility, Proceedings of the 39th International Instrumentation Symposium, May 2-6 1993, Albuquerque, NM, USA, Publ by Instrument Society of America, Research Triangle Pk, NC, USA, 1993, 877-887, 1556174586

Aeroelasticity is defined and different types of aeroelastic tests are described. the instrumentation and data acquisition requirements dictated by the time varying characteristics of aeroelastic phenomena are pointed out. Instrumentation needs for various types of tests are discussed. the hardware components and operational features of the real-time, digital-computer-controlled data acquisition system used to support testing at the Langley Transonic Dynamics Facility, which includes a major wind-tunnel, a helicopter-model hover facility, and two model setup and calibration laboratories described. Transonic dynamics

Journal Long Form, 67, Sridhar, B. //Smith, P. //Surosa, R. //Hussien, B. NASA, Moffett Field, CA, USA, Multirate and event-driven Kalman filters for helicopter flight, IEEE Control Systems Magazine, 1993, 13, 4, 26-33, ISMAD7, 0272-1708

Helicopters flying at low altitude need information about objects in the vicinity of their flight path for automatic obstacle avoidance in a guidance system or as a display to warn the pilot. NASA is examining the role of a vision based obstacle detection system to provide a

range map, i.e. information about objects as a function of azimuth and elevation. Results show that, compared to the standard Kalman filter, either the multirate or event-driven formulation can be used to achieve a more uniform estimation accuracy over a large portion of the image with a substantial reduction in the amount of computation. Multirate Event driven Helicopter flight

Journal Long Form, 68, Gribble, Jeremy J. Univ of Glasgow, Glasgow, Scotl, Linear quadratic Gaussian/loop transfer recovery design for a helicopter in low-speed flight Journal of Guidance, Control, and Dynamics, 1993, 16, 4, 754-761, JGCODS, 0731-5090

A control law for a helicopter in low-speed flight is designed using the linear quadratic Gaussian/loop transfer recovery method. The specifications are adapted from a subset of the U.S. Army helicopter handling qualities requirements. The design model consists of the rigid-body dynamics linearized about the 30 kt forward flight condition, together with a simplified, low-order representation of actuator and rotor dynamics. Evaluation is performed using higher-order models, obtained by linearization about several different points in the flight envelope, covering the speed range from 10 to 50 kt. These models contain more accurate representations of the high-frequency actuator and rotor modes. The final selection of the numerical values of the linear quadratic parameters is made by numerical optimization of the loop shape. It is found that the specifications considered can be satisfied for all of the evaluation models without gain scheduling. Linear quadratic Gaussian/loop recovery method Actuator dynamics Rotor dynamics Helicopter flight control system Low speed flight

Journal Long Form, 69, Takahashi, Marc D. NASA Ames Research Cent, Moffett Field, CA, USA, Synthesis and evaluation of an H-2/ control law for a hovering helicopter, Journal of Guidance, Control, and Dynamics 1993, 16, 3, 579-584, JGCODS, 0731-5090

The design and simulator evaluation of a rate-command flight-control law for a UH-60 helicopter in near-hover flight conditions are described. The multivariable control law was synthesized using an H-2/ method, which, through weighting functions, directly shapes the singular values of the sensitivity (I $PLU GK)$+$MIN@1$/, complementary sensitivity GK(I $PLU GK)$+$MIN@1$/, and control input K(I $PLU GK)$+$MIN@1$/ transfer-function matrices. The design was implemented on the vertical motion simulator, and four low-speed hover tasks were used to evaluate the control system characteristics. The pilot comments indicated good decoupling and quick response characteristics, but also revealed a mild pilot-induced oscillation tendency in the roll axis. Flight control law UH-60 helicopters Rotor dynamics Rotocraft design

Conference Proceeding, 70, Bauman, Brian J. //Wolfe, William L. Optical Sciences Cent./Univ. of Arizona, Tucson, AZ, USA, Infrared systems for helicopter pilotage, Infrared Technology XVIII, Jul 19-22 1992, San Diego, CA, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1993, 1762, 50-55, 0819409359

As part of a team headed by the McDonnell Douglas Helicopter Company and including the Honeywell Systems and Research Division, we have investigated several advanced real-time viewing systems. The study was predicated upon human factors drivers that lead to specifications for several different types of systems. These include systems with 0.6 mr resolution and 170$DGR $MUL 50$DGR@, 100$DGR $MUL 50$DGR@, and 50$DGR $MUL 50$DGR fields of view. Real-time viewing systems Infrared systems Pilot night vision system (PNVS)

Journal Long Form, 71, Sarigul-Klijn, Marti M. //Kolar, Ramesh //Wood, E. Roberts, U.S. Navy, Alameda, CA, USA, Application of two chaos methods to higher harmonic control data, Journal of the American Helicopter Society 1993, 38, 2, 68-77 JHESAK, 0002-8711

This paper presents two new data analysis methods which will reduce Higher Harmonic Control (HHC) flight test requirements. HHC is an active system which suppresses helicopter vibrations. These methods, originally used in the study of chaos, are the Poincare section and the Van der Pol plane. Using flight test data from a McDonnell Douglas OH-6A HHC test aircraft, these methods show the following: 1) the limits of HHC vibration reduction; 2) determination of HHC controller type; and 3) that the HHC controller transfer matrix is predictable and repeatable when defined in the 'Rotor Time Domain.' (This domain is a concept introduced in this paper. These benefits do not require an HHC equipped helicopter, although they do require an instrumentation system installed. Finally, these methods can be implemented in real time in most instrumentation systems using only software changes and may be applicable to other vibration control and flight testing problems. Higher harmonic control Poincare section Van der Pol plane Rotor time domain

Book Whole, 72, Anon (Ed.)Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1816p

The Proceedings' first volume contains 64 papers. The topics covered include dynamics, aircraft design, crew stations and human factors, product support, propulsion, aerodynamics, military operations, structures and materials, test and evaluation, and handling qualities. Composite rotor blades Light twin helicoopter RAH-66 Comanche airframe Apache attack helicopter Aeromechanical stability Cockpit emergency procedures Digital terrain systems Night flight Synthetic vision systems EIREV

Conference Proceeding, 73, Hansford, Robert E. Westland Helicopters Ltd, Somerset, UK, Development of the Coupled Rotor-Fuselage Model (CRFM), 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 33-56

A collaborative programme in the United Kingdom, between Westland Helicopters Limited and the Defence Research Agency, has involved a multi-disciplinary team of researchers over the last 6 years, culminating in the first software release of the Coupled Rotor Fuselage Model. By coupling the dynamic systems of the rotor and fuselage using complex rotor modes the analysis accommodated the effects of hub motion on rotor load and vibration prediction. It has also allowed the range of hub types to be expanded to include; bearingless, multi-bladed teetering and gimbal configurations. A main feature of CRFM is to simulate manoeuvring flight conditions, to achieve this aim a model has been developed to mimic the pilot control logic to fly manoeuvres and a new wake model has been included to address the first order implications of manoeuvres on wake geometry. Algorithms for the timewise solution of modal response have been reviewed and prioritized on the basis of accuracy, efficiency and numerical stability. The calculation of rotor loads has shown benefits by the incorporation of a new modal curve fitting technique, providing improved accuracy and efficiency when determining loads using the Force Integration procedure. CRFM has been structured to provide versatility in computation and in application to multiple rotor and wing combinations of different aircraft configurations. The main technology modules are described with associated examples of the potential advantages of CRFM to enhance rotorcraft modelling. Software package Coupled Rotor Fuselage Model Complex rotor modes Hub motions Pilot control logic Modal response Timewise solution Force integration method

Conference Proceeding, 74, Nyhus, Daniel //Rao, Carlo, McDonnell Douglas Helicopter Co, Mesa, AZ, USA, Design of the variable pitch fan for the McDonnell Douglas MD 520N helicopter equipped with the NOTAR$+TM$/ system, 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 111-120

Operational characteristics such as high efficiency, low noise, reduced operating costs and low pilot workload pose significant challenges to the NOTAR$+TM$/ fan designer. A simple lightweight device is designed that effectively addresses these challenges. Each element of the fan is optimized by a full understanding of the physics involved and, within the given constraints, manipulation of the physics to work to the designer's advantage. McDonnell Douglas MD 520N helicopters NOTAR anti torque systems Variable pitch fans

Conference Proceeding, 75, Haworth, Loran A. //Seery, Ronald E. NASA Ames Research Cent, Moffett Field, CA, USA, Helmet Mounted Display symbology integration research, 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 197-213

A five week flight simulation investigation comparing screen/head stabilized Apache Helmet Mounted Display (HMD) flight symbology to world stabilized flight symbology is presented in this paper. Simulation test results indicate that pilots perform significantly (P$LS@.05) better using world stabilized attitude symbology. They were accurate to an average of 1/2 degree at estimating terrain relief and aerial target locations. Pilots were able to take advantage of world referenced symbology due to the unique features of HMD that allow the pilot to visually use the symbology at extreme azimuth and elevation off-axis angles. Pilots preferred world stabilized symbology while performing contour flight tasks. They reported that the use of climb-dive-marker during contour flight greatly reduced pilot work load under conditions tested. A surprising number of cyclic input errors occurred when using both MIL-STD-1295 hover symbology and test symbology indicating that a better approach for depicting hover symbology is probably warranted. The magnitude of cyclic input and spatial estimation errors increased as the off-axis viewing angle became larger. Apache helicopters Helmet mounted display World stabilized symbology Contour flight tasks Aerial target locations Terrain relief estimation Climb dive markers Cyclic input errors Spatial estimation errors Hover symbology

Conference Proceeding, 76, Carter, Mike //Holley, C. D. //Emery, J. H. Bell Helicopter Textron, Inc, Fort Worth, TX, USA, Development of an expert system for cockpit emergency procedures, 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 215-222

Several studies were conducted by Bell Helicopter Textron, Inc. (BHTI), circa 1985, to examine the role of human error in helicopter accidents. These efforts included formulating constructs related to pilot error accidents and, where appropriate, training rationale as a potential intervening strategy. The foregoing background and the software-based training tool that was subsequently developed to attenuate some aspects of the pilot error problem are discussed in this paper. Preliminary results suggest that the software tool provides a practical approach for remediating some aspects of the pilot error problem. Bell Helicopter Textron Incorporated (BHTI) Pilot error accidents Cockpit emergency procedures Software based training tool

Conference Proceeding, 77, Dousis, Dimitri A. Bell Helicopter Textron, Inc, Fort Worth, TX, USA, Vibration Monitoring Acquisition and Diagnostic System for helicopter drive train bench tests, 48th Annual Forum Proceedings of the American

Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 355-369

An automated drive train test stand vibration monitoring system called VMADS has been developed by Bell Helicopter Textron, Inc. and has been installed at Bell's transmission bench test facility. VMADS provides the operator with warning and alarm indications for preselected degraded conditions, and acquires vibration data to be used by engineers to improve the diagnostics for better fault detection and fault isolation. VMADS is used as a test bed for new monitoring and diagnostic algorithm evaluation and validation, a necessary step to ensure development of accurate, reliable integrated health usage monitoring systems for the Bell rotorcraft fleet. This paper highlights the VMADS features for helicopter and tiltrotor aircraft drive train bench test monitoring and diagnostics and discusses supportive ongoing health and usage monitoring activities at BHTI, both military and commercial for enhanced safety and reduced maintenance costs. Bell is translating VMADS developed capability to airborne applications, while simultaneously enhancing the original VMADS capabilities. Vibration Monitoring Acquisition and Diagnostic System (VMADS) Fault detection Fault isolation Bell Helicopter Textron Incorporated Tiltrotor aircraft drive train bench tests Integrated health usage monitoring systems

Conference Proceeding, 78, Whalley, Matthew S. //Carpenter, William R. NASA Ames Research Cent, Moffett Field, CA, USA, Piloted simulation investigation of pitch and roll handling qualities requirements for air-to-air combat, 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 723-735

A piloted simulation investigation of handling qualities requirements for helicopter air-to-air combat has been performed. Specifically, pitch and roll bandwidth, maximum angular rate, and attitude quickness have been investigated in order to determine the magnitudes required for Level 1 and Level 2 handling qualities. Air-to-air engagements were conducted one-on-one versus an automated adversary termed the AUTOMAN. In general, good agreement with the existing rotorcraft handling qualities specification was seen, with the possible exception of pitch bandwidth and roll attitude quickness, both of which may need to be increased. A new requirement for maximum pitch rate is suggested. Results for pitch attitude quickness were inconclusive. Task performance results correlated well with pilot opinion ratings. The AUTOMAN automated adversary proved to be useful in compelling the pilots to perform aggressive air-to-air maneuvering. Handling qualities Attitude quickness Maximum angular rate Pitch and roll bandwidth Air to air combat Piloted simulation Automated adversary AUTOMAN

Conference Proceeding, 79, Ham, Johnnie A. //Metzger, Mark //Hoh, Roger H. U.S. Army Aviation Technical Test Cent, Fort Rucker, AL, USA, Handling qualities testing using the mission oriented requirements of ADS-33C, 48th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), Jun 3-May 92, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1992, 1, 781-791

The U.S. Army Aviation Technical Test Center (ATTC) has been conducting numerous flight and simulator evaluations of rotorcraft handling qualities using the requirements contained in ADS-33C, Handling Qualities Requirements for Military Rotorcraft, a proposed updated MIL-H-8501. This design standard has been adopted as the primary handling qualities specification for the RAH-66 Comanche program. Tests have been conducted on a variety of aircraft aimed at developing, validating, and refining the flight test techniques to be used in future ADS-33C evaluations. Research on the handling qualities requirements of the ADS-33C has been conducted to further develop the mission oriented maneuvers contained in Section 4. These stylized maneuvers were designed to evaluate aircraft response characteristics and pilot workload to both single and multi-axis inputs at three levels of aggressiveness. Some of the problems associated with these maneuvers include the lack of `adequate' performance criteria and the importance of obtaining performance criteria feedback in the maneuvers. The latter directly affects pilot gain and has a major impact on the handling qualities rating assigned the task. Several of the maneuvers were redefined to more easily determine performance compliance using low cost instrumentation. Though no substitute for a complete evaluation, the maneuvers as modified, provide an excellent quick look at a mature aircraft's overall handling qualities, and can serve as a map to further testing to define which of the engineering requirements of the specification need to be revisited and tested in detail. Handling qualities Mission oriented maneuvers Aircraft response Pilot workloads Multi axis inputs Aggressiveness levels RAH-66 Comanche helicopters Handling Qualities Requirements for Military Rotorcraft ADS-33C Performance criteria Criteria feedback

Conference Proceeding, 80, Yablonsky, Evgeny V. Mil Moscow Helicopter Plant, Moscow, Russia, Some considerations on indication means for helicopter pilot vision systems, 48th Annual Forum Proceedings of the American Helicopter Society. Part 2 (of 2), Jun 3-May 92, Washington, DC, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1992 2, 1587-1598

Approaches to development of the architecture of indication means for the helicopter round-the-clock vision system are considered. The conclusion of the TV display priority over the helmet mounted display is made. The optimal 13$MUL@18 degree-field of view of the system (sensor-display) is proved showing at the same time that widening of the instantaneous field of view will be detrimental as it does not increase the coverage width at the critical obstacle detection range and reduces the time required for maneuvering to avoid the obstacle or fly over it. Indication means Helicopter pilot vision systems Helmet mounted display (HMD)

Journal Long Form, 81, Wilkins, Robert Ryan, Boeing Defense and Aerospace Group, Rotorcraft Human Factors man . . . machine . . . environment, SAE (Society of Automotive Engineers) Transactions 1990, 99, Sect 1, 2185-2209, SAETA5, 0096-736X

Some aspects of Human Factors have long been a neglected area in rotorcraft design. This is true of such areas not directly influenced by motion and workload studies: the areas of human factors missing from the domain of human factors are those not included in the engineering set, but in the psychological and physiological set. Rotorcraft human factors issues are many of the same developed or determined for the aircraft/airplane category and can be divided into groups such as the man, machine, environment. Included are the issues of operating criteria (environment) of the rotorcraft and its pilots, design criteria to aid that pilot to alleviate stress and enable a functional cockpit (machine), and the issues of how best to train the pilot (man), mentally and physically, to accomplish the tasks set before him. Systems such as aircraft design and operation, crew physiology and training and airspace management need to be revamped and updated. Solutions must be developed and implemented to better design, man, train and utilize rotorcraft in the future. This will take a coordinated effort by the regulatory agencies and the industry. Rotorcraft human factors Fly-by-wire digital automatic flight controls Airspace management Multifunction displays Rotorcraft design

Journal Long Form, 82, Schroeder, J. A. //Merrick, V. K. NASA Ames Research Cent, Moffett Field, CA, USA, Control and display combinations for blind vertical landings Journal of Guidance, Control, and Dynamics, 1992, 15, 3, 751-760 JGCODS, 0731-5090

Several hover control and display concepts were evaluated in flight on a variable-stability helicopter. The control and display concepts enable precise hover maneuvers, station keeping, and vertical shipboard landings in zero-visibility conditions and until now have been evaluated only in piloted simulations. A new display design method is presented that attempts to attain the same pilot-vehicle performance regardless of the level of control augmentation. The display design method was first examined analytically with the control dynamics in the context of the pilot's desired guidance strategy. Then, while fully hooded, three pilots performed landing-pad captures followed by vertical landings with attitude-rate-command/attitude-hold, attitude-command/attitude-hold, and translational-velocity-command control systems. Of the 28 piloted blind landings, 25 were within 5 ft and 14 were within 2 ft of the specified touchdown point. Blind landing capability All weather approaches Vertical shipboard landings

Journal Long Form, 83, Riha, Christopher D. Shenandoah Shared Hospital Services, Shenandoah Valley, VA, USA, Biomedical equipment considerations for aeromedical transports Biomedical Instrumentation & Technology 1993, 27, 1, 22-30 BITYE2, 0899-8205

Since the Korean War, aircraft have been widely utilized to transport trauma patients. The last 20 years has seen an enormous growth in these aeromedical transports in nonmilitary applications. This report explores both the environment and the precautions that should be taken with biomedical equipment in aeromedical applications. This is intended to educate the biomedical engineer and the technician to be able to maintain existing equipment and establish prepurchase evaluation criteria. Infusion pump Incubators Intra-aortic balloon pumps Capnographs Ventilators Automated blood pressure monitors G forces

Journal Long Form, 84, Low, Eicher //Garrard, William L. Univ of Minnesota, Minneapolis, MN, USA, Design of flight control systems to meet rotorcraft handling qualities specifications, Journal of Guidance, Control, and Dynamics, 1993, 16, 1, 69-78JGCDDT, 0731-5090

This paper describes a methodology for the design of control laws for improvement of helicopter handling qualities. The design procedure uses eigenstructure assignment techniques for the design of inner-loop control laws that decouple roll, pitch, and yaw rates and vertical velocity, provide appropriate bandwidths in all channels, and stabilize low-frequency open-loop instabilities. With the inner loops closed, the angular rates and vertical velocity responses to commands are approximated by four decoupled first-order systems. Various response types, such as attitude command attitude hold, can then be easily realized by simple single-loop feedbacks and feedforwards wrapped around these inner loops. Both time and frequency responses show that the closed-loop helicopter provides excellent nominal performance in terms of tracking of pilot commands and achievement of desired response type characteristics. Stability robustness is investigated by unstructured singular value techniques. Performance and stability are also verified by simulations using an off-nominal flight condition, and a higher order model that includes explicit models of rotor and actuator dynamics, and a time delay model of other higher order dynamics and delays due to digital implementation of the control laws. The control laws presented in this paper provide better stability robustness and performance and are simpler in structure than those designed using a previous eigenstructure procedure proposed by the authors. Helicopter handling qualities Inner loop control laws Angular rates Vertical velocity responses Digital control law implementation Stability robustness Eigenstructure assignment techniques Unstructured singular value techniques Pilot command tracking

Journal Long Form, 85, Hess, R. A. //Malsbury, T. //Atencio, A. Jr. Univ of California, Davis, Davis, CA, USA, Flight simulator fidelity assessment in a rotorcraft lateral

translation maneuver, Journal of Guidance, Control, and Dynamics, 1993, 16, 1, 79-85 JGCDDT, 0731-5090

A model-based methodology for assessing flight simulator fidelity in closed-loop fashion is exercised in analyzing a rotorcraft low-altitude maneuver for which flight test and simulation results were available. The addition of a handling qualities sensitivity function to a previously developed model-based assessment criteria allows an analytical comparison of both performance and handling qualities between simulation and flight test. Model predictions regarding the existence of simulator fidelity problems are corroborated by experiment. The modeling approach is used to assess analytically the effects of modifying simulator characteristics on simulator fidelity. Rotorcrafts Lateral translation maneuver Flight simulator fidelity Handling qualities Flight tests

Conference Proceeding, 86, Wang, Ji C. San Jose State Univ, San Jose, CA, USA, Tilt-rotor aircraft whirl-flutter alleviation using active controls, Winter Annual Meeting of the American Society of Mechanical Engineers, Nov 8-13 1992, Anaheim, CA, USA, Publ by ASME, New York, NY, USA, 1992, 38, 139-148, 0791810933

Synthesis of two active whirl-flutter control laws for a XV-15 size tilt-rotor aircraft are presented. One control law is based on the classical root-locus method, and the other is based on results of optimal linear regulator control theory. The control systems are designed in the aircraft modal domain. Physical implementation of the control laws is realized from the estimated airframe modal states. The number of vibration sensors and placement of these sensors on the wing-tip surface are investigated for estimation of the feedback airframe modal states. The effectiveness of active whirl-flutter control systems with the rotor blade cyclic pitch inputs is confirmed. The tilt-rotor aircraft flutter speed can be delayed from 285 knots to over 300 knots. Whirl flutter control laws XV-15 size tilt rotor aircraft Optimal linear regulator control theory Flutter phenomenon Airframe modal states Vibration sensors

Conference Proceeding, 87, Gordon, Alastair C. Bristow Helicopters Ltd, Engl, Development to production of an integrated health and usage monitoring system for helicopters, Aerospace Technology Conference and Exposition, Sep 23-26 1991, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1991, 1-31

This paper starts with the reasons why Bristow Helicopters as an operator are at the forefront of putting together an Integrated Health and Usage Monitoring package. Bristows identifies its long history of design work introducing onto helicopters various major modifications culminating in the IHUMS programme. The paper goes on to deal with the need for health monitoring which is really the outcome of the HARP report. It discusses the trials that were conducted in three phases for the CAA and which led Bristows to believe they could package an integrated CVR/FDR and health monitoring system together in time to meet the CAA's mandated FDR. The practical specification for the system is discussed and the argument for the need to integrate the system with flight data recording and cockpit voice recording. The operation of the system is then discussed in some detail indicating how the generic nature of the system is accomplished and introducing the vital role of the groundstation and the interface in the groundstation between the pilot and the engineer and the system as a whole. The paper goes onto discuss the problems of certification and of gaining manufacturers acceptance of the system on their aircraft, without which of course monitoring would never reach its full potential. The paper finishes with some ideas of future potential and the direction which Bristows believe IHUMS will develop. Helicopter usage monitoring system Bristow helicopters Integrated health and usage monitoring package (IHUMS) Gearbox vibration analysis Helicopter airworthiness review panel (HARP) Transmission health monitoring

Conference Proceeding, 88, Hill, Gary //Du Val, Ronald W. //Green, John A. //Huynh, Loc C. Advanced Rotorcraft Technology, Inc, Mountain View, CA, USA, Comparison of elastic and rigid blade-element rotor models using parallel processing technology for piloted simulations, Aerospace Technology Conference and Exposition, Sep 23-26 1991, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1991, 1-17

A piloted comparison of rigid and aero-elastic blade-element rotor models was conducted on the Crew Station Research and Development Facility (CSRDF) at Ames Research Center. FLIGHTLAB, a new simulation development and analysis tool, was used to implement these models in real time using parallel processing technology. Pilot comments and quantitative analysis performed both on-line and off-line confirmed that elastic degrees of freedom significantly affect perceived handling qualities. Trim comparisons show improved correlation with flight test data when elastic modes are modeled. The results demonstrate the efficiency with which the mathematical modeling sophistication of existing simulation facilities can be upgraded using parallel processing, and the importance of these upgrades to simulation fidelity. Rigid blade-element rotor models FLIGHTLAB simulation tool Parallel processing technology Piloted simulations Flight test data Advanced digital optical control system Crew station research and development facility (CSRDF)

Conference Proceeding, 89, Eshow, Michelle M. //Aiken, Edwin W. //Hindson, William S. //Lebacqz, Victor J. //Denery, Dallas G. US Army Aeroflightdynamics Directorate, USA, Review of recent programs and future plans for rotorcraft in-flight simulation at Ames Research Center, Aerospace Technology Conference and Exposition, Sep 23-26 1991, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1991, 1-13

A new flight research vehicle, the Rotorcraft-Aircrew Systems Concepts Airborne Laboratory (RASCAL), is being developed by the U.S. Army and NASA at Ames Research Center. The requirements for this new facility stem from a perception of rotorcraft system technology requirements for the next decade together with operational experience with the Boeing Vertol CH-47B research helicopter that was operated as an in-flight simulator at Ames during the past 10 years. Accordingly, both the principal design features of the CH-47B variable-stability system and the flight-control and cockpit-display programs that were conducted using this aircraft at Ames are reviewed. Another U.S. Army helicopter, a Sikorsky UH-60A Black Hawk, has been selected as the baseline vehicle for the RASCAL. The research programs that influence the design of the RASCAL are summarized, and the resultant requirements for the RASCAL research system are described. These research programs include investigations of advanced, integrated control concepts for achieving high levels of agility and maneuverability, and guidance technologies, employing computer/sensor-aiding, designed to assist the pilot during low-altitude flight in conditions of limited visibility. The approach to the development of the new facility is presented and selected plans for the preliminary design of the RASCAL are described. Rotorcraft aircrews systems concepts airborne laboratory (RASCAL) CH-47B flight experiments Rotorcraft in-flight simulation Rascal research system development strategy Ames research center in-flight simulator

Journal Long Form, 90, Gurley, Sydney E. Sikorsky Aircraft, West Palm Beach, FL, USA, Civil development and certification of a helicopter automatic approach and hover system on the Sikorsky S-76, SAE (Society of Automotive Engineers) Transactions, 1991 100, Sect 1 pt 2, 1988-1997 SAETA5, 0096-736X

BACKGROUND - Sikorsky Aircraft and Honeywell Incorporated, in response to customer requirements, began development of an all weather Search and Rescue (SAR) capable S-76 helicopter in April 1989. To accomplish this primarily over water rescue mission, an automatic approach and hover capability was added to the standard Digital Automatic Flight Control System (DAFCS). A key element to the system was the automatic approach and hover with doppler velocity control, and new approach-to-hover and hover Electronic Flight Instrument System (EFIS) displays. Sikorsky S-76 Digital automatic flight control system (DAFCS) Automatic approach and hover system Electronic flight instrument system

Journal Long Form, 91, Eshow, Michelle M. //Aiken, Edwin W. //Hindson, William S. //Lebacqz, J. Victor //Denery, Dallas G. US Army Aeroflightdynamics Directorate, Review of recent programs and future plans for rotorcraft in-flight simulation at Ames Research Center, SAE (Society of Automotive Engineers) Transactions 1991, 100, Sect 1 pt 2, 2410-2422, SAETA5, 0096-736X

A new flight research vehicle, the Rotorcraft-Aircrew Systems Concepts Airborne Laboratory (RASCAL), is being developed by the U.S. Army and NASA at Ames Research Center. The requirements for this new facility stem from a perception of rotorcraft system technology requirements for the next decade together with operational experience with the Boeing Vertol CH-47B research helicopter that was operated as an in-flight simulator at Ames during the past 10 years. Accordingly, both the principal design features of the CH-47B variable-stability system and the flight-control and cockpit-display programs that were conducted using this aircraft at Ames are reviewed. Another U.S. Army helicopter, a Sikorsky UH-60A Black Hawk, has been selected as the baseline vehicle for the RASCAL. The research programs that influence the design of the RASCAL are summarized, and the resultant requirements for the RASCAL research system are described. These research programs include investigations of advanced, integrated control concepts for achieving high levels of agility and maneuverability, and guidance technologies, employing computer/sensor-aiding, designed to assist the pilot during low-altitude flight in conditions of limited visibility. The approach to the development of the new facility is presented and selected plans for the preliminary design of the RASCAL are described. Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) Ames Reasearch Center Boeing Vertol CH-47B Low altitude flight

Journal Long Form, 92, Birckelbaw, Lourdes G. //Corliss, Lloyd D. NASA-Ames Research Cent, USA, Flap control simulation, Aerospace Engineering (Warrendale, Pennsylvania), 1992, 12 7, 13-14AEENEP, 0736-2536

Due to renewed interest in tiltwing aircraft for use in several applications including the U. S. Special Operations Command aircraft, the U. S. Airforce Advanced Theater Transport, NASA highspeed rotorcraft studies, and proposed designs for civil applications, a simulation study was initiated at NASA Ames Research Center to investigate alternative wing and flap controls for the aircraft. In an initial phase of the study, researchers compared the flying qualities of both a conventional flap and an innovative geared flap. In the second phase of the study an alternate method for pilot control of the geared flap was introduced and the flying qualities of the programmed flap and two geared flap configurations were studied further. Based on the simulation study researchers were able to obtain valuable information on the flying qualities of a conventional programmed flap and two geared flap configurations. The results showed little difference among the three flap control configurations except during a longitudinal reposition task where the programmed flap configuration performed the best. The addition of pitch attitude stabilization greatly enhanced the aircraft handling qualities. Flap control simulation Tilt wing aircraft

Conference Proceeding, 93, Chana, William F. //Sullivan, T. M. William F, Chana Associates, Inc, USA, Tilt wing advantage - for high speed VSTOL aircraft, Aerotech '92, Oct 5-8 1992, Anaheim, CA, USA Publ by SAE, Warrendale, PA, USA, 1992, 1-9

By the early 21st century, high speed VSTOL aircraft will be operating in Air Transportation Systems around the world moving people and cargo to and from thousands of public use vertiports and stolports. Of even greater significance is the fact that high speed VSTOL aircraft will be playing a major role in reducing traffic congestion on the ground and in the air at busy hub airports. For many years world wide attention has been drawn to the United States' effort to develop the military V-22 Osprey. More than two billion dollars have been expended on this tilt rotor program. The advantages of a tilt wing over a tilt rotor, however, are beginning to surface in both the United States and abroad. The tilt wing, it turns out, is more efficient, more cost effective, safer and an easier aircraft to operate. Tilt wing development began in the mid 1950's. Successful demonstrator aircraft were the Boeing Vertol 76 VZ-2, the Hiller X-18, the LTV/Hiller/Ryan XC-142A and the Canadair CL-84. In the mid 1970's military support for this form of power lift decreased. Also, there was no obvious need at the time for civil high speed VSTOL aircraft. Now there is. Tilt rotor studies began in the mid 1940's by the Bell Helicopter Company. Bell's first test aircraft was the XV-3. Their second tilt rotor aircraft was the XV-15. The military V-22 Osprey is a combined Bell-Boeing tilt rotor program. This paper brings into focus the technical and operational advantages of the tilt wing concept in comparison with the tilt rotor, the helicopter and conventional airplanes. The following areas are discussed and analyzed: Public Acceptance, Block Time, Direct Operating Cost, Useful Load and Payload, Vertical Lift, Propulsive Efficiency, Pilot Transition, Reliability Maintenance and Safety, Development and Production cost, Structural Dynamics, CTOL/VTOL/STOL and STOVL operations, and Search and Rescue (SAR). A 9 passenger (11 seats) high speed VSTOL tilt wing aircraft is proposed for entry into the civil market by the late 1990's. It will be certificated in the U.S. under the FAA's 'Airworthiness Criteria for the Powered-Lift Normal Category Aircraft' which applies to 'nine or fewer passenger seats'. A 14 passenger (16 seats) tilt wing vehicle that will require certification under the FAA's 'Airworthiness Criteria for Powered Lift Transport Category Aircraft' is currently in development by another company. Tilt wing advantage Powered-lift normal category aircraft Airworthiness criteria VSTOL aircraft wings Tilt rotor development history Til-wing TW068 CTW-409 tilt wing Tilt wing aircraft sizes Direct operating cost advantage Cruise speed performance

Conference Proceeding, 94, Haworth, Loran A. //Seery, Ronald E. NASA Ames Research Cent, USA, Rotorcraft Helmet Mounted Display symbology research, Aerotech '92, Oct 5-8 1992, Anaheim, CA, USA, Publ by SAE, Warrendale, PA, USA, 1992, 1-16

Screen/head stabilized MIL-STD 1295 Helmet Mounted Display (HMD) flight symbology as integrated on the Apache helicopter was compared to world referenced/stabilized flight symbology. Simulation test results indicate that pilots perform significantly better using world stabilized conformal attitude symbology. They were accurate to an average of $HLF degree at estimating terrain relief and aerial target locations. Pilots were able to take advantage of world referenced symbology due to the unique features of HMD that allow the pilot to visually use the symbology at extreme azimuth and elevation off-axis angles. World stabilized conformal symbology was also preferred while performing contour flight tasks. They reported that the use of climb-dive-marker during contour flight greatly reduced pilot work load under conditions tested. Cyclic input errors occurred when using both MIL-STD 1295 hover symbology and test symbology indicating that a better approach for depicting hover symbology is warranted. The magnitude of cyclic input and spatial estimation errors increased as the off-axis viewing angle became larger. Helmet mounted display (HMD) Screen/head stabilized MIL-STD 1295 Rotorcraft HMD symbology Apache helicopter Spatial estimation errors Aircraft math model Position recovery task description Flight tasks Low altitude spatial awareness estimation

Conference Proceeding, 95, VanderVliet, Gery, Naval Air Warfare Cent, USA, Test, evaluation, development, and use of a Manned Flight Simulator to support navy developmental testing of the V-22 Osprey, Aerotech '92, Oct 5-8 1992, Anaheim, CA, USA, Publ by SAE, Warrendale, PA, USA, 1992, 1-8

Initial shipboard compatibility tests of the V-22 Osprey VSTOL tilt-rotor aircraft were conducted aboard the USS Wasp (LHD-1) on 4-8 December 1990. In preparation for this event, the Naval Air Warfare Center Aircraft Division Patuxent River (NAWCADPAX) Manned Flight Simulator (MFS) was used for pilot training and engineering analysis. The focused task was V-22 shipboard launch and recoveries which was comprised of the shipboard approach, transition, hover landing, and takeoff (each in essence a subtask). In preparation for follow-on V-22 at-sea tests, the performance of this 'first-cut' simulation, with regard to both hardware and software, were tested and evaluated. The scope of the initial at-sea test was, although hazardous, limited in nature, thus, the use of the simulator (and the corresponding fidelity requirements) was limited. This paper examines the simulator fidelity requirements, test requirements, development, and integration efforts imposed on the MFS to enable it to be an effective engineering and training tool for both the initial and follow-on V-22 shipboard Developmental Tests (DT). The follow-on shipboard DT is expected to be more demanding on both the pilot and the aircraft, thus, the fidelity of the simulator must rise to the occasion. Manned flight simulator V-22 Osprey VSTOL tilt-rotor aircraft Control dynamics V-22 shipboard developmental tests (DT) Navy developmental testing

Journal Long Form, 96, Austin, Fred //George, Dino //Bivens, Court, Grumman Corporate Research Cent, Bethpage, NY, USA, Automated adversary for piloted simulation of helicopter air combat in terrain flight, Journal of the American Helicopter Society, 1992, 37, 4, 25-31 JHESAK, 0002-8711

The AUTOMAN$+TM$/ computer program develops automated maneuvering decisions for helicopters during air-to-air combat over hilly terrain. Maneuvers are selected by

employing game theory. Recently, the capabilities of this program have been extended and enhanced to include: a guidance law for target acquisition when a firing opportunity arises; fire-control sequence logic; improved low-flying capabilities; line-of-sight computations for the cockpit field-of-view, terrain obstructions, and visual range limits; use of terrain for masking; air-to-air collision-avoidance maneuvers; decisions on dispensing flares and chaff; and adjustable levels of pilot experience. The revised program was installed at the NASA Ames manned flight-simulation facility to drive a computer-generated image of an enemy helicopter, thereby providing an adversary for the human pilot. A total of 101 runs were made by test pilots to evaluate this new simulation capability. The program was found to show promise for both rotorcraft handling-quality evaluations and air-to-air combat training. Air to air combat Hilly terrain flight Automated adversaries Software package AUTOMAN Handling qualities Combat training Line of sight (LOS) Low altitude flight

Journal Long Form, 97, Sridhar, Banavar //Suorsa, Ray //Smith, Phillip //Hussien, Bassam, NASA, Moffett Field, CA, USA, Vision-based obstacle detection for rotorcraft flight, Journal of Robotic Systems, 1992, 9, 6, 709-727 JRSYDB, 0741-2223

The ability of rotorcraft to fly at low altitude is hindered by the high pilot workload required to avoid obstacles. The development of automation tools that can detect obstacles in the rotorcraft flight path, warn the crew, and interact with the guidance system to avoid detected obstacles would significantly reduce pilot workload and increase safety. This article describes an obstacle detection approach based on feature tracking and recursive range estimation that takes into account the characteristics of rotorcraft flight. The merits and weaknesses of the approach are discussed using image sequences from the laboratory and from flight. Vision-based obstacle detection Rotorcraft flight Feature tracking Recursive range estimation Range estimation algorithm

Journal Long Form, 98, Knock, R. M. GEC, Engl, Helicopter safety - IHUMS has the answers, GEC Review, 1992, 7, 3, 161-166GECREP, 0267-9337

Passenger safety is of major concern in all aspects of civil aircraft design. Since 1965, it has been mandatory, in the United Kingdom, for civil fixed-wing aircraft to be fitted with flight data recorders. The latter have been invaluable in determining the causes of failures and consequential accidents. Regulations, soon to be introduced, will make mandatory for most rotary-wing aircraft over 2, 700 kg to be fitted with a flight data recorder (FDR). In addition, electronic equipment is now being used to monitor the state of the mechanical components of the aircraft such as the body, the engines, the gearbox, and the transmission. This gives the operator, and sometimes the pilot, warning of critical wear or damage before the safety of the aircraft is jeopardized. The author discusses how technology enables monitoring to be carried out. Helicopter safety UK Civil Aviation Authority Flight data recorders Fixed wing aircraft Rotary wing aircraft Electronic data collection

Conference Proceeding, 99, Mace, W. Derry Jr. //Elliott, Joe W. //Blancha, Barry //Murphy, Jay, Lockheed Engineering & Sciences Co, Hampton, VA, USA, Comparison of frequency domain and time domain laser velocimeter signal processors, ICIASF '91 Record: International Congress on Instrumentation in Aerospace Simulation Facilities, Oct 27-31 1991, Rockville, MD, USA, Publ by IEEE, Piscataway, NJ, USA, 1991, 103-112

An experimental investigation was conducted in the 14- by 22-foot subsonic tunnel at NASA-Langley Research Center to measure the inflow into a scale model helicopter rotor in forward flight. These inflow measurements were acquired utilizing a two-component laser velocimeter, and the data were processed by a frequency-domain processor (FDP). As a subset of the experiment, a time-domain counter processor was utilized simultaneously with an FDP to make a comparison of the two processors possible. The results indicate that the FDP had a marked improvement in processing capability in conditions of low signal-to-noise ratios and had a reduction in the number of erroneous data points acquired. However, the FDP yielded a lower data rate in comparison to the counter when signal-to-noise ratios were high. Comparison of the data sets shows that the FDP consistantly measures velocities which are 0.7% higher than those measured by the counter processor. Laser Velocimeters Signal processors Scale models

Conference Proceeding, 100, Grant, I. //Smith, G. H. //Liu, A. //Infield, D. //Eich, T. Particle image velocimetry measurements of the aerodynamics of a wind turbine, ICIASF '91 Record: International Congress on Instrumentation in Aerospace Simulation Facilities, Oct 27-31 1991, Rockville, MD, USA Publ by IEEE, Piscataway, NJ, USA, 1991, 314-320

The authors describe an aerodynamic study of flow over a simple commercial wind turbine in wind tunnel experiments using the particle image velocity (PIV) technique. In particular the use of the PIV technique was demonstrated for determining both the characteristics of the tip vortices trailing from consecutive blades of the wind turbine and circulation around the individual blade. These factors are of interest to both helicopter and wind turbine blade design. The experimental apparatus is described as it pertains to the sampling of the periodic but unsteady flow found behind the rotor. Also described are the data processing techniques used to extract velocity, vorticity and circulation measurements from the PIV images. Particle image velocimetry Unsteady periodic flow Vorticity

Conference Proceeding, 101, LeBlanc, D. J. //McClamroch, N. H. The Univ of Michigan, Ann Arbor, MI, USA, Vision-based recursive estimation of rotorcraft

obstacle locations, Proceedings of the 1992 American Control Conference Jun 24-26 1992, Chicago, IL, USA, Publ by American Automatic Control Council, Green Valley, AZ, USA, 1992 2, 937-941, 0780302109

Development of an onboard obstacle detection and estimation scheme for low altitude rotorcraft flight is necessary both for the development of pilot warning systems and as a step toward achieving fully autonomous flight. Vision sensors provide passive sensing of obstacles, and allow a wide field of view and nearly infinite range with relatively low cost. We consider the problem of estimating the relative location of identifiable features on nearby obstacles, assuming a sequence of noisy camera images and imperfect measurements of the camera's translation and rotation. An iterated extended Kalman filter is used to provide recursive range estimation; the correspondence problem is simplified by predicting and tracking each feature's image within the Kalman filter framework. Simulation results are presented which show convergent estimates and generally successful feature point tracking. Estimation performance degrades for features near the optical axis and for accelerating motions; image tracking is also sensitive to angular rate. Our approach is also applicable to other vision-based obstacle detection and estimation problems. Low altitude rotorcraft flight Onboard obstacle detection

Conference Proceeding, 102, Tolle, Charles R. //Rodriguez, Armando A. Arizona State Univ, Tempe, AZ, USA, Vertical guidance for a lockheed L1011-100 using optimal dynamic interpolation, Proceedings of the 1992 American Control Conference, Jun 24-26 1992, Chicago, IL, USA, Publ by American Automatic Control Council, Green Valley, AZ, USA, 1992, 2, 1534-1538, 0780302109

In this paper, dynamic interpolation is applied to an L1011-100 vertical guidance problem. A flight management system's (FMS) optimized vertical flight plan is used to obtain way points which serve as inputs to the dynamic interpolation algorithm. The algorithm produces reference commands which are issued to a model obtained from a certified FAA L1011-100 and autopilot. The resulting dynamic behavior is compared to the results obtained from reference commands produced by an L1011-like commercial aircraft FMS. Quadratic and cubic spline solutions to the dynamic interpolation problem are presented. Performance degradation with respect to weight uncertainty is examined for both the FMS and the Dynamic Interpolation commands. Flight management system's (FMS) Instrumentation landing systems (ILS's) Dynamic interpolation algorithm

Conference Proceeding, 103, KrishnaKumar, K. //Sawhney, S. Simulator based adaptive helicopter training using neural networks, Conference Proceedings of the 1991 IEEE International Conference on Systems, Man, and Cybernetics Oct 13-16 1991, Charlottesville, VA, USA Publ by IEEE, Piscataway, NJ, USA, 1991, 3, 1511-1516

The authors present an approach to the application of artifical neural networks in adaptive simulator-based helicopter training of novice student pilots. The theory that an experienced helicopter pilot performs in some optimal fashion was used as the underlying basis for the adaptive hover trainer design. This development was based on the hypothesis that a novice can be trained to fly a helicopter automatically if the helicopter system adapts to the learning curve of the student. Based on the hypothesis of adaptive training, a neural network synthesis procedure is developed. The neural network synthesis provides student performance monitoring, and helicopter system adaptation using an adaptive neurocontroller. Learning Curves Adaptive Training Helicopter Simulators Artificial Neural Networks Neurocontrollers

Book Whole, 104, Anon (Ed.), Publ by IEEE, Piscataway, NJ, USA, 1991, 614p

This proceedings contains 95 papers. The following topics are dealt with: vehicle management systems; communication, navigation, identification (CNI) systems; launch vehicle and spacecraft avionics; Ada applications and methods; special function avionics and techniques; systems engineering methods and tools; rotorcraft avionics; fault-tolerant avionics; space systems avionics; modular avionics; automating software development; commercial avionics; sensor and signal processing; crew station technology; artificial intelligence and expert systems; pilot-vehicle interface; neural networks; and optical technology and systems. EiREV Integrated avionics Rotorcraft avionics Commercial avionics Fault-tolerant avionics Digital avionics

Conference Proceeding, 105, Pankow, Richard J. Sikorsky Aircraft, Stafford, CT, USA, Integrating a radar/ESM antenna suite with the S-70 helicopter, IEEE/AIAA 10th Digital Avionics Systems Conference, Oct 14-17 1991, Los Angeles, CA, USA, Publ by IEEE, Piscataway, NJ, USA, 1991, 539-543

The underside of the helicopter below the crew cabin was used for the installation of a combination antenna system. Very little clearance is available between the helicopter underside and the ground when accounting for hard landings. A combination of technical approaches were required to install broadband, rotating antennas along with a radar narrowband antenna in these small volumes. All antennas in the suite, which cover 5.2 octaves, share a common rotating scan axis. Single method attacks on the problem did not produce desired results. Reported is the successful compromise solution giving acceptable levels of performance for all systems served by the suite. S-70 helicopters Broadband antennas

Conference Proceeding, 106, Daniels, T.S. //Berry, J.D. //Park, S. NASA Langley Research Cent, Hampton, VA, USA, Digital resolver for helicopter model blade motion analysis, Proceedings of the 38th International Instrumentation Symposium,

Apr 26-30 1992, Las Vegas, NV, USA Publ by ISA Services Inc, Research Triangle Pk, NC, USA, 1992, 619-628, 1556173784

The development and initial testing of a digital resolver to replace existing analog signal processing instrumentation are described. Currently, a powered helicopter wind tunnel model is instrumented to measure blade flapping and yaw angles. Potentiometers, mounted directly on one of the four fully articulated blades, are electrically connected through a slip ring to analog signal processing circuitry. The measured signals are periodic with aximuth angle and are resolved into harmonic components, with 0 degrees over the tail. The periodic nature of the helicopter blade motion restricts frequency content of each resolved flapping and yaw signal to the fundamental and harmonics of the rotor rotational frequency. A minicomputer is used to collect this information and then plot it graphically in real-time. Using this and other information generated by the instrumentation, a test pilot can then adjust the helicopter model's controls to achieve desired aerodynamic test conditions. This new instrument used a digital signal processor board mounted within a personal computer. On-board anti-alias filters and 16-bit ADC's perform the bandwidth-limiting and digitizing, respectively. The personal computer then displays the results graphically, and periodically updates the minicomputer. The elegance of the digital signal processing is a result of the synchronized sampling scheme, which takes advantage of information known a priori. Digital Resolver Helicopter Blades

Conference Proceeding, 107, Desjardins, S.P. //Shane, S. Joseph, Simula Inc, Phoenix, AZ, USA, Structural testing of commercial rotorcraft seats. An overview, Proceedings of the 29th Annual SAFE Symposium, Nov 11-13 1991, Las Vegas NV, USA, Publ by Survival & Flight Equipment Assoc, Newhall, CA, USA, 1991, 63-81

This paper is intendd to provide a general understanding of the requirements, the differences between static and dynamic testing, the procedures, and the types of facilities that can be used to perform structural tests of commercial rotorcraft seats. A general discussion of static and dynamic tests is followed by that of the dynamic overshoot and the necessity to limit the loads on human body to those that it can tolerate. Static and dynamic test requirements are detailed, the test equipment, test dummies, instrumentation, as well as the dynamic test facilities, such as CAMI sled test facility, Siimula drop tower test facility, NADC sled test facility, are compared. It is concluded that the imposition of requirements for dynamic testing has added a great deal of complexity to the certification process and increased its costs. Rotorcraft Seats Structural Testing Simula Drop Tower Test facility NADC Sled Test Facility CAMI Sled Test Facility Anthropomorphic Test Dummies

Conference Proceeding, 108, Wismann, Volkmar //Rieger, Swer, Measurements of ocean surface signatures with a five frequency multi-polarization airborne scatterometer, 1991 International Geoscience and Remote Sensing Symposium - IGARSS'91, Jun 3-6 1991, Espoo, Finl, Publ by IEEE, Piscataway, NJ, USA, 1991, 3, 1615, 0879426756

Summary form only given. An experimental airborne scatterometer (HELISCAT) for basic studies of radar backscatter from ocean, ice, and land surfaces has been developed. The platform used for the instrument is an MBB BO 105 helicopter. Measurements of the normalized radar cross section can be obtained at radar frequencies of 1.0, 2.4, 5.3, 10.0, and 15.0 GHz quasi-simultaneously for VV, HH, VH, and HV polarizations. The instrument consists of five pulsed superheterodyne Doppler scatterometers (one per microwave channel) combined by a bandpass multiplexer. During the SAXON-FPN remote sensing experiment in November 1990 over the North Sea the signatures of monomolecular slicks consisting of oleyl alcohol and oloeic acid methylester were measured. Airborne Scatterometer HELISCAT SAXON-FPN Remote Sensing Experiment North Sea Oleyl Alcohol Abstract Only

Conference Proceeding, 109, Forssander, Marit I. Vattenfall Utveckling AB, Vasteras, Sweden, Thermographic inspection and heat flow simulation of midspan joints, Thermosense XIV: An International Conf on Thermal Sensing and Imaging Diagnostic Applications, Apr 22-24 1992, Orlando, FL, USA Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1992, 1682, 43-51, 0819408433

Vattenfall (Swedish State Power Board) was the first company to use the thermographic technique for inspection of high tension electrical equipment. The method has mainly been used for inspection of switchgear- and transformer stations. Recently Vattenfall has introduced a high resolution imager mounted in a helicopter for inspection of joints in the transmission lines. The inspection program has started due to some phase-dropping caused by increased resistance in the joints. The Rank Taylor Hobson Talytherm 8-1000 camera is mounted in a vibration-free rig under the fuselage of the helicopter. The inspector, seated alongside the pilot, controls all the functions of the camera, together with the viewing angle pen and tile, with the use of a single control panel. Mounted in front of the inspector is a 9 inch monitor on which the thermal image is displayed. The complete inspection is recorded on a S-VHS video tape for later retrieval together with comments and inspection data such as line identification, tower number, load, and weather conditions. A HP-computer with the Talytherm T.E.M.P.S. Imager/Data analyzing system is used to determine over-temperature compared with the transmission line. As the reconditioning criteria is based on the joint resistance, an FEM computer program has been developed to calculate the resistance using the temperature pattern on the surface of the joint and the connecting lines. The temperature pattern based on data such as: geometrical data, resistance, load, wind speed and direction can be calculated with the program. The resistance can then be determined by comparing the results with the measured temperature pattern by the thermal inspection., Transmission Line Midspan Joints Thermographic Inspection Heat Flow Simulation FEM Computer Program

Journal Long Form, 110, Eshow, Michelle M. NASA Ames Research Cent, Moffett Field, CA, USA, Flight investigation of variations in rotorcraft control and display dynamics for hover, Journal of Guidance, Control, and Dynamics 1992, 15, 2, 482-490, JGCDDT, 0731-5090

This paper describes a flight investigation of the handling qualities issues associated with variations in display dynamics for varying levels of vehicle augmentation. The experiment was conducted on the NASA/Array CH-47B Variable-Stability Research Helicopter using its model-following control system and a color, panel-mounted display. A display law design method developed and flight tested previously was refined and expanded to account for guidance effects. Specifically, for rate, attitude, and velocity command vehicle response types, both integrator-like and gain-like display controlled element dynamics were evaluated in two hovering tasks conducted in simulated zero-visibility conditions. The tasks were performed both with and without automation of the vertical and directional axes to assess the impact of divided attention on performance and work load. Quantitative and subjective data describing the pilots' ability to perform the tasks were collected and analyzed, and pilot-vehicle-display dynamics were identified. Results indicated that gain-like display dynamics were generally preferred and resulted in better inner-loop tracking and higher inner-loop crossover frequencies, while not degrading outer-loop position performance. Display Dynamics Display Law Design Method Hover Pilot Vehicle Display Dynamics Gain Like Display Dynamics Display Format

Journal Long Form, 111, Tsutahara, Michihisa //Kimura, Takeyoshi //Takahashi, Kunio, Pilot pump of rotary type using the Weis-Fogh mechanism and its characteristics, Nippon Kikai Gakkai Ronbunshu, B Hen/Transactions of the Japan Society of Mechanical Engineers, Part B, 1991, 57, 542, 3439-3443 NKGBDD, 0387-5016

A pilot pump of the rotary type using the Weis-Fogh mechanism, which is a lift generation mechanism in the hovering flight of small insects, was built, and its characteristics were studied experimentally in this paper. As rotation rate increases the power and the total head increase, and as the flow rate increases the total head decreases. The maximum efficiency of this pump under the conditions of this experiment was about 16%. Flow visualization around the rotor, using air bubbles as a tracer, was also performed. Stable vortices which appear commonly in tangential flow pumps were found near the rotation axis of the rotor. Rotary Type Pilot Pump Weis-Fogh Mechanism Tangential Flow Pumps Lift Generation Mechanism

Journal Long Form, 112, Krishnakumar, Kalmanje S. //Sawal, Dinesh //Bailey, J. E. //Dohme, John A. Dept of Aerospace Eng, Univ of Alabama, Tuscaloosa, AL, USA, A simulator-based automated helicopter hover trainer--Synthesis and verification, IEEE Transactions on Systems, Man and Cybernetics 1991, 21, 5, 961-970, ISYMAW, 0018-9472

An approach to the application of flight simulators for automated training of novice student pilots, with limited human interaction, is presented. A hypothesis for automated human training is presented. On the basis of this hypothesis, a synthesis procedure for a simulator-based automated hover trainer is developed. The synthesis uses the theory of optimal control pilot modeling for designing varying levels of stability augmentation, which mimics certain aspects of an instructor pilot. Simulator implementation of the hover trainer utilizes an adaptive loop to provide continuous augmentation level changes based on the student's learning curve. Experimental verification of the hypothesis, using a group of neophytes, showed that neophytes could be successfully trained using the automated hover trainer. Automated Helicopter Hover Trainer Optimal Control Pilot Modeling Stability Augmentation

Conference Proceeding, 113, Smith, C.O. Fatal helicopter crash, ASME Winter Annual Meeting, Dec 1-6 1991, Atlanta, GA, USA, Publ by ASME, New York, NY, USA, 1991, 1-7

A helicopter was making a turn and slowing to get into position to deposit a load transported at the end of a sling. The helicopter crashed, killing the pilot and demolishing the helicopter. This paper describes the accident situation, plaintiff's allegations, defendant's claims, course of litigation, and resolution of the case. Air Crashes Litigation National Transportation Safety Board Reports

Journal Long Form, 114, Borgman, Dean C. McDonnell Douglas Helicopter Co, Mesa, AZ, USA, McDonnell Douglas' new light twin helicopter. The MDX, Vertiflite 1992, 38, 1, 28-30 VEFLAD, 0042-4455

McDonnell Douglas Helicopter Co. is in the process of developing a new light twin-engined helicopter in the 4000 to 6000 lb. class that will set the standard for the worldwide helicopter market. The helicopter is officially designated Model MD 900/901 (depending on engine selection), but has become widely known as MDX. From the outset, there were certain unique features that were recognized as requirements for the MDX. The most significant of these were: a) the static mast support for the main rotor; b) the composite flexbeam hingeless main rotor; c)a liquid crystal integrated instrument display system with built-in rotor track and balance equipment and system monitoring; d) the NOTAR anti-torque/directional control system; and e) the energy-absorbing landing gear/lower fuselage structure. There are additional safety features such as crashworthy seats, lightning protection, and protection from high-intensity radiated fields. The MDX is being designed with the aid of the Unigraphics II system, which greatly simplifies the fabrication process by allowing engineers to go directly from the stored design files to the

programming tapes for machines on the production floor. McDonnell Douglas MDX Helicopter Light Twin-Engined Helicopters Helicopter Safety Features Computer Aided Helicopter Design Unigraphics II System

Conference Proceeding, 115, Gurley, Sydney E. Sikorsky Aircraft, West Palm Beach, FL, USA, Civil development and certification of a helicopter automatic approach and hover system on the sikorsky S-76, International Pacific Air and Space Technology Conference and 29th Aircraft Symposium Proceedings Oct 7-11 1991, Gifu, Jpn, Publ by SAE, Warrendale, PA, USA, 1991, 111-120, 1560911468

Sikorsky Aircraft and Honeywell, Inc. have combined efforts to produce an all-weather search and rescue (SAR) helicopter capable of automatic approach and hovering over a target. The S-76 SAR helicopter contains the Honeywell SPZ-7600 Digital Automatic Flight Control System (DAFCS) which enables unrestricted over water automatic approach and hover operations in Instrument Meteorological Conditions (IMC), single or dual autopilot. Each aspect of the system--Approach 1, Approach 2, Mark On Target (MOT), Velocity Hold, RAD Alt Hold and CLIMB--was flight tested by the FAA, which subsequently granted certification for the helicopter. Digital Automatic Flight Control System (DAFCS) Electronic Flight Instrument System (EFIS) Honeywell SPZ-7600 Autopilot

Journal Long Form, 116, Prasad, J.V.R. //Mittal, Manoj //Schrage, Daniel P. Georgia Inst of Technology, Atlanta, GA, USA, Control of a twin lift helicopter system using nonlinear state feedback, Journal of the American Helicopter Society, 1991, 36, 4, 57-65JHESAK, 0002-8711

An input-output feedback linearization technique is used to synthesize a nonlinear controller based on state feedback for a twin-lift helicopter configuration with a spreader bar. A seven- degree-of-freedom nonlinear model of the twin-lift system is developed in the lateral/vertical plane. The feedback control computations are carried out using the complete nonlinear model without any order reduction. The nonlinear controller, in addition to providing stability augmentation, is capable of accepting pilot commands to move the load to a desired position. The performance of the controller in response to pilots' commands is illustrated through simulation of the nonlinear model. The effects of parameter uncertainties in the aerodynamic and control models of the helicopters on the closed-loop performance are assessed. Twin-Lift Helicopter Systems Nonlinear Automatic Controllers Nonlinear State Feedback Input-Output Feedback Linearization Stability Augmentation Systems

Journal Long Form, 117, Ballin, Mark G. //Dalang-Secretan, Marie-Alix, NASA Ames Research Cent, Moffett Field, CA, USA, Validation of the dynamic response of a blade-element UH-60 simulation model in hovering flight, Journal of the American Helicopter Society 1991, 36, 4, 77-88 JHESAK, 0002-8711

The dynamic fidelity of an operational blade-element simulation model of the UH-60A helicopter is assessed for the hovering and low-speed flight regimes. Nonparametric frequency-response identification techniques and time-history comparisons are used to determine the validity of vehicle responses. Frequency-domain methods are applied to the model to isolate deficiencies and verify refinements and corrections. A dedicated flight-test program was conducted to provide data used in the analyses. Model deficiencies are also identified by using side-by-side pilot assessments of a motion-based simulation and of a test aircraft. Model refinements are found to improve fidelity significantly in the frequency range of interest to handling-qualities research. The applicability of the model to high-bandwidth flight-control research is also discussed. UH-60A Helicopter Rotor Blades Blade Element Simulation Models Helicopter Hovering Flight Simulation Model Validation Helicopter Flight Testing Blade Element Dynamic Response

Conference Proceeding, 118, Velger, Mordekhai //Toker, Gregory, ELOP Electro-Optics Industries Ltd. Rehovot, Israel, Study of active 3-D terrain mapping for helicopter landings, Sensors and Sensor Systems for Guidance and Navigation, Apr 2-3 1991, Orlando, FL, USA Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1991, 1478, 168-176, 0819405876

A feasibility study of an active 3-D terrain mapping system for helicopter landings is presented. The system acquires the 3-D shape of the terrain beneath the helicopter by scanning the terrain with a laser beam and imaging the illuminated spot by two position-sensing devices. The measurement accuracy of the system is assessed, and a Kalman filter for accuracy improvement is devised. The acquired terrain shape is displayed continuously to the pilot on a perspective display, showing both the terrain shape and helicopter spatial position. 3-D terrain mapping Terrain mapping Terrain scanning

Journal Long Form, 119, Menon, P.K.A. //Prasad, J.V.R. //Schrage, D.P. Georgia Inst of Technology, Atlanta, GA, USA, Nonlinear control of a twin-lift helicopter configuration Journal of Guidance, Control, and Dynamics 1991, 14, 6, 1287-1293 JGCDDT, 0731-5090

Significant pilot work load involved in flying a twin-lift helicopter configuration necessitates the development of highly augmented flight control systems for satisfactory performance. Two nonlinear control philosophies based on feedback linearization are advanced for this configuration. The controller performance, together with the sensitivity to a few parameter variations, is studied in a nonlinear simulation. Controller implementation aspects are discussed. Flight Control Systems Feedback Linearization Twin-Lift System

Book Whole, 120, Anon (Ed.), Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, var paging

This conference proceedings contains 61 papers discussing results of research activities on helicopter technology. The various sessions cover the following topics: Acoustics, aircraft design, dynamics, avionics and systems, propulsion and icing, civil operators, crew stations and human factors engineering, and product support. High speed helicopters, automatic flight control systems, helicopter main rotor performance in icing conditions, helicopter corrosion protection, and an evaluation of an advanced finite element analysis for rotor blades are some of the subjects covered in the conference. EiREV Helicopter Rotor Blade Dynamics High Speed Helicopter Shock Noise Prediction Code Intelligent Pilot-Vehicle Inte
rface Attack Helicopters Helicopter Helmet-Mounted Display

Conference Proceeding, 1, Gehrig, Jerome C. //Anderson, William D. //Williams, Stephen G. Naval Air Test Cent, Patuxent River, MD, USA, UC-880 Telemetry Relay Airborne Command System (TRACS), 22nd Annual International Symposium of the Society of Flight Test Engineers, Aug 5-9 1991, St. Louis, MO, USA Publ by Soc of Flight Test Engineers, Lancester, CA, USA, 1991, 3.2-1-3.2-9

The Naval Air Test Center (NAVAIRTESTCEN), Range Directorate, has developed an airborne telemetry data center and telemetry relay platform utilizing a Convair UC-880 aircraft. In its present configuration, the UC-880 can receive, record, process, and display telemetry data in real time; reshape and retransmit the telemetry data; remotely control instruments, cameras, emitters, and electronic countermeasures equipment on ground targets or instrumentation sites; provide inflight refueling of aircraft; display on CRT's the maps of the area of test operations; and coordinate and relay UHF project communications. This paper will present the development of the UC-880 Telemetry Relay Airborne Command System (TRACS), and the system characteristics. Although originally developed to conduct cruise missile test and training operations, the UC-880 is actually a general purpose flying range operations/telemetry center and can be used for many types of air vehicle test programs, including rotary wing and VTOL aircraft test scenarios. Figure 1 depicts a feasible usage of the UC-880 to support a nap-of-the-earth rotary wing test scenario. TRACS System UC-880 System

Conference Proceeding, 2, Swenson, Harry N. NASA Ames Research Cent, Moffett Field, CA, USA, Computer aiding for low-altitude helicopter flight, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1991 2

A computer-aiding concept for low-altitude helicopter flight has been developed and evaluated in a real-time piloted simulation. The concept included an optimal control trajectory-generation algorithm based on dynamic programming, and a head-up display (HUD) presentation of a pathway-in-the-sky, a phantom aircraft, and flight-path vector/predictor symbol. The trajectory-generation algorithm uses knowledge of the global mission requirements, a digital terrain map, aircraft performance capabilities, and advanced navigation information to determine a trajectory between mission waypoints that minimizes threat exposure by seeking valleys. The pilot evaluation was conducted at NASA Ames Research Center's Sim Lab facility in both the fixed-base Interchangeable Cab (ICAB) simulator and the moving-base Vertical Motion Simulator (VMS) by pilots representing NASA, the U.S. Army, and the U.S. Air Force. The pilot manually tracked the trajectory generated by the algorithm utilizing the HUD symbology. They were able to satisfactorily perform the tracking tasks while maintaining a high degree of awareness of the outside world. Low-Altitude Helicopter Flight Real-Time Piloted Simulation Head-Up-Display (HUD) Trajectory Generation Algorithm Helicopter Maneuvering Penetration Guidance Algorithm

Conference Proceeding, 3, Russier, M. Aerospatiale Helicopter Div, Marignane, Fr, P120 programme. First results of the pre-development phase, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1991 2

Improving the still modern Ecureuil helicopter is our permanent concern. Many pre-projects were devoted to its replacement or a complementary helicopter. P120 outlines were drawn in 1984 shortly after it was realized a cooperation programme was needed to share development costs and reduce manufacturing costs. Numerous thoughts were given to this programme since then, starting from studies covering every sector of the light helicopter market, examining concepts and technologies, defining cost/development objectives, including cooperation with China and Singapore. Last year was devoted to finding confirmations in every field where coherence is imperative for the success of this programme and to detailing the different activities involved in the future phases of this cooperation programme up to customer support. This paper presents the activities undertaken in parallel by Aerospatiale as a contribution to the technical and economical objectives inherent to P120 success: Fenestron optimization for noise reduction purposes V shaped fin Economic fenestron blade Modern, economic avionics, Ecureuil Helicopter P120 Improvement Tail Rotor Efficiency Fenestron Tail Rotor Ecureuil Experimental Fenestron Crew/System Interface

Conference Proceeding, 4, Jacobs, Eric W. //Prillwitz, Ronald D. //Johnson, James R. //Yoerkie, Charles A. Jr. United Technologies Corp, Stratford, CT, USA, Stage 2 noise certification of the Sikorsky S-76A and S-76C helicopters, 47th Annual Forum

Proceedings, May 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 829-840

Stage 2 noise certification tests have been performed by Sikorsky Aircraft for the S-76A and S-76C helicopters. The S-76A test was the first to be conducted under the Noise Standards for Helicopters in the Normal, Transport, and Restricted Categories; Final Rule (14 CFR Parts 21 and 36) issued by the Federal Aviation Administration (FAA) in the Federal Register (Vol. 53, No. 24) on February 5, 1988. The present paper summarizes the methods used to conduct the noise certification flight test, the analyses performed to determined take off, approach, and flyover effective Perceived Noise Levels (EPNL) in accordance with Federal Aviation Regulation (FAR) Part 36, and some of the lessons learned during the S-76A and S-76C noise certification test programs. Stage 2 Noise Certification Tests Sikorsky Noise Certification Tests Meteorological Instrumentation Flyover Test Procedures Range Time Synchronization

Conference Proceeding, 5, Chiesi, Brian //Parasida, Tony //Walliser, Eric, Boeing Defense & Space Group, Philadelphia, PA, USA, Concurrent engineering at Boeing Helicopters, 47th Annual Forum Proceedings, May 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 921-930

This paper details the concurrent engineering processes employed at Boeing Helicopters on the MH-47E and V-22 pilot production programs and planned activities for the LH prototype program. The processes involved include the development of concurrent engineering/manufacturing product definition and Boeing's use of CATIA for electronic mockups and digital preassembly. Concurrent engineering is a systematic approach to creating a product definition that considers all elements of the product life cycle from conception through fabrication, and in so doing simultaneously defines the product, its manufacturing processes, and other required life-cycle support processes. CATIA (Computer-Aided Three-Dimensional Interactive Application) is a 3D/2D graphics system that is used to develop and maintain the concurrent engineering product definition. From the CATIA 3D solids database, all engineering, supportability, and manufacturing requirements including electronic mockup definitions (replacing Class II and Class III physical mockups) are developed and maintained. Digital preassembly is an automated method of checking for fit-and-function errors within the CATIA data base to prevent engineering errors from reaching the factory floor. The paper examines not only the development of these processes, but also the cultural changes that are required to make these efforts successful. The expected results from implementing these concurrent engineering processes are schedule compaction, cost reduction, and increased employee and customer satisfaction. Concurrent engineering is a major development in support of Boeing's corporate commitment to continuous quality improvement. Computer Aided Three-Dimensional Interactive Application (CATIA) Boeing Helicopter Concurrent Engineering CATIA Digital Product Definition Concurrent Product Definition

Conference Proceeding, 6, Geist, Doug //Fried, Zoltan, McDonnell Douglas Helicopter Co, Mesa, AZ, USA, Functionally integrated aircraft instrumentation for the next generation commercial helicopter, 47th Annual Forum Proceedings, May 1991, Phoenix, AZ, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1057-1065

An Integrated Instrumentation Display System (IIDS) was designed to meet the aircraft instrumentation requirements of Federal Aviation Regulation, Part 27, certification of commercial light helicopters. Criteria were defined that would allow an assessment of selected functions for integration into one unit. The goal was to provide a compact instrumentation system to monitor and display the performance of various aircraft subsystems. An aircraft subsystem monitoring feature provides a means to acquire knowledge of the health of the aircraft subsystems. Engine performance can be monitored in real-time, which allows aircraft operators to better schedule repair/overhaul activities. Also, maintenance personnel can transfer collection of aircraft operational information to a ground based computer for determining trending and maintenance actions. Vibration monitoring is provided to the helicopter user with a simple and convenient means of acquiring the information needed to minimize vibration caused by mass and aerodynamic imbalance in the rotor and NOTAR fan system. The display consists of color, Liquid Crystal Display (LCD) panels which allows the flexibility of integrating the specified sensor data and caution/warning information onto a display packaged as one unit. Functionally Integrated Aircraft Instrumentation Liquid Crystal Displays Commercial Light Helicopters NOTAR Fan System Repair/Overhaul Activities

Conference Proceeding, 7, Eddy, Brett, Honeywell Inc, Glendale, AZ, USA, Automatic flight control system (AFCS) Honeywell SPZ-7600 for Search and Rescue helicopters, 47th Annual Forum Proceedings, May 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1083-1089

During a Search and Rescue (SAR) mission, the helicopter pilot is often faced with difficult and adverse conditions that increase his workload to the point of affecting his capability to safely conduct the mission. Since these are often the same conditions that initiate the rescue mission, it is imperative that the pilot be given additional tools and assistance necessary to safely continue the flight. One way to greatly reduce pilot workload is to provide an Automatic Flight Control System (AFCS). Of particular importance is an AFCS that can automatically guide the aircraft through various SAR approach, hover, and climb maneuvers, allowing the pilot to simply monitor the aircraft systems. An SAR mode recently developed by Honeywell, Mark-on-Target, will be discussed here. Helicopter Automatic Flight Control System Search and Rescue (SAR) Mission Honeywell SPZ-7600 Flight Control Mark-on-Target

Conference Proceeding, 8, Schwab, Rudolph T. //Hood, Robert C. U.S. Army Aviation Systems Command, Fort Eustis, VA, USA, Day/night adverse weather pilotage system (D/NAPS), 47th Annual Forum Proceedings, May 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1429-1431

The D/NAPS program is a four year, three phase project intended to flight demonstrate the integration of advanced technology in sensors, computing methods, flight controls, and displays to maximize combat helicopter mission effectiveness and survivability in day/night adverse weather conditions. The program focus is the development of pilot cognitive decision aiding (CDA) through the application of artificial intelligence and the integration, but not development, of advanced pilotage sensors, controls, and displays. Based upon a competitive solicitation, McDonnell Douglas Helicopter Company (MDHC) and Sikorsky Aircraft (SA) were awarded contracts in June 1990 for execution of the first phase of the program, scheduled to be completed in June 1992. The first phase of the project is directed toward development of a CDA system using contractor selected baseline aircraft and mission equipment packages modelled in the contractor's simulator facilities. The effectiveness of the CDA system will be measured by comparing the performance of their baseline aircraft system against the performance of their baseline aircraft system equipped with their CDA system. A downselect to one contractor for the completion of the program, the second and third phases, is planned for July 1992. The second phase will involve the integration of candidate D/NAPS hardware and software with applicable mission equipment and aircraft systems, in a hot bench. The third phase will be an actual flight demonstration of the D/NAPS. Day/Night Adverse Weather Pilotage System (D/NAPS) Sikorsky Aircraft (SA) Pilot Gognitive Decision Aiding (CDA) Helicopter Flight Demonstration Aircraft Flight Controls

Conference Proceeding, 9, Hackett, William E. Jr. //Stulb, George M. Jr. //Coleman, Robert J. Jr. Boeing Defense and Space Group, Philadelphia, PA, USA, LH-embedded training. The First Team's approach, 47th Annual Forum Proceedings, May 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1527-1583

The Boeing Sikorsky First Team approach to the Light Helicopter's embedded training (ET) objectives are broken down into capabilities for On Board Simulation (OBS) and a Multiple Integrated Laser Engagement System/Air to Ground Engagement System (MILES/AGES). OBS allows the capability for the pilot/gunner to train virtually anywhere and at anytime utilizing aircraft equipment. This discussion of OBS concentrates primarily on the philosphy of the requirements and capabilities of the system rather than the details of the system architecture. However, Line-Of-Sight (LOS) solution to the target, visual scene generation requirements, safety implications, and the harmonization with the Integrated Mission Support Station (IMSS) for OBS missions planning, rehearsal, and debriefing are discussed. The First Team approach to providing MILES/AGES capabilities into the LH design achieves significant advances in the state of the art by providing: in-flight boresighting, collateral damage assessment, and realistic HELLFIRE missile simulation. In summary, these OBS and MILES/AGES systems, provide unique capabilities for individual, crew, team, and collective training, thereby significantly enhancing the effectiveness of the LH weapon system. Light Helicopter Embedded Training On-Board Simulation (OBS) Embedded Training Component Layout Line of Sight (LOS) Solution HELLFIRE Missile Simulation Exercise Management

Journal Long Form, 10, Tischler, Mark B. //Fletcher, Jay W. //Morris, Patrick M. //Tucker, George E. NASA Ames Research Cent, Moffett Field, CA, USA, Flying quality analysis and flight evaluation of a highly augmented combat rotorcraft, Journal of Guidance, Control, and Dynamics, 1991, 14, 5, 954-963 JGCDDT, 0731-5090

This paper discusses implications of digital flight control system design for rotorcraft and illustrates the analysis of the resulting handling qualities obtained with the Advanced Digital Optical Control System demonstrator in the context of the proposed new handling-qualities specification for rotorcraft. Topics covered are digital flight control design and analysis methods, flight testing techniques, handling-qualities evaluation results, and correlation of flight test results with analytical models and the proposed handling-qualities specification. The evaluation of the demonstrator system indicates desirable response characteristics based on equivalent damping and frequency, but undesirably large effective time delays (exceeding 240 ms in all axes). Piloted handling qualities are found to be desirable or adequate for all low, medium, and high pilot gain tasks, but handling qualities are inadequate for ultrahigh gain tasks such as slope and running landings. Correlation of these results with the proposed handling-qualities specification indicates good agreement for the bandwidth boundaries, but suggests the need for more stringent limits on allowable phase delay. Analytical models based on emulation (s-plane) techniques compare favorably with flight-extracted frequency-domain characteristics of the overall (end-to-end) system responses. Combat Rotorcraft Advanced Digital Optical Control Systems

Conference Proceeding, 11, Blanken, Christopher L. //Hart, Daniel C. //Hoh, Roger H. U.S. Army Aviation Systems Command, Moffett Field, CA, USA, Helicopter control response types for hover and low-speed near-earth tasks in degraded visual conditions, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1, 169-193

A piloted ground-based simulation was conducted to assess several control response types during helicopter low-level flight in degraded visual conditions. The NASA Ames Vertical Motion Simulator and the Singer-Link Dig 1 Computer Image Generator (CIG) were used to simulate a helicopter cockpit in a degraded visual environment. The CIG visibility was reduced to a point where the horizon and other far-field cues were not

discernible. The control response types included a rate command, an attitude command/attitude hold, and a translational rate command. Pilot control was implemented through conventional controls: a cyclic, collective, and pedals. A simple stability derivative mathematical model of a helicopter with known dynamics and no coupling was used to perform the evaluations. The piloting tasks were a hover, a 'vertical landing, ' a pirouette, an acceleration/deceleration, and a sidestep maneuver. These tasks were flown in sequence, and both desired and adequate performance levels were specified for each task. Visual cue ratings with a rate command response type were initially collected to set the usable cue environment (UCE) at UCE $EQ 3. The results of the simulation indicate that the qualitative determination of the UCE was consistent among the five evaluation pilots. Cooper-Harper handling qualities ratings were collected for each task and control response type. The results indicate that a rate command response type provided poor Level 2 handling qualities in UCE $EQ 3 for the five tasks evaluated. The attitude command response type provided good Level 2 handling qualities. For the hover and vertical-landing tasks the ratings of the translational rate command response type were all Level 1. For the pirouette, the acceleration/deceleration, and the sidestep tasks, the ratings of the translational rate command response type were a mixture of Level 1 and Level 2. Singer-Link Dig 1 Computer Image Generator (CIG) Helicopter Control Response NASA Ames Vertical Motion Simulator

Conference Proceeding, 12, Crews, Curtis T. //Stanzione, Kaydon A. USMC, Washington, DC, USA, Expanding U.S.M.C. roles for the AH-1W SuperCobra, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1, 307-318

The AH-1W has a long and successful lineage of warfighting capability for the U.S. Marine Corps. Recently, investigations have been conducted to assess the effectiveness of technology developments which will further improve the AH-1W's capability to meet expanding mission requirements. Emerging mission role requirements dictate desirable characteristics for aircraft performance, doctrine, mission equipment package (avionics), and weapons loadout. Design and performance considerations are given to product improvements such as new rotor systems, new transmission, glass cockpit, upgraded alighting gear, integrated crew station, and other improvements in aerodynamics, survivability, RAM, and vulnerability. During 1987-8, Bell Helicopter successfully flight tested a bailed AH-1W with a four-bladed rotor system and other improvements (4BW demonstrator). In 1990, an independent examination was conducted to assess the feasibility of applying the benefits of advanced technology developments to increasing the productivity and effectiveness of the AH-1W. The study results indicate the AH-1W can be upgraded to a 4BW configuration which offers cost-effective benefits. AH-1W SuperCobra Four Bladed Rotor System

Conference Proceeding, 13, Bent, Nathaniel E. Decision-Science Applications, Inc, Arlington, VA, USA, Helicopter air-to-air value-driven engagement model (HAVDEM). Prototype development, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1, 369-377

HAVDEM is a non-real-time engagement level simulation of helicopter air-to-air combat. It addresses the Army's need for an analysis tool that not only models helicopter hardware systems, but also models pilots' decisions about how those systems are used. Terrain utilization by the pilot decision logic is one of the primary objectives of the HAVDEM program. The ongoing development of the prototype involves the combination of government-supplied computer software simulating helicopter systems, a pilot decision methodology used in a fixed wing simulation, and an original algorithm for terrain utilization. The development is divided into three phases: functional requirements, detailed design, and implementation. Testing is performed incrementally for each functional module as it is implemented. This design and development strategy has been successful in maintaining program goals and in exposing unforeseen problems with the government-supplied software. The result of the development program will be a realistic and reliable simulation of helicopter combat. A side effect will be an improved version of the government-supplied software. Future development of HAVDEM can include improved sensors and coordinated behavior among flights in an m-versus-n engagement. Helicopter Ait-To-Air Value-Driven Engagement Model (HAVDEM) Fixed Wing Simulation

Conference Proceeding, 14, Mayo, John R. //Occhiato, John J. //Hong, Steve W. United Technologies Corp, Stratford, CT, USA, Helicopter modeling requirements for full mission simulation and handling qualities assessment, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1991 1, 525-541

The U.S. Army Light Helicopter (LH) program has placed demanding requirements on the manufacturer's design analysis in order to provide a low risk, highly sophisticated attack helicopter for the next decade and beyond. In particular, it has emphasized the use of piloted simulation in design and in the demonstration of handling qualities specification compliance. This paper outlines the simulation model and simulator facility requirements that are considered crucial for obtaining meaningful pilot ratings and performance data. Included in this discussion are the components of an LH air vehicle model that contribute to realistic simulation, such as a blade-element rotor, nonlinear T800 engine and fuel control, detailed representation of fuselage and empennage aerodynamics and airflow interactions with the rotor, and an antitorque system. The operational considerations for integrating the air vehicle mathematical model with a motion base simulator facility are reviewed, and some lessons learned during the Army's ADS-33C assessment and full mission simulation evaluation are revealed. Light Helicoper (LH) LH Air Vehicle Model ADS-33C

Conference Proceeding, 15, Austin, Fred //George, Dino //Bivens, Court, Grumman Corporate Research Cent, Bethpage, NY, USA, Real-time simulation of helicopter air-to-air combat, 47th Annual Forum Proceedings, May 6-8 1991, Phoenix, AZ, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1991, 1, 553-563

The AUTOMAN computer program develops automated maneuvering decisions for helicopters during air-to-air combat over hilly terrain. Recently, the capabilities of this program have been extended and enhanced significantly. The revised program was installed at the NASA Ames manned flight-simulation facility to drive a computer-generated image of an enemy helicopter, thereby providing an adversary for the human pilot. Maneuvers are selected by employing game theory. Enhancements include a guidance law for target acquisition when a firing opportunity arises; fire-control sequence logic; improved low-flying capabilities; line-of-sight computations for the cockpit field-of-view, terrain obstructions, and visual range limits; use of terrain for masking; air-to-air collision-avoidance maneuvers; decisions on dispensing flares and chaff; and adjustable levels of pilot experience. Many runs were made by test pilots to evaluate this new simulation capability. The program was found to be extremely useful for both rotorcraft handling-quality evaluations and air-to-air combat training. Helicopter Air To Air Combat AUTOMAN Ames Manned Flight Simulation Facility

Journal Long Form, 16, Borgman, Dean C. MDX. A unique approach to a unique helicopter, Vertiflite, 1991, 37, 1, 66-68, VEFLAD, 0042-4455

McDonnell Douglas Helicopter Co. (MDHC) is using an approach which is truly unique in the helicopter industry for the design and development of the MDX helicopter; the goal is to produce the best helicopter in its class. The MDX design includes the MDHC standard static mast, a five blade, composite main rotor system, and NOTAR, and, from the risk-sharing subcontractors; a choice of Pratt & Whitney, Canada or Turbomeca engines (an industry first); a Kawasaki transmission (the only gearbox on the aircraft); an acoustic isolator for the transmission from Barry Controls; energy absorbing seats from Golan Industries; actuators from Lucas Aerospace; a liquid crystal integrated instrumentation display system (IIDS) from Canadian Marconi; and the basic fuselage from Hawker de Havilland. MDX Helicopter Quality Function Deployment Customer Advisory Team Integrated Product Development Total Quality Management System

Journal Long Form, 17, van der Walt, Johannes P. //Nurick, Alan, Univ of the Witwatersrand, Johannesburg, S Afr, Helicopter pitot intake performance and flow coefficient relationship, Journal of the American Helicopter Society, 1991, 36, 3, 84-88JHESAK, 0002-8711

The performance of a pitot type intake used on helicopter engines is analyzed for hover and forward flight, in terms of the DC(60) distortion index and pressure recovery factor. It is shown that for particular intakes these parameters may be correlated with the flow coefficient requiring limited empirical constants. The method provides a practical means for correlating engine intake performance parameters with the flow coefficient. Helicopter Pilot Intake Performance Flow Coefficient Relations Helicopter Forward Flight Pressure Recovery Factor DC(60) Distortion Index

Conference Proceeding, 18, Kaiser, Mary K. //Foyle, David C. NASA Ames Research Cent, Moffett Field, CA, USA, Human factors issues in the use of night vision devices, Proceedings of the Human Factors Society 35th Annual Meeting Volume 2 (of 2), Sep 2-6 1991, San Francisco, CA, USA, Publ by Human Factors Soc Inc, Santa Monica, CA, USA, 1991, 2, 1502-1506

Electro-optical imaging systems have been integrated into rotorcraft operations, allowing pilots to fly at very low altitudes and avoid obstacles in reduced visibility. The hardware characteristics of these systems result in visual displays which differ significantly from unaided, daylight vision. The impact of these differences on perceptual performance (and, ultimately, on pilotage) is poorly understood. In this paper, we identify critical human factors concerns suggested by field data and review empirical studies of performance on flight-relevant perceptual tasks, notably depth and distance perception. Hardware modifications to improve man-system performance are suggested. Night Vision Devices Electro-optical Imaging Systems Rotorcraft Pilots Night Vision Goggles (NVG) Pilot Night Vision System (PNVS)

Conference Proceeding, 19, Zhao, Yiyuan //Bryson, A. E. Univ of Minnesota, Minneapolis, MN, USA, Aircraft control in a downburst on takeoff and landing, Proceedings of the 29th IEEE Conference on Decision and Control Part 2 (of 6), Dec 5-7 1990, Honolulu, HI, USA Publ by IEEE, Piscataway, NJ, USA, 1990, 2, 753-757

Aircraft takeoff and landing in the presence of downbursts are addressed. Dynamic optimization and feedback control system design techniques are used to determine proper guidance laws for aircraft in the presence of downbursts, and insensitivity to downburst structures is emphasized. Avoidance is the best policy. If an inadvertent encounter occurs when the aircraft is already close to or even in the downburst, the pilot should concentrate on vertical flight, unless he is sure which direction to turn for winds of less intensity. If such an encounter happens on takeoff, maximum thrust should be used aggressively and a lower climb rate or even descending flight is recommended. Similar strategy is applicable for abort landing. If an encounter happens on landing and encounter height is low, landing should proceed. It is recommended that the nominal horizontal and vertical velocities w.r.t the ground should be maintained, subject to a minimum airspeed constraint. A landing

control logic is designed to accomplish this. Downbursts Feedback Control Landing Control Logic

Journal Long Form, 20, Negrin, M. //Grunwald, A. J. //Rosen, A. Technion - Israel Inst of Technology, Haifa, Isr, Superimposed perspective visual cues for helicopter hovering above a moving ship deck, Journal of Guidance, Control, and Dynamics, 1991, 14 3, 652-660JGCDDT, 0731-5090

The subject of the investigation is a manual low-altitude hovering task above a small moving ship deck using visual field cues supplemented by superimposed display symbology. In this task, rather than tracking the ship-deck motion, the pilot should keep the helicopter inertially stable at a desired inertial position with respect to the ship deck. This hovering stage lasts until the touchdown can be performed during some period of quiescent ship motion. The main difficulties during this task arise from the lack of appropriate visual references necessary to keep the helicopter inertially stable above the ship deck. This research investigates, both analytically and experimentally, the effects of the information superimposed on the visual field on hovering performance. This additional visual information can be implemented by inertial references generated on the ship deck, and/or by a helicopter-based head-up display. For the ship-deck references, inertially stable, three-dimensional visual structures such as line-drawn cubes are investigated. For the head-up display information, only an artificial horizon is investigated. The results of the investigation clearly show that hovering performance is improved by the inclusion of inertially stable visual cues. Moreover, it is shown that the performance is almost independent of the size of the three-dimensional structure. Thus, it is possible to implement the ship-based visual references within practical physical dimensions. Hovering Optimal Control

Conference Proceeding, 21, Maclay, D. //Williams, S. J. Cambridge Control Ltd, Engl, Use of mu-synthesis in full envelope, helicopter flight control system design, International Conference on CONTROL '91, Mar 25-28 1991, Edinburgh, Scotl, Publ by IEE, Stevenage, Engl, 1991, 2, 718-723

Proposals for future military combat helicopters place great emphasis on agile and precision manoeuverability and divided attention operation. Agility is required for combat situations whilst precise control of attitudes and vertical velocity are required during hover or for tasks requiring a stable platform. The requirement for divided attention operation means that the pilot must be relieved of the basic stabilization task, which is especially important for single pilot operation. These requirements in turn put tough demands on the flight control system and to meet them, a high bandwidth, multivariable control system will be necessary which takes care of the basic helicopter stabilization, and provides accurate and independent control of each of the selected outputs. The problems involved in designing such a control system are considerable, and include, coping with large variations in system dynamics across the flight envelope as well as uncertainty due to modelling limitations or stores configuration. MU-Synthesis Helicopter Flight Control System Design Robust Performance Model Uncertainty DE-Saturation Method

Conference Proceeding, 22, Krucoff, Mitchell W. //Croll, Martha A. //Pendley, Laura P. //Burdette, Deana L. //Pope, James E. //Hutchinson, Deborah D. //Stone, Janice S. //Weber, Rita A. //Califf, Robert M. Duke Univ Med Center, Durham, NC, USA, Continuous computer-assisted electrocardiographic monitoring in patients with acute myocardial infarction: Early experience, Proceedings - Computers in Cardiology, Sep 19-22 1989, Jerusalem, Isr, Publ by IEEE, Los Alamitos, CA, USA, 1989, 197-200, 0818621141

Results of 3311 h of continuous digital 12-lead ST segment monitoring in a pilot population of 77 patients treated early in myocardial infarction (MI) with thrombolytic therapy are reported. 'Mean beat' signal processing over 353 min of monitoring in 12 patients subjected to normal flight vibration during helicopter transport was compared with 390 min of monitoring in 12 patients in the coronary core unit (CCU). Automated ST episode detection triggered 15 episodes in helicopter and 19 episodes in CCU, of which 3/15 (20%) and 7/19 (37%) were artifact, respectively. From the 77 patients overall, ST trend evidence of changes in infarct vessel patency was noted more than twice in 38 (49%), more than four times in 21 (27%), and more than six times in 11 (14%). ST evidence of patency change occurred from 30 s to 47.6 h apart. It is concluded that mean beat signal processing can provide technically adequate ECG monitoring information even with a vibrating signal source during helicopter transport and that continuous ST monitoring may be useful for detecting changes in infarct vessel patency occurring outside the brief time window of acute angiography. Acute Myocardial Infarction Thrombolytic Therapy Helicopter Transport Acute Angiography

Conference Proceeding, 23, Cameron, Alexander A. GEC Avionics, Rochester, Engl, Development of the combiner eyepiece night vision goggle, Helmet-Mounted Displays II, Apr 19-20 1990, Orlando, FL, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1990, 1290 16-29, 0819403415

Conventional 'straight through' night vision goggles are now in widespread service with many armed forces throughout the world. Though originally designed for ground forces they have been successfully engineered into the airborne environment and are used on both rotary wing and fixed wing aircraft. However, a major disadvantage in the use of this type of NVG, particularly in fast jet applications, is that they obscure the pilots direct view of the Head Up Display. The combiner eyepiece NVGs solves this problem by giving the pilot a direct view of the HUD and cockpit instruments which is optically combined with the intensified image. The cockpit instruments and HUD are of course compatible with the NVG and are invisible to the NVG. The development of a Combiner eyepiece NVG from

initial concept through to production is discussed including design considerations, trade offs and enhancements to the operation of the device. The further development of the combiner eyepiece NVG into a fully integrated ejection safe night vision helmet is also described. Night Vision Goggle Head Up Display Image Intensifier Tubes Sky Spectral Irradiance

Conference Proceeding, 24, Caldwell, J. L. //Cornum, R. L.S. //Stephens, R. L. //Rash, C. E. U.S. Army Aeromedical Research Lab, AL, USA, Visual processing. Implications for helmet mounted displays, Helmet-Mounted Displays II, Apr 19-20 1990, Orlando, FL, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1990, 1290, 165-172, 0819403415

A study was conducted to compare the performance of AH-64 (Apache) pilots to other Army pilots on visual tasks. Each pilot was given a task presented monocularly to the right eye, a task presented monocularly to the left eye, and a task presented to both eyes simultaneously in a dichoptic task. Results indicated no performance difference between the groups of pilots on the dichoptic task, but indicated better performance on the left monocular task for the AH-64 pilots. These results indicate that AH-64 pilots who are required to switch their attention from their left eyes to their right eyes in order to obtain needed information are capable of processing information efficiently and effectively using only one eye. The implications of these results for the Integrated Helmet and Display Sighting System (IHADSS) are discussed. Helmet Mounted Displays Pilots Display Sighting System

Book Whole, 25, Lewandowski, Ronald J. (Ed.)Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1990, 1290, 266p, 0819403415

This conference proceedings contains 24 papers. The subject matter primarily concerns helmet displays and trackers used in aircraft. Though serious development began in the early 1960s and helmet systems have been in production on both the Navy F-4 and the Army Apache, helmet-mounted displays have recently been enjoying a resurgence of interest. The following reasons for this are described: Increased complexity and clutter of panel-mounted displays; Off-boresight weapon delivery; Emphasis on pilot situational awareness; Expanded fixed-wing missions, including Night attack; Increased workloads, especially in single-cockpit aircraft; Advances in optical performance of helmet-mounted displays; Use of helmet displays by opposing forces; and Innovative optical approaches for all applications: rotary wing, fixed wing, land vehicles, simulators, space applications, and commercial applications. The wide choice and availability of helmet-display concepts developed over the past several years makes selection of a display for a particular application difficult and confusing. It has been estimated that over 100 different display concepts have reached the drawing board. This conference was designed to help both developers and users understand each other's point of view, allowing more intelligent decisions related to the development and use of helmet-mounted displays. Helmet Mounted Display Field-of-View Night Vision Drive Electronics System Radiometry EIREV

Conference Proceeding, 26, Gogineni, S. P. //Moore, R. K. Univ of Kansas Center for Res, Inc, Lawrence, KS, USA, Scatterometers for helicopter-based measurements, 10th Annual International Geoscience and Remote Sensing Symposium - IGARSS '90, May 20-24 1990, College Park, MD, USA, Publ by IEEE, Piscataway, NJ, USA, 1990, 813

Summary form only given. Scatterometers have been developed for helicopter-based measurements at center frequencies of 5.3, 10, 15, 35, and 94 GHz. These systems have been and are being used for measurements of sea ice, soils, and vegetation. The same systems are used from platforms in the sea for measurements of ocean backscatter. In addition, a special three-beam instrument can measure the slope vector for the ocean surface. Some of these systems collect full polarimetric scattering matrices. Design considerations and system performance are discussed. Scatterometers Summary Only

Journal Long Form, 27, Okuno, Yoshinori //Kawachi, Keiji //Azuma, Akira //Saito, Shigeru, Univ of Tokyo, Tokyo, Jpn, Analytical prediction of height-velocity diagram of a helicopter using optimal control theory, Journal of Guidance, Control, and Dynamics, 1991, 14, 2, 453-459JGCDDT, 0731-5090

The autorotative landing of a single-engine helicopter following power failure is analyzed using optimal control theory. The optimization problems are formulated to minimize the unsafe region in the height-velocity diagram under the condition that the touchdown speed is within the capability of the landing gear. Nonlinear equations of motion are described using a rigid-body dynamic model with longitudinal three degrees of freedom. The aerodynamic model of the rotor takes account of the effects of blade stall during descent and increased induced flow in the vortex ring state. The present method gives a good estimation of the height-velocity boundary in comparison with the existing flight test data. It is pointed out that the test pilot started the collective flare-earlier than that occurred in the optimal solution. Autorotative Helicopter Landing Aerodynamic Rotor Model

Conference Proceeding, 28, Walter, Michael B. Scientific-Atlanta, Inc, San Diego, CA, USA, Mechanical diagnostics--Past, present and future, IEEE Systems Readiness Technology Conference - Autotestcon '90, Sep 17-20 1990, San Antonio, TX, USA, Publ by IEEE, Piscataway, NJ, USA, 1990, 517-521, 0879426837

The background and current trends of the automatic diagnostics of mechanical systems are reviewed. Particular attention is given to a breakthrough in this field involving the introduction of the Mechanical Systems Diagnostic Analyzer in the late 1970s. Further

advances in this field are also discussed, with particular emphasis on a reasonably expert system, Scientific-Atlanta's Rotor Analysis and Diagnostic system (RADS-AT), which allows a nonexpert user to quickly bring rotor-induced vibration in helicopters below the accepted level (typically 0.2 in/s.). Automatic Diagnostics Mechanical Diagnostics Rotor-Induced Vibrations

Conference Proceeding, 29, Marciano, Joseph //Pratt, Joseph //Carlton, Lynn //Carlson, Raymond, United Technologies Corp, Mechanical system condition monitor (MSCM) system design, IEEE Systems Readiness Technology Conference - Autotestcon '90, Sep 17-20 1990, San Antonio, TX, USA, Publ by IEEE, Piscataway, NJ, USA, 1990, 543-548, 0879426837

The interrelationship of mechanical system condition monitor (MSCM) design parameters with R&M (reliability and maintenance) and O&S (operation and support) cost parameters is established. Based on these relationships, a simple model that allows numerical estimates of required diagnostic attributes is developed in two parts. The proposed methodology relates support costs, mean time between removal, and fault detection effectiveness. Some current statistics on a modern helicopter (AH-64) are reviewed in light of the proposed model. Mechanical Systems Fault Detection

Journal Long Form, 30, Pausder, H.-J. Inst fuer Flugmechanik, Braunschweig, West Ger, Study of roll response required in a low altitude slalom task, Vertica 1990, 14, 1, 19-30 VERTDW, 0360-5450

A helicopter in-flight simulation was conducted to investigate the influence of roll sensitivity, roll damping, and roll-to-pitch coupling on the evaluation of handling qualities. The flight test task for the test pilots was to fly a slalom track set up with poles on the ground. The altitude of 100 ft and the airspeed of 60 kts had to be maintained fairly constant. The slalom task represents evidently the roll response demands of an NOE flight. The experiment utilized the variation capability of the DLR BO 105-S3 helicopter equipped with a fly-by-wire control system. The research helicopter, the flight test set up and the test procedure are described. Results are shown in terms of Cooper-Harper ratings and pilot comments. They are compared with existing criteria requirements and recommendations of previous studies. These results yield the suggestion of a higher level of roll sensitivity and damping in comparison to the current criteria. In addition, approaches for task performance evaluation are discussed and correlated with the test data. Roll Response Helicopter In-Flight Simulation Roll Sensitivity Roll Damping Roll-To-Pitch Coupling Slalom Track

Journal Long Form, 31, Bongers, P. M. //Hulshof, C. T.J. //Dijkstra, L. //Boshuizen, H. C. Univ of Amsterdam, Amsterdam, Neth, Back pain and exposure to whole body vibration in helicopter pilots, Ergonomics, 1990, 33, 8, 1007-1026 ERGOAX, 0014-0139

In a questionnaire survey the prevalence of back pain in 163 helicopter pilots was compared to that in a control group of 297 non-flying air force officers who underwent the same pre-emplohment medical examination. Since pilots document their hours of flight in a personal flight log, an accurate estimate of the of the duration of exposure could be made. In addition, vibration levels of the helicopters were measured and an accumulative vibration dose was calculated for each pilot. 'Transient' back pain of a short duration was more frequent amongst the pilots compared to the control group, and the prevalence of 'chronic' back pain of a persistent nature was also higher amongst the helicopter pilots. Transient back pain seemed to be most strongly related to the average hours of flight per day, whereas chronic back pain was more closely related to total hours of flight or the accumulative vibration dose. A significant higher prevalence of this chronic back pain was observed only after 2000 hours of flight or a vibration dose of 400 m$+2$/h/s$+4$/. The observed health effects may be due to vibration or constrained posture but are most likely due to concomitant exposure to both factors. Backache Whole Body Vibration Posture Helicopter Pilots

Conference Proceeding, 32, Shively, Robert J. U.S. Army, Moffett Field, CA, USA, Pre-flight risk assessment in emergency medical service (EMS) helicopters, Proceedings of the Human Factors Society 34th Annual Meeting - Orlando '90, Oct 8-12 1990, Orlando, FL, USA, Publ by Human Factors Soc Inc, Santa Monica, CA, USA, 1990, 1052-1056

The EMS industry has been the subject of several television and newspaper articles (Harvey and Jensen, 1987) which emphasized the negative aspects, (e.g. fatal accidents and high accident rates), rather than the life saving services performed. The accident rate of the EMS industry is five times as high as that of other civil helicopters. This high accident rate coupled with the dramatic rise in the number of programs (from a single service at its inception in 1972 to over 180 today, Spray, 1987), prompted the National Transportation Safety Board (NTSB) to study the accidents that occurred between May 11, 1978 and December 3, 1986 (NTSB, 1988). The NTSB report concluded that 'Sound pilot judgement is central to safe flight operations.' They further stated that '... factors unique to EMS helicopter operations--such as the influence of the mission itself, program competition, and EMS program management perspectives--can drastically influence pilot judgement during the EMS mission.' One of the most difficult decisions that a pilot must make is whether to accept or decline a mission. A pre-flight risk assessment system (SAFE) was developed at NASA-Ames Research Center for civil EMS operations to aid pilots in making this decision objectively. The ability of the SAFE system to predict risk profiles of missions was tested at an EMS operator. The results of this field study demonstrated that the usefulness of SAFE was highly dependent on the type of mission

flown. Emergency Medical Service Helicopters Rescue Service Helicopter Accident Rates Helicopter Mission Risk Assessment

Conference Proceeding, 33, Ballin, Mark G. //Dalang-Secretan, Marie-Alix //Anon (Ed.) //Anon (Ed.) //Anon (Ed.) //Anon (Ed.) //Anon (Ed.), NASA Ames Research Cent, Moffett Field, Ca, USA, Validation of the dynamic response of a blade-element UH-60 simulation model in hovering flight, 46th Annual Forum Proceedings of the American Helicopter Society Additional papers, May 21-23 1990, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1990, 3

The dynamic fidelity of an operational blade-element simulation model of the UH-60 helicopter is assessed for the hovering and low-speed flight regimes. Nonparametric frequency-domain identification techniques and time-history comparisions are used to determine the validity of total-vehicle on-axis and coupled responses. A dedicated flight-test program was conducted to provide data used in the analysis. The flight-test techniques and data verification methods employed are briefly described. Frequency-domain methods are applied to the model and to several model components in order to isolate deficiencies and verify refinements and corrections. Model deficiencies are also identified by using side-by-side pilot assessments of a motion-base simulation and of a test aircraft. Model updates are found to significantly improve fidelity in the frequency range that is of interest to handling-qualities research. The applicability of the model to high-bandwidth flight-control research is also discussed. UH60 Helicopter Frequency Responses

Conference Proceeding, 34, Glickstein, Ira //Anon (Ed.) //Anon (Ed.) //Anon (Ed.) //Anon (Ed.) //Anon (Ed.), IBM - Federal Sector Div, Owego, NY, USA, Automated threat assessment and response, 46th Annual Forum Proceedings of the American Helicopter Society Additional papers, May 21-23 1990, Washington, DC, USA Publ by American Helicopter Soc, Alexandria, VA, USA, 1990 3

The modern battlefield is a deadly, unforgiving environment. State of the art weapons jeopardize tactical rotorcraft survival. In the future, threats will be even more deadly, and harder to detect and recognize. They will be more accurate, faster acting, and have longer detection and firing ranges. To survive in such an environment, rotorcraft must take full advantage of aircraft survivability equipment. This requires supplementing human intelligence with automated functions. Automated threat assessment and response requires a mix of rapid-execution advanced automation algorithms and knowledge-based approaches. Traditional rule-based approaches require extensive processing and have difficulty handling dynamic environments. Practical application of artificial intelligence technology to real-time cognitive decision aiding is therefore a challenge. Our goal is a realizable implementation that makes best possible use of human and machine capabilities to really improve mission performance and reduce pilot stress and workload. This paper is based on continuing IR&D projects at IBM Federal Sector Division. It outlines an integrated systems approach of sensor resource management and multi-sensor data fusion. The resultant cognitive decision aiding will yield improved threat ID and location inferencing, threat prioritization, and response decision making under uncertainty. This paper discusses how a cellular automata parallel processing technique, proven successful on rapid tactical route replanning, can be applied to threat situation assessment. Threat Assessment Electronic Warfare Cellular Automata Concepts Rotorcraft Parallel Processing

Conference Proceeding, 35, Dorman, Jeffrey, McDonnell Douglas Helicopter Co, Minicomputer part-task simulation for helicopter development. An economical approach, Aerospace Technology Conference and Exposition, Oct 1-4 1990, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1990

An economical part-task simulator for providing quantitative optimization of helicopter cockpit layout and displays has been built. The steps followed to confer real-time minicomputer application of a simplified flight model (FLYRT), is outlined, as is the control law development needed for 4-axis sidearm controller application. Instrument display variable synthesis, based on calculated variables is discussed. Helicopter Cockpit Layout Minicomputer Part-Task Simulation Software Package FLYRT Cockpit Layout Computer Simulation

Conference Proceeding, 36, Wilkins, Robert Ryan, Boeing Defense and Aerospace Group, Rotorcraft human factors: Man . . . machine . . . environment, Aerospace Technology Conference and Exposition, Oct 1-4 1990, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1990

Some aspects of Human Factors have long been a neglected area in rotorcraft design. This is true of such areas not directly influenced by motion and workload studies: the areas of human factors missing from the domain of human factors are those not included in the engineering set, but in the psychological and physiological set. Rotorcraft human factors issues are many of the same developed or determined for the aircraft/airplane category and can be divided into groups such as the man, machine, environment. Included are the issues of operating criteria (environment) of the rotorcraft and its pilots, design criteria to aid that pilot to alleviate stress and enable a functional cockpit (machine), and the issues of how best to train the pilot (man), mentally and physically, to accomplish the tasks set before him. Systems such as aircraft design and operation, crew physiology and training and airspace management need to be revamped and updated. Solutions must be developed and implemented to better design, man, train and utilize rotorcraft in the future. This will take a coordinated effort by the regulatory agencies and the industry. Rotorcraft Design Rotorcraft Cockpit/Crew Station Vertiport Design Tiltrotor Task Training

Conference Proceeding, 37, Stringer, Paul G. Essex Corp, Columbia, MA, USA, Opportunities to improve helicopter cockpit displays; a pilot's perspective, Aerospace Technology Conference and Exposition, Oct 1-4 1990, Long Beach, CA, USA, Publ by SAE, Warrendale, PA, USA, 1990

Human error remains as the major cause/factor identified in both civil and military helicopter accident reports. This paper identifies some opportunities for improving helicopter operational performance and reduce human error accidents based on critical event analysis of accident reports and associated operational requirements. Analysis identified areas where the pilot was overloaded and information available to the pilot was inadequate for the particular situation. These results suggest several areas where the task demands could be made more compatible with the pilot capabilities for improved performance, fewer errors, and timely decisions in critical situations. Two areas addressed are power/flight performance management and obstacle avoidance. This information can be useful in developing helicopter automation and electronic display systems that improve safety and mission reliability. Helicopter Cockpit Displays Pilot Error Critical Events Analysis Army Helicopter Accidents

Journal Long Form, 38, Dees, James W. //Cornett, Timothy R. United States Army Aviation Cent, Fort Rucker, AL, USA, Simulator networking in helicopter air-to-air combat training, Journal of Aircraft 1990, 27, 4, 381-382, JAIRAM, 0021-8669

In August 1988, the Singer Corporation demonstrated a relatively simple networking of the AH-64 combat mission simulator (CMS), AH-1 flight and weapons simulator (FWS), and UH-60 flight simulator (FS) at Fort Rucker. At the end of this demonstration, three night shifts were made available for a quick research evaluation of this capability. One AH-64 and one AH-1 crew volunteered to participate in an air-to-air combat (ATAC) pilot study involving their respective aircraft. The sample size of this pilot study is inadequate to draw any conclusions with certainty. However, in this instance, there is so little information on the use of simulators in training helicopter ATAC that even the tentative suggestions of a pilot study are of interest. All reference to weapons performance has been deleted for security reasons. Simulator Networking Air-To-Air Combat Training Combat Mission Simulator

Conference Proceeding, 39, Leighty, Bradley D. //Rhodes, David B. NASA Langley Research Cent, VA, USA, Synchronous strobed laser light sheet for helicopter model rotor flow visualization, Proceedings of the Thirty-Sixth International Instrumentation Symposium, May 6-10 1990, Denver, CO, USA, Publ by ISA Services Inc, Research Triangle Pk, NC, USA, 1990, 36, 9-22

A synchronous, strobed laser light sheet has been developed for use in flow visualization of a helicopter rotor model. The light sheet strobe circuit included selectable blade position, strobe duration, and multiple pulses per revolution for rotors having 2 to 9 blades. The flow was seeded with propylene glycol. Between runs, a calibration grid board was placed in the plane of the laser sheet and recorded with the video camera at the position used to record the flow field. A slip-sync mode permited slow motion visualization of the flow field over complete rotations of the rotor. The system was used to make 2-dimension flow field cuts of a four-bladed rotor operating at advance ratio of 0.37 at wind tunnel speeds up to 79.25 meters per second (260 feet per second). Helicopter Rotor Model Strobed Laser Light Sheet Light Sheet Strobe Circuit Propylene Glycol Slow Motion Visualization Laser Sheet

Journal Long Form, 40, Saal, Karl W. //Cole, Jeffrey L. United Technologies Corp, FL, USA, Category 'A' certification of S-76B featuring variable CDP and V2 speeds, Journal of the American Helicopter Society 1990, 35, 3, 12-21, JHESAK, 0002-8711

This paper discusses the development and qualification of a Transport Category 'A' takeoff and landing procedure for the S-76B helicopter which provides the flexibility necessary to encourage helicopter operators to use the Rotorcraft Flight Manual zero exposure time takeoff and landing procedure, thus improving overall safety. The takeoff procedure features variable critical decision point (CDP) and takeoff safety speed (V2). Rejected and continued takeoff distances are directly proportional to CDP and V2 speeds, respectively, therefore lower CDP and V2 speeds equate to shorter field lengths. Maximum takeoff and landing gross weight is also directly proportional to CDP/V2 speeds, therefore higher CDP/V2 speeds can equate to higher maximum takeoff gross weights. This, coupled with published headwind influence, permits payload to be traded off against available field length in such a manner that Category 'A' one engine inoperative (OEI) climb performance minima are maintained over a wide range of environmental conditions. The landing procedure features two different approach profiles. The primary landing approach path is intended for VFR approaches to airfields with minimum available space, with an alternate approach path providing a more shallow profile to address transition from instrument approach or where landing space is not critically short. Helicopter Certification Procedures Helicopter Airworthiness Standards One Engine Inoperative Performance Standards

Journal Long Form, 41, Hess, Ronald A. //Gorder, Peter J. Univ of California, CA, USA, Design and evaluation of a cockpit display for hovering flight Journal of Guidance, Control, and Dynamics, 1990, 13, 3, 450-457, JGCDDT, 0731-5090

A simulator evaluation of a cockpit display format for hovering flight is described. The display format is based on the position-velocity-acceleration representation similar to that used in the Pilot Night Vision System in the Army AH-64 helicopter. By only varying the

nature of the display law driving the 'primary' indicator in this format, i.e. the acceleration symbol, three candidate displays are created and evaluated. These range from a status display in which the primary indicator provides true acceleration information, to a command display in which the primary indicator provides flight director information. Simulation results indicate that two of the three displays offer performance and handling qualities that make them excellent candidates for future helicopter cockpit display systems. Hovering

Book Whole, 42, Anon (Ed.)Publ by American Helicopter Soc, Alexandria, VA, USA, 1990, 11372p (2 vols)

This conference proceedings includes 127 papers (114 papers in two bound volumes and additional papers) which concern an assortment of topics regarding helicopters. Design techniques are presented. Propulsion issues are reviewed. Avionics and instrumentation are considered. Several contributions discuss noise and acoustic issues, while dynamics is also reviewed. Materials and structures, aerodynamics, cockpit design, testing, manufacturing, flight simulation, and quality assurance are also included. Rotorcraft Blades Control Systems Power Transmission Aerodynamics EIREV

Conference Proceeding, 43, Cappetta, A. N. //Johns, J. B. Naval Air Development Cent, PA, USA, An evaluation of the proposed specification for handling qualities of military rotorcraft, MIL-H-8501B, utilizing predicted and actual SH-60B handling qualities, 46th Annual Forum Proceedings of the American Helicopter Society. Part 2 (of 2), May 21-23 1990, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1990, 2, 965-978

SH-60B dynamic characteristics used for comparison with MIL-H-8501B dynamic requirements were obtained from a validated SH-60B non-linear math model. This comparison revealed lessons learned with regard to the application of small, moderate, and large amplitude criteria. Actual SH-60B handling qualities data were obtained from flight tests conducted by the Naval Air Test Center. Pilot opinion data from these tests were then correlated with the predicted handling qualities obtained through comparison of the SH-60B dynamics and MIL-H-8501B requirements. Through this correlation hover and low-speed pitch and yaw, and forward flight roll criteria were evaluated. This evaluation revealed support for a majority of MIL-H-8501B criteria. Handling Qualities Military Rotorcraft Military Specification MIL-H-8501B SH-60B Helicopters

Conference Proceeding, 44, Beggs, Robert M. //Sawaya, John, Boeing Helicopters, PA, USA, Computer aided reflection analysis, 46th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), May 21-23 1990, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1990, 1, 655-661

This paper examines computer based methods of predicting the location of reflections in helicopter cockpits and other vehicular applications. The reflections that occur on the windscreens of tactical and commercial aircraft caused by internal light sources, e.g. lighted pushbuttons, lightplates, and CRT displays can significantly degrade pilot visual performance. Cockpit designers utilize numerous methods to control reflections including; light sources orientation, incorporation of glareshields and baffles, and installation of micro-louvered films over lighted components. Typically though, reflections cannot be analyzed until a prototype cockpit is produced or a full-scale mockup of the cockpit is constructed. Design of reflection control features consequently suffers due to their late incorporation into the cockpit configuration. Boeing Helicopters and Boeing Computer Services have developed a computer based approach to predicting cockpit reflections, which eliminates the need for physical mockups for this task. Reflections Rotorcraft

Conference Proceeding, 45, Bolukbasi, A. O. //Bertone, C. M. McDonnell Douglas Helicopter Co, AZ, USA, Helicopter crew station design using a computerized human model, 46th Annual Forum Proceedings of the American Helicopter Society. Part 1 (of 2), May 21-23 1990, Washington, DC, USA, Publ by American Helicopter Soc, Alexandria, VA, USA, 1990, 1, 649-654

A computerized modeling system, Program MACMAN (McDonnell Anthropometric Computerized Man-Model), has been developed to assist in designing helicopter crew stations. MACMAN combines a three-dimensional representation of the human body with the crew station geometry. The human body model consists of twelve segments whose dimensions and kinematic constraints have been determined from studies of human anthropometry. MACMAN is menu-driven and very user-friendly. The human model sizes can be interactively changed to represent 5th percentile female through 95th percentile male crew members. The human model can also be animated to evaluate reach envelopes and collision and interaction detection. MACMAN has been validated and used in design of the MD900 crew station, dramatically reducing the time needed to construct mockups and design iterations. Software Package MACMAN Crew Stations

Conference Proceeding, 46, Turner, Christopher T. Litton Instruments & Life, IA, USA, Integrating OBOGS and OBIGGS. The V-22 concentrator, Proceedings of the 27th Annual Symposium of SAFE Association, Dec 5-8 1989, New Orleans, LA, USA, Publ by Survival & Flight Equipment Assoc, Newhall, CA, USA, 1989, 25-28

Litton Instruments & Life Support Division has developed a system integrating OBOGS and OBIGGS systems into one compact package. The system was developed for the team of Bell Helicopter and Boeing Vertol for use on the V-22 Osprey tilt-rotor aircraft. The oxygen-enriched gas is utilized by the four man crew for breathing consumption while the oxygen-depleted gas is used for fuel tank inerting. The primary benefit of combining these

systems is the weight savings resulting from utilizing common air distribution components, structural members, and failure monitor functions. Oxygen Masks Air Consumption Breathing Systems

Journal Long Form, 47, Beerwinkle, K. R. //Lopez, J. D. //Bouse, L. F. //Brusse, J. C. Texas A&M Univ, TX, USA, Large helicopter-towed net for sampling airborne arthropods Transactions of the ASAE, 1989, 32, 6, 1847-1852 TAAEAJ, 0001-2351

The development of a large helicopter-towed net for aerial sampling of arthropods in research of insect flight behavior and movement is described. The pyramidal, windsock-shaped net has a 5 m$+2$/ inlet and an air sampling rate of 3.2 $MUL 10$+5$/ m$+3$//h when towed at the designed airspeed of 64 km/h. This sampling rate is more than four times that reported in the literature for similar systems. With an apical angle of 25 deg or less in the large net, collected insects are efficiently funneled into a smaller compartmentalized collection net. The individual compartments of the collection net are constructed such that they can be sealed with styrofoam balls released by the pilot by remote control. Airborne Arthropods Collection Nets

Journal Long Form, 48, Parlier, Charles A. View of perestroika, Vertiflite 1990, 36, 1, 52-55, VEFLAD, 0042-4455

The current waves of reform rolling through the Soviet Union have brought changes throughout the world. Within the aviation community, the changes have opened doors to our counterparts within the Soviet Union. Soviet aircraft have appeared at international airshows for many years, but the architects and mastes of Soviet aviation have been largely isolated from their Western colleagues until the last two years. For the helicopter industry the change began at the 1989 American Helicopter Society Annual Forum, and was continued at the 1989 Paris Airshow and Helitech 89 at Redhill Aerodrome, United Kingdom. The author had the distinct pleasure of being able to participate firsthand in this experience. In this paper, the author reports on his meetings with Soviet helicopter designers and crew members and also describes some of the helicopters displayed at these airshows. International Airshows Soviet Helicopter Exhibits Soviet Rotary Wing Aircraft

Conference Proceeding, 49, Gibson, Chris P. //Martin, Wayne L. Royal Aerospace Establishment, Engl, Designing the virtual cockpit man-machine interface, Display System Optics II, Mar 30-31 1989, Orlando, FL, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1989, 1117, 85-93

The current trend towards the 'glass cockpit' and 'mission management systems' has certainly increased the data and facilities which are available to the crew but it has also encouraged the crew to devote a significant amount of their attention to 'head down' operations. With the projected complexity of future battlefield scenarios there is an increasing requirement to remain 'head out' and the virtual cockpit is now firmly established as an operational concept for increasing the crew efficiency of future fixed wing and rotary wing aircraft by efficient presentation of information and the flexible configuration of interfacing techniques. This research has utilised a Visually Coupled Airborne Systems Simulator (VCASS), and a panoramic helmet-mounted display, to investigate the relative efficiency of several MMI configurations and the effect of pilot strategy in carrying out a realistic Interdiction type mission. The results are discussed with particular reference to user acceptability and the operational application and development of the virtual cockpit. Virtual Cockpit Man-Machine Interfaces Visually Coupled Airborne Systems Simulator Panoramic Helmet Mounted Displays Glass Cockpit Mission Management Systems Vision Systems

Conference Proceeding, 50, Rash, Clarence E. //Verona, Robert W. U.S Army Aeromedical Research Lab, AL, USA, Cockpit lighting compatibility with image intensification night imaging systems. Issues and answers, Helmet-Mounted Displays, Mar 28-29 1989, Orlando, FL, USA Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1989, 1116, 170-175

Night imaging systems based on image intensification (I$+2$/) tubes are a major factor in the night operation capability of U.S. Army rotary-wing aircraft. A major problem associated with the use of these systems is the detrimental effect caused by internal cockpit lighting. Instrument lamps, caution lamps, utility lights, and other light sources inside the cockpit activate the bright source protection control circuits of the intensification tubes, thereby reducing their sensitivity to external natural and artificial illumination. In 1986, a Tri-Service specification, MIL-L-85762, 'Lighting, aircraft, interior, night vision imaging system compatible, ' was adopted to resolve the cockpit lighting problems. MIL-L-85762 defines the measurement instrumentation and techniques required to certify lighting components as 'ANVIS compatible.', Night Imaging Systems Image Intensification ANVIS System Aircraft Panel Lamps Flashlight Filters Cockpit Lighting

Conference Proceeding, 51, Tatro, Jon S. //Taylor, Robert R. Bell Helicopter - Textron, Inc, TX, USA, Helmet mounted displays and the emerging attack rotorcraft counterair mission, Helmet-Mounted Displays, Mar 28-29 1989, Orlando, FL, USA, Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1989, 1116, 37-46

Helmet mounted displays (HMD) and air-to-ground weapons delivery are integral to attack rotorcraft today. Very little design data is available to establish HMD specifications for the emerging attack rotorcraft air-to-air mission requirements. Even cursor analysis of the air-to-air mission indicates several areas which differ from the air-to-ground missions studied in the past and these differences impact HMD and overall system requirements. The

primary purpose of this paper is to examine the counterair mission for future attack rotorcraft and the implications for crew station design requirements, specifically regarding 'eyes out' display and control technologies. The findings of several BHTI research programs are discussed. Helmet Mounted Displays Attack Rotorcraft Counterair Mission Air-to-Air Mission Air Vehicle Maneuvering Field of View (FOV)

Conference Proceeding, 52, Lohmann, Robert A. //Weisz, Alexander Z. Hughes Aircraft Co, CA, USA, Helmet-mounted displays for helicopter pilotage. Design configuration tradeoffs, analyses, and test, Helmet-Mounted Displays, Mar 28-29 1989, Orlando, FL, USA Publ by Int Soc for Optical Engineering, Bellingham, WA, USA, 1989, 1116, 27-32

Human engineering criteria applicable to the design of helmet mounted displays for use with night vision sensors, such as forward looking infra-red (FLIR) or low light level television (LLTV), are stated and reviewed. Systems requirements are presented which call for pilot operation at night that is as equivalent as practicable to flight under normal daytime visual rules. Requirements are developed that utilize head motion coupled to sensor movement to achieve the semblance of daytime pilotage while conducting operations at night under the cover of deep darkness. Items addressed include: overall head supported weight, center-of-gravity, and other ergonomic factors affecting pilot acceptance; such as: comfort, eye-relief, total and instantaneous field of view, full or partial overlap of left-eye and right-eye fields of coverage, and head movement-to-sensor servo response. Helmet Mounted Displays Helicopter Pilotage Night Vision Sensors Forward Looking Infrared (FLIR)

Journal Long Form, 53, Aponso, Bimal L. //Mitchell, David G. //Hoh, Roger H. Systems Technology, Inc, CA, USA, Simulation investigation of the effects of helicopter hovering dynamics on pilot performance, Journal of Guidance, Control, and Dynamics, 1990, 13, 1, 8-15JGCDDT, 0731-5090

A fixed-based simulation has been performed to investigate the handling-qualities requirements for the midterm pitch response of a helicopter at hover and in low-speed flight. Pilot rating results from this simulation, using an attitude-tracking task, were compared with those from previous experiments to develop handling-qualities limits on the frequency and damping of the oscillatory mode in the hovering cubic. Pilot performance data obtained during the experiment were used to confirm the pilot-rating results. These data show the pilot performance to closely match that predicted by the theory of piloted control. A means of predicting pilot ratings from the open-loop aircraft dynamics is presented. Rotorcraft Pitch Response Attitude Response

Journal Long Form, 54, Paccini, Piero, Agusta, Italy, Air traffic control's application to vertical flight - an international perspective, Vertiflite 1989, 35, 6, 18-20 VEFLAD, 0042-4455

With the current air traffic regulations, even a helicopter wishing to make an instrument approach can only use the existing facilities and must strictly follow the procedures prescribed for fixed wing aircraft. Recently, however-and undoubtedly the development of tiltrotor programs has contributed to this-research and experimental work in the United States have identified the heir to the successful ILS as being the MLS (Microwave Landing System). This highly versatile and accurate system allows the automatic simultaneous control of many aircraft from various directions, even with curved paths, varying altitudes, and, most interesting of all, with approach angles as large as 20$DGR@C. This is why ICAO, together with the FAA, has already set up a program for the gradual replacement of ILS with MLS. At the beginning the two systems shall be used simultaneously. By 1998, the new system will take over on a global scale. Vertical Flight Aircraft Instrumented Landing Approaches Vertiport Airspace Control Microwave Landing System

Journal Long Form, 55, Barrer, John N. //Sinha, Agam N. MITRE Corp, VA, USA, Operational perspective of potential benefits of microwave landing systems Journal of the Institution of Engineers (India), Part AE: Aerospace Engineering Division, 1988, 69, 1-2, 16-21 JIADEY, 0257-3423

MLS has wide of applications. It has the potential to offer benefits to all classes of users (air carrier, general aviation, commuter, rotorcraft etc), at all types of airports (large, small, reliever, heliports, etc). Each individual application requires a set of ATC procedures and corresponding ground system/avionics capability to be effective. These requirements are included in the paper together with the general requirements that may require modification or adaptation for site-specific application. The purpose of the explicit identification of these requirements is to provide some insight to the transition planning from the current ILS to the future MLS environment., Microwave Landing Systems Instrument Landing Systems Ground Systems

Journal Long Form, 56, Brahney, James H. Aerospace Engineering, PA, USA, MDX: a helicopter designed by its users, Aerospace Engineering (Warrendale, Pennsylvania), 1989, 9, 9, 23-25, AEENEP, 0736-2536

McDonnell Douglas Helicopter Co. (MDHC) has launched production of its new MDX helicopter, but only after exhaustive analysis of data acquired from surveys made of its potential users. In the truest sense, the design team of the MDX has incorporated the wishes of the operators into the design of the helicopter. The final MDX design configuration calls for a single pilot and accommodations for seven passengers, consisting

of two rows of three-abreast seating in the cabin and a seat in the cockpit. Design gross weight for the MDX is set at 2452 kg, with an empty weight of 1080 kg and a useful load of 1371 kg. With an external load, allowable gross weight will be 2738 kg. With a fuel capacity of 666 liters, maximum range is just over 400 miles, with a 30-minute reserve. The MDX features outstanding hover performance, minimum noise and vibration, the use of composites in the rotor system, a flight control system free of hydraulic boast, grease lubrication for the main rotor transmission, and, most unusual, the absence of a tail rotor. Light-Weight Passenger Helicopters Low-Noise Helicopters No-Tail-Rotor Helicopters

Journal Long Form, 104, Scoughton, Craig, Allied-Bendix Aerospace, Teterboro, NJ, USA, Allied-Bendix Aerospace, Teterboro, NJ, USA, ROTORCRAFT INTEGRATION FOR IMPROVED MISSION COST EFFECTIVENESS. Vertiflite, 1987, 33, 2, 12-16, VEFLAD, 0042-4455

The system integration discussed in this article involves the use of a central multiplex bus with signal interfacing provisions, central processing, and multipurpose controls and displays to allow crew management of a total aircraft system from a convenient, central location within the crew station. The author discusses the role of the mission computer, the remote terminal unit, the display processor, and crew station data entry devices and displays in an integrated control system. The author cites as an example of an integrated control system the Boeing Vertol Model 360 Avionics Management System, which can be expanded around a set of core functions into a mission management system. AVIONICS SYSTEM INTEGRATION CENTRALIZED AVIONICS MANAGEMENT CENTRALIZED DATA PROCESSING

Conference Proceeding, 105, Gagliardi, F. //De Martinis, U. //Piccolo, A. //Rossi, F. GESTIONE INTEGRATA DELLA RISORSA IDRICA PER LA PRODUZIONE DELL'ENERGIA ELETTRICA E PER L'USO AGRICOLO. ELECTRIC MOTORS APPLICATIONS IN AGRICULTURE ARICULTURAL MOTORIZATIONPalermo, Italy, 1982, 00669822

HYDROELECTRIC POWER GENERATION SYSTEM IRRIGATION SYSTEM MATHEMATICAL OPTIMIZATION MODEL

Journal Long Form, 1, Goodenough, Frank, ANALOG-CELL LIBRARIES STRETCH FOR STANDARD-PRODUCT PERFORMANCE. Electronic Design, 1987, 35, 8, 29-34, 36, 38ELODAW, 0013-4872

The usefulness of working with a library that also carries analog cells is recommended for designing a mixed analog-digital system with digital standard cells. The benefits of this approach are examined, and available libraries of this type are described. The evaluation of standard cells is discussed, and future developments are considered. ANALOG-CELL LIBRARIES DIGITAL STANDARD CELLS APPLICATION-SPECIFIC INTEGRATED CIRCUITS

Journal Long Form, 2, Goldberg, Edward H. NEC Electronics Inc, Natick, MA, USA, NEC Electronics Inc, Natick, MA, USA, ONE-CHIP COMPUTER SHRINKS SIZE AND PART COUNT OF STEPPING-MOTOR CONTROLLER. Electronic Design 1987, 35, 8, 81-84 ELODAW, 0013-4872

The use of a microcontroller to manage a stepping motor with fewer parts than earlier designs is discussed. A theoretical analysis of the motor control is given. It is then shown how the firmware is applied to achieve the desired control. STEPPING-MOTOR CONTROLLER MICROCONTROLLERS

Journal Long Form, 3, Anon, Royal Dutch/Shell Group, The Hague, Neth, Royal Dutch/Shell Group, The Hague, Neth, LIQUEFIED-GAS STORAGE-TANK DESIGN, CONSTRUCTION ADDRESSED. Oil and Gas Journal, 1987, 85 27, 42-46, OIGJAV, 0030-1388

New recommendations for liquefied-gas storage tank design and construction are included in 'Recommendations for the Design and Construction of Refrigerated Liquefied Gas Storage Tanks, ' which was published late last year by the Engineering Equipment & Materials Users Association (EEMUA), London. This publication includes the newest requirements for refrigerated storage tanks. Environmental concerns and safety for surrounding areas receive special attention. Its recommendations for design and construction of the newest types of tanks are not yet included in existing British Standards and API codes for refrigerated storage tanks. It is expected that these new recommendations will be applied worldwide in the coming years. Their intention is to promote a more uniform approach to reduce misunderstanding and misinterpretation. STORAGE TANKS

Journal Long Form, 4, Servant, C. //Gherbi, El H. //Cizeron, G. CNRS, Orsay, Fr, CNRS, Orsay, Fr, TEM INVESTIGATION OF THE TEMPERING BEHAVIOUR OF THE MARAGING pH 17. 4 Mo STAINLESS STEEL. Journal of Materials Science 1987, 22, 7, 2297-2304JMTSAS, 0022-2461

The pH 17-4 Mo steel (Z6 CND 17. 04. 02), used in the steam generator of nuclear reactors, was investigated in order to determine the structural evolution occurring during tempering carried out under various conditions of duration and temperature. The formation and growth of different types of carbides such as Mo//2C, M//2//3C//6 and M//7C//3 and of Fe//2Mo intermetallic compound were studied and also of reversed austenite. A small

secondary hardening peak was observed for tempering close to 400 degree C which is related to the Mo//2C carbide precipitation; beyond this temperature, softening occurs. REVERSED AUSTENITE SECONDARY HARDENING SOFTENING

Journal Long Form, 5, Ocelik, V. //Diko, P. //Hajko, V. Jr. //Miskuf, J. //Duhaj, P. Slovak Acad of Sciences, Kosice, Czech, Slovak Acad of Sciences, Kosice, Czech, FRACTURE TOUGHNESS OF SOME METALLIC GLASSES. Journal of Materials Science, 1987, 22, 7, 2305-2308, JMTSAS, 0022-2461

The critical stress intensity factor of Fe//4//0Ni//4//0B//2//0, Fe//3//0Cr//1//0Ni//4//0B//2//0, Ni//8//0Si//1//0B//1//0 and Ni//8//0Si//5B//1//5 metallic glass ribbons was measured. Stressing by ultrasound, a new method for preparation of a sharp crack in a metallic glass, was used. Only shear rupture failures were investigated for all alloys. Scanning electron microscopy (SEM) of fracture surfaces revealed the role of 'quenched-in' defects in the process of the failure and also enabled specification of the stress conditions in the crack tip under which the fracture takes place. CRITICAL STRESS INTENSITY FACTOR FRACTURE TOUGHNESS SHEAR RUPTURE FAILURES

Journal Long Form, 6, Kwarciak, J. //Lekston, Z. //Morawiec, H. Silesian Univ, Katowice, Pol, Silesian Univ, Katowice, Pol, EFFECT OF THERMAL CYCLING AND Ti//2Ni PRECIPITATION ON THE STABILITY OF THE Ni-Ti ALLOYS. Journal of Materials Science, 1987, 22, 7, 2341-2345 JMTSAS, 0022-2461

Two near-stoichiometric Ni-Ti alloys have been investigated. One of them contained Ti//2Ni phase in the matrix, the second did not. Using high-temperature X-ray measurements and differential thermal analysis it was found that the martensitic transformation occurs in several stages, via the R phase. The reverse transformation proceeds directly from the martensite to the parent phase. Thermal cycling causes a decrease in the characteristic temperatures and heats of transformation. This is associated with an increase in the number of defects in the matrix. In the alloy containing particles of Ti//2Ni phase further precipitation takes place during thermal cycling, causing destabilizing of the structure and properties of this alloy. THERMAL CYCLING MARTENSITIC TRANSFORMATION

Journal Long Form, 7, Pausder, H. J. //Sanders, K. DFVLR, Braunschweig, West Ger, DFVLR, Braunschweig, West Ger, DFVLR FLYING QUALITY RESEARCH USING OPERATIONAL HELICOPTERS. Vertica 1986, 10, 1, 47-58, VERTDW, 0360-5450

A flight-test program has been conducted in the field of flying quality research. The tests utilized the operational helicopters BO 105 and UH-1D of the German Aerospace Research and Test Institute (DFVLR) and the German Flight Test Center. The main advantage of operational helicopters is the reality of visual and motion cues for the pilot. The extensive flight tests had the objectives to: (1) assess the demands of missions; (2) derive qualified flight-test tasks; (3) determine criteria for task performance evaluation; and (4) establish anchor points for an examination of the validity of simulator results. An overview of the DFVLR test activities is presented. HELICOPTER FLIGHT TESTING

Journal Long Form, 8, Thompson, Brian E. //Sawin, Herbert H. MIT, Cambridge, MA, USA, MIT, Cambridge, MA, USA, POLYSILICON ETCHING IN SF//6 RF DISCHARGES: CHARACTERISTICS AND DIAGNOSTIC MEASUREMENTS. Journal of the Electrochemical Society, 1986 133, 9, 1887-1895, JESOAN, 0013-4651

The response of polysilicon etching characteristics and various diagnostic measurements to pressure, power, and flow rate in 13. 5 MHz SF//6 discharges is reported and discussed. The etching rate increases with increasing power, decreasing pressure, and increasing flow. As a function of discharge pressure, the etching rate is not proportional to the bulk fluorine concentration as measured by optical emission using Ar actinometry. However, the etching rate is related to the bulk fluorine concentration with a model that includes diffusion of fluorine from the bulk plasma to the wafer surface and the subsequent reaction of the fluorine with the silicon. SULFUR HEXAFLUORIDE POLYSILICON ACTINOMETRY

Conference Proceeding, 9, Kapasi, Asagar E. Bell Helicopter Textron Inc, Fort Worth, TX, USA, Bell Helicopter Textron Inc, Fort Worth, TX, USA, ROTORCRAFT AVIONICS TAILORED FOR ADVERSE CONDITIONS. Proceedings - IEEE/AIAA 7th Digital Avionics Systems Conference.Fort Worth, TX, USA, IEEE, New York, NY, USA, 1986, 757-764

A substantial number of helicopters is dedicated to the logistic support of the offshore oil industry, hospitals, and the search mission for police. These and other helicopters used in the military environment have to accomplish their missions under adverse conditions most of the time. Pilot workload without proper avionics and mission equipment packages under such conditions becomes very heavy. A generic block diagram of an avionics system that can achieve missions under adverse conditions is described. The major blocks are explained and the simplified computational flow of the avionics system is discussed. ROTORCRAFT AVIONICS SYSTEM MISSIONS UNDER ADVERSE CONDITIONS

Journal Long Form, 10, Allen, Gordon, Offshore Petroleum Industry Training Board, Offshore Petroleum Industry Training Board, OFFSHORE HELICOPTER FIREFIGHTING AND RESCUE TRAINING. Petroleum Review, 1987 41, 480, 41-44, PETRB2, 0020-3076

In the main, operating companies offshore have taken a positive view of helicopter training and their emergency crews have a good knowledge of what is required of them and they are trained to a satisfactory standard. Unfortunately there are some companies who are well behind and still require some prodding to train their crews. This paper is designed to be of benefit to the reader in choosing a helideck crew and the helicopter emergency training. FIREFIGHTING AND RESCUE TRAINING OFFSHORE HELICOPTER FIREFIGHTING

Conference Proceeding, 11, Ram, Balasubramanian //Skinner, Laura, North Carolina State Univ, Greensboro, NC, USA, North Carolina State Univ, Greensboro, NC, USA, PRIORITIZATION OF INFORMATION FOR A HELICOPTER PILOT. Proceedings of the 1986 IEEE International Conference on Systems, Man, and Cybernetics.Atlanta, GA, USA, IEEE, New York, NY, USA, 1986, 1238-1241

Recent trends in helicopter technology have increased the information-processing content of a helicopter pilot's task. One aspect of this information-processing role is the prioritization of the information presented to the pilot during flight. A description is given of work in progress on a project to develop a methodology for this prioritization., INFORMATION PRIORITIZATION HELICOPTER PILOTS

Journal Long Form, 12, Brahney, James H. Aerospace Engineering, Mars, PA, USA, Aerospace Engineering, Mars, PA, USA, FLYING HANDS OFF TO A HOVER. Aerospace Engineering (Warrendale, Pennsylvania) 1986, 6, 4, 10-15, AEENEP, 0736-2536

Until the 1970s, helicopters did not routinely fly in IFR (instrument flight rules) conditions, at least not by choice. While most modern multi-engine helicopters and a few single-engine helicopters are now certificated for IFR operations, some still require two pilots, and many require a stability augmentation system. Aided by the development of microprocessors, multifunction displays, and digital data buses, integration of electronic flight director systems with digital automatic flight control systems is making 'hands-off' flying of helicopters a reality. MICROPROCESSOR DEVELOPMENTS ELECTRONIC FLIGHT DIRECTOR SYSTEMS FLIGHT COMPUTER CONTROLLER

Journal Long Form, 13, Alexander, Harold R. //Maisel, Martin D. //Giulianetti, Demo J. Boeing Vertol Co, Philadelphia, PA, USA, Boeing Vertol Co, Philadelphia, PA, USA, DEVELOPMENT OF ADVANCED TECHNOLOGY BLADES FOR TILT-ROTOR AIRCRAFT. Vertica, 1986, 10, 3-4, 315-339VERTDW

The paper discusses the development and ground testing of blades for the XV-15 tilt-rotor demonstrator aircraft. These blades, known as the Advanced Technology Blades (ATB), replace the rectangular, steel blades which were part of the XV-15 original design. The materials used in the primary structure of the ATB are fiberglass and high strain graphite epoxy laminates. This facilitates the use of 43 deg of non-linear twist, a nonuniform tapered planform and thin airfoils required for aerodynamic efficiency. Instrumentation life is extended by encapsulating gages and wiring in the composite structure. Hover testing has demonstrated performance significantly superior to that predicted by contemporary methodology. TILT-ROTOR AIRCRAFT BLADES XV-15 TILT ROTOR AIRCRAFT

Journal Long Form, 14, Key, David L. //Aiken, Edwin W. US Army Aviation Research & Technology Activity, Moffett Field, CA, USA, US Army Aviation Research & Technology Activity, Moffett Field, CA, USA, AIRCREW-AIRCRAFT INTEGRATION: A SUMMARY OF U. S. ARMY RESEARCH PROGRAMS AND PLANS. Vertica, 1986 10, 3-4, 299-313 VERTDW

A review of selected programs which illustrate the research efforts of the U. S. Army Aeroflightdynamics Directorate in the area of aircrew-aircraft integratio is presented. Plans for research programs to support the development of future military rotocraft are also described. The crew of a combat helicopter must, in general, perform two major functions during the conduct of a particular mission: fightpath control and mission management. Accordingly, the research programs described are being conducted in the same two major categories: flightpath control, which encompasses the areas of handling qualities, stability and control, and displays for the pilot's control of the rotocraft's flightpath; and mission management, which includes human factors and cockpit integration research topics related to performance of navigation, communication, and aircraft systems management tasks., AIRCREW-AIRCRAFT INTEGRATION MILITARY ROTORCRAFT

Conference Proceeding, 15, Stiles, Lorren Jr. United Technologies Corp, Stratford, CT, USA, United Technologies Corp, Stratford, CT, USA, SIKORSKY AIRCRAFT CREW STATION TECHNOLOGY RESEARCH HELICOPTER. Fourth Aerospace Behavioral Engineering Technology Conference Proceedings. 'The Human Performance Envelope: What Are the Operational Capabilities'? . Presented at the 1985 SAE Aerospace Technology Conference & Exposition.Long Beach, CA, USA, SAE, Warrendale, PA, USA, 1985, 143-150, 0898837324

Sikorsky Aircraft has developed a new research helicopter dedicated to the study of crew station technology. A high visibility single seat cockpit has been added to an S-76 airframe just forward of the existing cockpit. The new cockpit is linked to the aircraft systems via a variable stability fly-by-wire flight control system and is equipped with various display media, including touch sensitive CRTs, a voice interactive system, head-up display, and a visually-coupled wide field of view helmet-mounted display system. The aircraft can be operated autonomously from the new crew station, with an independent safety pilot position retained at the original right pilot station. This aircraft will permit the evaluation of

advanced control and display concepts in the agile S-76 air vehicle under a full range of flight conditions. CREW STATIONS ROTORCRAFT DESIGN FLY-BY-WIRE FLIGHT CONTROL RESEARCH COCKPIT

Conference Proceeding, 16, Simpson, Carol A. Psycho-Linguistic Research Associates, Menlo Park, CA, USA, Psycho-Linguistic Research Associates, Menlo Park, CA, USA, PILOT SPEECH PERFORMANCE WHILE TALKING TO A SPEECH RECOGNIZER AND FLYING A COMPETITIVE HELICOPTER PURSUIT TASK. Fourth Aerospace Behavioral Engineering Technology Conference Proceedings. 'The Human Performance Envelope: What Are the Operational Capabilities'? . Presented at the 1985 SAE Aerospace Technology Conference & Exposition.Long Beach, CA, USA SAE, Warrendale, PA, USA, 1985, 133-141, 0898837324

In a previous paper it was reported that recognition accuracy for an isolated word, speaker-dependent recognizer, was severely degraded under various levels of pilot task-induced stress. The speech data were collected as part of a larger study of alternative cockpit control and display modes for the LHX mission. In the study reported here, a connected word, speaker-dependent recognizer by the same vendor was used. There was no statistically significant effect on recognition accuracy for task-induced stress, at least for the levels of stress induced in this experiment. However, different types of errors occurred with the connected word recognizer compared to the isolated word recognizer. This paper describes the characteristics of the pilots' speech under stress which were associated with the different types of recognition errors for the two types of recognizers. It is suggested that these human speech performance characteristics must be considered in any implementation of speech recognition in rotorcraft. ROTORCRAFT RECOGNITION ERRORS

Conference Proceeding, 17, Hess, R. A. //Chan, K. K. Univ of California, Davis, CA, USA, Univ of California, Davis, CA, USA, MODEL OF THE HUMAN'S USE OF VISUAL FIELD CUES IN NAP-OF-THE-EARTH FLIGHT. Collection of Technical Papers - AIAA Guidance, Navigation and Control Conference.Williamsburg, VA, USA, AIAA (CP869), New York, NY, USA, 1986, 875-885

A model for the human pilot's use of visual field cues for vehicular control in nap-of-the-earth flight is quantified and combined with a structural model of the human pilot. The model represents a description of preview control for this flight task. Manned simulation and flight test experiments for low altitude lateral-directional maneuvering provide corroborative data for the modeling approach. The model represents a qualitative as well as a quantitative method for analyzing relevant perceptual factors in low altitude vehicular control. NAP-OF-THE-EARTH FLIGHT VISUAL FIELD CUES FLIGHT TASKS PREVIEW CONTROL LATERAL-DIRECTIONAL MANEUVERING HUMAN PILOTS

Conference Proceeding, 18, Kapasi, Asagar E. Bell Helicopter Textron Inc, Fort Worth, TX, USA, Bell Helicopter Textron Inc, Fort Worth, TX, USA, ROTORCRAFT AVIONICS TAILORED FOR ADVERSE CONDITIONS. Proceedings - IEEE/AIAA 7th Digital Avionics Systems Conference.Fort Worth, TX, USA, IEEE, New York, NY, USA, 1986, 757-764

A substantial number of helicopters is dedicated to the logistic support of the offshore oil industry, hospitals, and the search mission for police. These and other helicopters used in the military environment have to accomplish their missions under adverse conditions most of the time. Pilot workload without proper avionics and mission equipment packages under such conditions becomes very heavy. A generic block diagram of an avionics system that can achieve missions under adverse conditions is described. The major blocks are explained and the simplified computational flow of the avionics system is discussed. ROTORCRAFT AVIONICS SYSTEM MISSIONS UNDER ADVERSE CONDITIONS

Conference Proceeding, 19, Enns, Dale, Honeywell Systems & Research Cent, Minneapolis, MN, USA, Honeywell Systems & Research Cent, Minneapolis, MN, USA, MULTIVARIABLE FLIGHT CONTROL FOR AN ATTACK HELICOPTER. Proceedings of the 1986 American Control Conference.Seattle, WA, USA, IEEE, New York, NY, USA, 1986, 858-863

Advanced flight control laws for the Apache YAH-64 helicopter are discussed. The control laws have been flight tested and were evaluated with fixed-base piloted simulation as part of an advanced rotorcraft technology integration flight experiment. The control laws use three body rate gyros, and normal and lateral and longitudinal cyclic controls. The control laws were developed to provide decoupling, gust attenuation, desensitization, and stability augmentation in the face of aircraft modeling uncertainty. A multivariable proportional plus integral element is the basic ingredient of the control laws. Various analyses, including frequency and time responses, are presented. Stability robustness properties of the control laws are presented using singular value and structured singular value techniques. Responses of the controlled helicopter to pilot and gust inputs are presented using time histories. FLIGHT CONTROL APACHE YAH-64 HELICOPTER

Conference Proceeding, 20, Kaiser, Robert H. //Weinberg, Ricky A. //Davis, Thomas Jr. //Benn, Omer //Taylor, Henry L. Univ of Illinois, Inst of Aviation, Urbana, IL, USA, Univ of Illinois, Inst of Aviation, Urbana, IL, USA, COMBINED INSTRUMENT/PRIVATE PILOT FLIGHT TRAINING PROGRAM. Proceedings of the IEEE 1986 National Aerospace and Electronics Conference, NAECON 1986.Dayton, OH, USA IEEE, New York, NY, USA, 1986, 1040-1047

An experimental program, which combines instrument and private pilot flight instruction, has been conducted using general aviation simulators and training airplanes. The program consisted of a total of 112. 6 hr (34 simulator and 78. 6 aircraft) and emphasized the acquisition of instrument flight skills. The ability to control the aircraft during visual flight rules (VFR) flight, i. e. contact flight, was gained during the aircraft flight, which was primarily dedicated to instrument flight training. Six beginning flight students served as subjects. The effectiveness of the program was evaluated during three intermediate stage checks, and a final check ride, conducted by FAA flight examiners. All evaluations included both an instrument and a private check. Three of the six subjects demonstrated ability equal to a private pilot with instrument rating; one subject fell short in some procedure and control areas; one subject has not completed the third stage check nor the final check; and one subject withdrew. FLIGHT TRAINING FLIGHT INSTRUCTIONS

Journal Long Form, 21, Bates, R. N. //Stove, A. G. Philips Research Lab, Redhill, Engl, Philips Research Lab, Redhill, Engl, MILLIMETER-WAVE RADAR. Philips Journal of Research, 1986, 41, 3, 206-218 PHJRD9, 0165-5817

There is an increasing interest in millimetric wave radars for applications which require compact systems with good resolution. The envisaged uses for such radars include obstacle avoidance for use in helicopters and weapon guidance for small munitions systems. Recent advances in mm-wave components together with the use of the FMCW technique has led to reductions in size, weight and cost. This paper describes the technology used to make such radars and presents some measurements made with a 94 GHz instrumentation radar. OBSTACLE AVOIDANCE WEAPON GUIDANCE FMCW TECHNIQUE

Journal Long Form, 22, Aiken, Edwin W. NASA, Ames Research Cent, Moffett Field, CA, USA, NASA, Ames Research Cent, Moffett Field, CA, USA, REVIEW OF THE EFFECTS OF SIDE-STICK CONTROLLERS ON ROTORCRAFT HANDLING QUALITIES. Journal of the American Helicopter Society 1986, 31, 3, 27-34 JHESAK, 0002-8711

Fixed- and rotary-wing feasibility studies and handling-qualities research programs pertinent to side-stick controllers are reviewed and the effects of certain controller chraracteristics on handling qualities for specific rotorcraft flight tasks are summarized. In particular, the effects of the controller force-deflection relationship and the number of controlled axes that are integrated in a single controller are examined. Simulation studies conducted as part of the Army's Advanced Digital/Optical Control System (ADOCS) program and flight research programs performed by the National Aeronautical Establishment of Canada provide a significant part of the available handling qualities data. These studies demonstrate the feasibility of using a single, properly designed, limited-displacement, multi-axis controller for certain relatively routine flight tasks in a two-crew rotorcraft with nominal levels of stability and control augmentation. SIDE-STICK CONTROLLERS COCKPIT DESIGN ROTORCRAFT HANDLING

Journal Long Form, 23, Andreson, Ronald K. US Army Aviation Systems Command, USA, US Army Aviation Systems Command, USA, LHX TARGETS DOLLARS AS WELL AS BOGEYS. Aerospace America, 1986, 24, 7, 24-27 AEAME2, 0740-722X

Creeping up to an average age of 25 years, the Army's fleet of 7, 000 light rotorcraft has become increasingly costly to maintain and modernize. As a consequence, the service has moved to develop a new group of helicopters known so far as the Light Helicopter family (LHX) that will target affordability. That will be no easy target for engineers, and one of the ways of saving money - paring down to one pilot - will stretch our technology. Stringent budget-dictated program objectives include limitations on mission gross weight, flyaway cost and parts proliferation. These budget constraints must be met despite equally demanding performance standards.

Conference Proceeding, 24, DeMasi, Janina N. //Harper, Howard P. Sikorsky Aircraft Co, Sikorsky Aircraft Co, ROLE OF FLIGHT SIMULATION IN HELICOPTER CREW STATION DESIGN. Flight Simulation/Simulators. Papers presented at the SAE Aerospace Technology Conference and Exposition.Long Beach, CA, USA, SAE, Warrendale, PA, USA, 1985, 1-10, 089883905X

The nature of helicopter crew station design has been transformed by new mission requirements, advanced cockpit technology and a greater emphasis on systems integration. As a result, simulation has emerged as a tool which can be used at a variety of levels during the design process. This dictates the need for a broad spectrum of simulation capabilities ranging from simple display generation through total mission simulation in ground-based or airborne concepts. HELICOPTER CREW STATION DESIGN AIRBORNE CONCEPTS SIMULATION CONCEPTS AVIONICS LABORATORY FIXED BASE SIMULATOR MOTION BASE SIMULATOR

Conference Proceeding, 25, Ripley, H. T. //Goodman, R. Atlantic Canada Airborne Sensing Ltd, Amherst, NS, Can, Atlantic Canada Airborne Sensing Ltd, Amherst, NS, Can, APPLICATION OF A FORWARD LOOKING THERMAL SCANNER FOR DETECTING AND MONITORING OIL SPILLS., Digest - 1985 International Geoscience and Remote Sensing Symposium (IGARSS '85). Remote Sensing Instrumentation: Technology for Science and Applications.Amherst, MA, USA, IEEE, New York, NY, USA, 1985, 984-985

Summary form only given. An oil spill dispersant trial was held offshore Halifax, Nova Scotia, Canada during the period September 12-17, 1983. Airborne data collection was

carried out by a specialized survey aircraft, a Piper Aztec (PA-23), C-FYRZ, specially instrumented for remote sensing research with a five-sensor package. An integral part of this sensor package was a thermal line scanner. The scanner used a simplified aerial scan design that allowed ease of operation while providing inherent reliability. It was housed in a weather-resistant sphere mounted on a remotely controlled gimbal located under the aircraft nose. The scanner was able to distinguish the areas of varying thicknesses of oil without trouble, demonstrating that thermal scanners of these design can be used for detecting and monitoring oil spills. This type of system can be mounted on both fixed wing and rotary wing aircraft and has a movable field of view, making it a very powerful sensor. The system is lightweight, thus very portable and easy to handle. The initial cost of this equipment is modest and the operating costs are quite low. THERMAL SCANNERS SUMMARY ONLY

Conference Proceeding, 26, Williams, L. D. //Birnie, R. V. //Gallagher, J. G. Univ of Aberdeen, Scotl, Univ of Aberdeen, Scotl, MILLIMETER-WAVE BACKSCATTER FROM SNOWCOVER. Digest - 1985 International Geoscience and Remote Sensing Symposium (IGARSS '85). Remote Sensing Instrumentation: Technology for Science and Applications.Amherst, MA, USA, IEEE, New York, NY, USA, 1985, 842-847

Ground-truth measurements of snowcover properties were made in Bavaria in 1984 in support of helicopter-mounted radar measurements of 80-GHz and 94-GHz backscattering from the snowcover. The variation of the backscattering coefficient sigma **o with surface snow properties is investigated by a stepwise multiple regression. Similar qualitative results are obtained for 80 GHz and for six polarization combinations of 94 GHz. For wet snow, sigma **o increased by 4-7 dB per mm surface roughness increase, and decreased by 0. 2-1. 1 dB per 1% increase in volumetric liquid water content. For dry snow, sigma **o decreased with increasing grain size (contrary to expectation) by 1-2 dB per mm, and did not depend on surface roughness. In a few cases (both wet and dry), porosity makes a small but statistically significant contribution to the regression, sigma **o increasing by 0. 1 dB per 1% increase in porosity. SNOWCOVER

Conference Proceeding, 27, McFarland, Richard E. NASA Ames Research Cent, Moffett Field, CA, USA, NASA Ames Research Cent, Moffett Field, CA, USA, CGI DELAY COMPENSATION. Aerospace Simulation II, Proceedings of the Conference.San Diego, CA, USA, Soc for Computer Simulation, San Diego, CA, USA, 1986, 16, 231-262

Computer-generated graphics in real-time helicopter simulation produces objectionable scene-presentation time delays. In the flight simulation laboratory at Ames Research Center, it has been determined that these delays have an adverse influence on pilot performance during aggressive tasks such as nap of the Earth (NOE) maneuvers. Using contemporary equipment, computer generated image (CGI) time delays are an unavoidable consequence of the operations required for scene generation. However, providing that magnitude distortions at higher frequencies are tolerable, delay compensation is possible over a restricted frequency range. This range, assumed to have an upper limit of perhaps 10 or 15 rad/sec, conforms approximately to the bandwidth associated with helicopter handling qualities research. A compensation algorithm is introduced here and evaluated in terms of tradeoffs in frequency responses. The algorithm has a discrete basis and accommodates both a large, constant transport delay interval and a periodic delay interval, as associated with asynchronous operations. COMPUTER GENERATED IMAGE TIME DELAYS SCENE PRESENTATION DELAY

Conference Proceeding, 28, Nakamura, Tatsuya, Mechanical Engineering Lab, Ibaraki, Jpn, Mechanical Engineering Lab, Ibaraki, Jpn, CONTROL CHARACTERISTICS OF A MULTI-FAN HOVERING MECHANISM IN SLOPING GROUND PROXIMITY. Proceedings - IECON '85, 1985 International Conference on Industrial Electronics, Control and Instrumentation. Industrial Applications of Mini, Micro & Personal Computers.San Francisco, CA, USA, IEEE, New York, NY, USA, 1985, 180-185

A multi-fan hovering mchanism is analyzed as a vehicle for field work in mountainous regions. The control characteristics in level and sloping ground proximity are presented. The motion is formulated considering ground effect. A controller stable for the change of property with height is presented. The experimental results obtained using a scale model are presented. It is shown that the controller works properly. Problems encountered in improving the hovering characteristics are discussed. TERRAIN FACTORS

Journal Long Form, 29, Lippay, A. L. //King, M. //Kruk, R. V. //Morgan, M. CAE Electronics Ltd, CAE Electronics Ltd, HELICOPTER FLIGHT CONTROL WITH ONE HAND. Canadian Aeronautics and Space Journal 1985, 31, 4, 335-345, CSPJAE, 0008-2821

A deflection-type side-arm controller developed in Montreal is described, which enables axis-by-axis or co-ordinated control in up to six degrees of freedom with one hand. The design minimizes unwanted inputs and cross-coupling between axes. Six-axis control was established in several spacecraft and manipulator simulations. A four-axis version has been installed in a research helicopter. Preliminary testing indicated good pilot acceptance, reduced training/familiarization requirements and - in some cases - significant improvement in control performance. A second generation engineering effort is currently in progress to produce high quality units for formal testing and eventual flight qualification. SIX-DEGREES-OF-FREEDOM HELICOPTER CONTROLLER

Conference Proceeding, 30, Ganesan, S. //Balasubramanian, T. S. //Atwood, J. William, Concordia Univ, Montreal, Que, Can, Concordia Univ, Montreal, Que, Can, MULTIBLADE COORDINATE TRANSFORMATION PROCESSOR. Computational Methods and Experimental Measurements.New York City, NY, USA, Springer-Verlag, Berlin, West Ger, 1984, 8. 49-8. 59, 0905451228

Helicopter dynamics in forward flight involve complex aerodynamic forces dependent on time and on the azimuth angles of the blades. Investigation of these phenomena leads to the solution of multidegree parametric instability problems for which the computer time required is exorbitant. One effective method used by helicopter dynamists to reduce the computer time required is the multiblade coordinate transformation. The multiblade coordinate transformation is widely used in the helicopter industry for studies of rotor dynamics. A microprocessor based instrument has been developed which transforms measured parameters of the rotor blades into parameters in the transformed coordinate system, which are of greater utility to the experimenter. ROTOR DYNAMICS MULTIBLADE COORDINATE TRANSFORMATION PROCESSOR HELICOPTER DYNAMICS IN FORWARD FLIGHT AZIMUTH ANGLES MULTIDEGREE PARAMETRIC INSTABILITY ELECTRODYNAMIC SHAKER

Book Whole, 31, Wilhoite, Gene M. (Ed.)ASCE, New York, NY, USA, 1986, 163p, 0872625117

This conference proceedings contains 14 papers. The general area of discussion was the design of electrical transmission line structures such as towers, steel poles, piers, and foundations. In particular, there were six formal sessions covering weather-element loading conditions, structural options, design recommendations, foundation alternatives, research efforts, and code requirements. CLIMATIC DESIGN LOADS TRANSMISSION STRUCTURE COLD-FORMED SHAPES DRILLED PIERS EIREV

Conference Proceeding, 32, Andreikiv, A. E. //Stadnik, M. M. //Zozulyak, V. A. //Garf, E. F. Ukrainian SSR Acad of Sciences, Lvov, USSR, Ukrainian SSR Acad of Sciences, Lvov, USSR, SELECTION OF FATIGUE FRACTURE CRITERION FOR ESTIMATION OF FATIGUE RESISTANCE OF FIXED OFF-SHORE STRUCTURES. Welding of Tubular Structures, Proceedings of the Second International Conference. Boston, MA, USA, r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 525-5330080311563

An approach, based on fracture mechanics, has been developed for study of the fatigue fracture of fixed off-shore platforms and estimation of their life taking into account the service conditions. FATIGUE FRACTURE STRESS INTENSITY FACTOR FATIGUE CRACK PROPAGATION PLATFORM TUBULAR ELEMENT

Conference Proceeding, 33, Culbertson, R. P. Brown & Root Inc, Houston, TX, USA, Brown & Root Inc, Houston, TX, USA, WELDING OFFSHORE STRUCTURES. Welding of Tubular Structures, Proceedings of the Second International Conference.Boston, MA, USA, r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 293-308, 0080311563

Many welding problems are encountered in the fabrication and construction of offshore structures. The effects of weld joint design, weld joint restraint, weld area accessibility and human factors are considered and the effect on weld quality. The metallurgy and weldability factors, such as hydrogen cracking, lamellar tearing, hardness and hot tears, are discussed as related to the fabrication and construction of welded offshore structures. WELD JOINT DESIGN WELDING CONSIDERATIONS JOINT RESTRAINT LAMELLAR TEARING HYDROGEN CRACKING

Conference Proceeding, 34, Inoue, Kazuo //Igarashi, Sadayoshi //Wakiyama, Kozo //Matsumoto, Takeji //Kindan, Isao, Osaka Univ, Suita, Jpn, Osaka Univ, Suita, Jpn, BUCKLING STRENGTH AND POST-BUCKLING BEHAVIORS OF TUBULAR TRUSS TOWER. Welding of Tubular Structures, Proceedings of the Second International Conference.Boston, MA, USA r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 151-158, 0080311563

Experimental results on the behaviors of four tubular towers, two of plane and two of space trusses subjected to severe cyclic lateral loads are reported. The effect of the horizontal strut and that of the direction of load on buckling strength and post-buckling behavior are examined. Ultimate strength and force-deflection curves of each specimen are compared with the analytical solutions by the rigid-plastic method. RIGID-PLASTIC METHOD POST-BUCKLING BEHAVIOR STATIC TEST PLANE TRUSSES SPACE TRUSSES

Conference Proceeding, 35, Hoffmeister, H. //Kuester, K. //Boellinghaus, T. //Bunes, E. Hochschule der Bundeswehr Hamburg, Hamburg, West Ger, Hochschule der Bundeswehr Hamburg, Hamburg, West Ger, REPAIR WELDING OF TUBULAR STRUCTURES BY AN UNDERWATER LOW HYDROGEN WET FILLET WELD SYSTEM. Welding of Tubular Structures, Proceedings of the Second International Conference. Boston, MA, USA, r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 145-1500080311563

Following previous work on butt weld joint quality of wet GMA underwater welding by the water curtain method the paper presents results on hydrogen pick up and weld quality of fillet welds made by a modified angular water curtain nozzle. Examples of possible applications to repair welding of tubular structures are demonstrated. TUBULAR

STRUCTURES WATER CURTAIN METHOD HYDROGEN CONTROL WELD JOINT QUALITY

Conference Proceeding, 36, Czechowski, A. Metal Structures Research & Design Cent, Warsaw, Pol, Metal Structures Research & Design Cent, Warsaw, Pol, INVESTIGATION INTO THE STATICS AND STRENGTH OF RHS LATTICE GIRDERS. Welding of Tubular Structures, Proceedings of the Second International Conference.Boston, MA, USA, r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 129-1360080311563

In this paper tests and analytical study are briefly described. The principal aim of the investigation presented was to examine to what extent the complete girder joints behave in a similar manner to those previously tested in isolation. Since the joint strength itself is not the only aspect of the structural behavior some specific problems concerning deflections, secondary moments, stability of bracing members are also outlined. JOINT FLEXIBILITY CALCULATION MODELS FLEXIBLE JOINT CALCULATION MODEL FAILURE MODES SECONDARY BENDING MOMENTS

Conference Proceeding, 37, Conery, Walker M. Hudson Engineering Corp, Houston, TX, USA, Hudson Engineering Corp, Houston, TX, USA, TESTING OF WELDMENTS FOR OFFSHORE STRUCTURES. Welding of Tubular Structures, Proceedings of the Second International Conference.Boston, MA, USA r Int Inst of Welding, London, Engl by Pergamon Press, Oxford, Engl, 1984, 119-1280080311563

Acknowledging the importance of practical considerations and the analysis of weldment testing to ensure structural reliability for joining of offshore structural members, this paper has been written for practical testing of welds which are the most influential considerations in the final reliability of structural integrity. The welding process relative to these considerations is illustrated with specific experiences based on work worldwide, including deep-water platforms in both the Gulf of Mexico and North Sea environments. From these examples, the paper draws some conclusions relative to a systematic approach to reliable weld testing prior to beginning fabrication by the constructor. LIQUID PENETRANT TESTING RADIOGRAPHY TESTING DESTRUCTIVE TEST

Conference Proceeding, 38, Barto, John J. Jr. United Technologies Corp, Sikorsky Aircraft Div, Stratford, CT, USA, United Technologies Corp, Sikorsky Aircraft Div, Stratford, CT, USA, ROBOTICS IN AIRCRAFT MANUFACTURING. 41st Annual Forum Proceedings - American Helicopter Society.Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1985, 2. 793-800

Robotic installations, manufacturing production airframe components for the helicopter industry, are described. Two robot applications consisting of small hole drilling and deburring and an assembly system to drill/wet seal/rivet are explained. A multi-station drilling system utilizes a Cincinnati Milacron T3-776 robot to drill pilot holes in a family of machined aluminum cabin frames. The system also is capable of brush deburring the machined surfaces. ROBOTIC DRILLING/RIVETING ROBOTIC DEBURRING SAFETY EQUIPMENT

Conference Proceeding, 39, Sen, Joyanto K. //Votaw, Michael W. //Downer, Geoffrey R. Hughes Helicopters Inc, Culver City, CA, USA, Hughes Helicopters Inc, Culver City, CA, USA, INFLUENCES OF TWO LANDING GEAR DESIGNS ON HELICOPTER CRASHWORTHINESS AND WEIGHTS. 41st Annual Forum Proceedings - American Helicopter Society.Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1985, 1. 451-461

The systems approach to crashworthiness is applied to a study of two landing gear designs to evaluate their influences on helicopter weights for survivable crash-impact conditions. Both landing gear designs share a trailing arm configuration; however, one is coupled and the other uncoupled. The coupled design requires that both main landing gear struts stroke and absorb energy together during high roll impacts. The designs and their influences on the crushing behavior of the landing gear, fuselage and crew seat, and the responses of the occupants are evaluated with program KRASH. WEIGHT OF HELICOPTER CRASH-IMPACT CONDITIONS CRASHWORTHINESS DESIGN

Conference Proceeding, 40, Levine, Larry S. //Warburton, Frank W. //Curtiss, H. C. Jr. United Technologies Corp, Sikorsky Aircraft Div, Stratford, CT, USA, United Technologies Corp, Sikorsky Aircraft Div, Stratford, CT, USA, ASSESSMENT OF ROTORCRAFT AGILITY AND MANEUVERABILITY WITH A PILOT-IN-THE-LOOP SIMULATION. 41st Annual Forum Proceedings - American Helicopter Society. Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1985, 1. 315-325

In many military applications, rotorcraft maneuverability and agility have been identified as drivers of combat effectiveness. However, the design parameters that improve these attributes also increase vehicle weight and cost. This paper describes an economical, mini-computer based, six-degree of freedom, piloted simulation that can be employed to assess the impact of vehicle design parameters on combat effectiveness. The simulation technique uses a pilot-directed vehicle, with agility and maneuverability characteristics that can be varied. PILOT-IN-LOOP SIMULATION ROTORCRAFT MANEUVERABILITY COMBAT EFFECTIVENESS

Conference Proceeding, 41, Davis, Thomas J. //Clary, George R. //Chisholm, John P. //Macdonald, Stanley L. NASA, Ames Research Cent, Moffett Field, CA, USA, NASA, Ames Research Cent, Moffett Field, CA, USA, DEVELOPMENT AND FLIGHT TEST OF A HELICOPTER, X-BAND, PORTABLE PRECISION LANDING SYSTEM CONCEPT. 41st Annual Forum Proceedings - American Helicopter Society.Fort Worth, TX, USA, American Helicopter Soc, Alexandria, VA, USA, 1985, 1. 121-130

A beacon landing system (BLS), based on a novel, X-band, precision approach concept is being developed and flight tested as a part of NASA's Rotorcraft All-Weather Operations Research Program. The system is based on state-of-the-art X-band radar technology and digital processing techniques. The BLS airborne hardware consists of an X-band receiver and a small microprocessor, installed in conjunction with the aircraft instrument landing system receiver. REMOTE AREA LANDING PORTABLE GROUND STATION FLIGHT-TEST PROGRAM BEACON LANDING SYSTEM (BLS) INSTRUMENT LANDING SYSTEM (ILS)

Book Whole, 42, AnonAIAA (CP 8411), New York, NY, USA, 1984, 668p

The following topics are dealt with: development methods for systems and software; commercial transport avionics; human factors and artificial intelligence applied to crew systems; digital flight controls; development and evaluation tools in systems and software; general aviation avionics; fault tolerant avionics; signal processing; advanced control/display technology applied to crew systems; verification and test techniques in systems and software; rotorcraft avionics; data bus concepts and practices; communication, navigation, and identification (CNI) terminals; onboard monitoring and test; VLSI design and testing; data link systems applications; merged digital map techniques; advanced digital integrated circuits; airborne separation assurance; all electric aircraft; standardized modular avionics; and digital propulsion control and monitoring systems. 102 papers were presented, of which 101 are published in full in the present proceedings. DIGITAL AVIONICS SYSTEMS SYSTEMS AND SOFTWARE FAULT TOLERANT AVIONICS DIGITAL PROPULSION CONTROL EIREV

Conference Proceeding, 43, DeMasi, Janina N. //Harper, Howard P. Sikorsky Aircraft Co, Sikorsky Aircraft Co, ROLE OF FLIGHT SIMULATION IN HELICOPTER CREW STATION DESIGN. Aerospace Technology Conference & Exposition.Long Beach, CA, USA, SAE, Warrendale, PA, USA, 1985

The nature of helicopter crew station design has been transformed by new mission requirements, advanced cockpit technology and a greater emphasis on systems integration. This dictates the need for a broad spectrum of simulation capabilities ranging from simple display generation through total mission simulation in ground-based or airborne concepts. In recognition of these needs, Sikorsky Aircraft Division has built an extensive simulation capability into its new Engineering Center. The Human Factors Engineering Laboratory has the capability to carry out studies of individual controls or dislays and part-task simulation. CREW STATION DESIGN SOFTWARE VALIDATION COCKPIT CONTROL

Conference Proceeding, 44, Smith, C. O. Rose Hulman Inst of Technology, Terre Haute, IN, USA, Rose Hulman Inst of Technology, Terre Haute, IN, USA, HELICOPTER TAIL ROTOR BLADE FAILURE. Winter Annual Meeting - American Society of Mechanical Engineers.Miami Beach, FL, USA, ASME, New York, NY, USA, 1985

A helicopter crashed near Sioux City, Iowa, killing pilot and passenger. Their widows sued the manufacturer, a flying club (previous owner), and an aviation mechanic. The crash resulted from a fatigue failure in one of the tail rotor blades. This paper details the failure analysis, discusses failures in 'identical' blades, and relates the resolution of the suit. FAILED BLADE EXAMINATION BLADE SEPARATION EXAMINATION METALLOGRAPHIC MICROSECTIONS STRESS CALCULATIONS LITIGATION RESOLUTION SIOUX CITY BLADE DATA

Conference Proceeding, 45, DeMasi, Janina N. //Harper, Howard P. Sikorsky Aircraft Co, Sikorsky Aircraft Co, ROLE OF FLIGHT SIMULATION IN HELICOPTER CREW STATION DESIGN. Aerospace Technology Conference & Exposition.Long Beach, CA, USA, SAE, Warrendale, PA, USA, 1985

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Conference Proceeding, 46, Smith, C. O. Rose Hulman Inst of Technology, Terre Haute, IN, USA, Rose Hulman Inst of Technology, Terre Haute, IN, USA, HELICOPTER TAIL ROTOR BLADE FAILURE. Winter Annual Meeting - American Society of Mechanical Engineers.Miami Beach, FL, USA, ASME, New York, NY, USA, 1985

A helicopter crashed near Sioux City, Iowa, killing pilot and passenger. Their widows sued the manufacturer, a flying club (previous owner), and an aviation mechanic. The crash resulted from a fatigue failure in one of the tail rotor blades. This paper details the failure analysis, discusses failures in 'identical' blades, and relates the resolution of the suit. FAILED BLADE EXAMINATION BLADE SEPARATION EXAMINATION METALLOGRAPHIC MICROSECTIONS STRESS CALCULATIONS LITIGATION RESOLUTION SIOUX CITY BLADE DATA

Journal Long Form, 47, Hoffmanner, A. L. Braun Engineering Co, Detroit, MI, USA, Braun Engineering Co, Detroit, MI, USA, WARMING TO COLD EXTRUSION'S ADVANTAGES. Machine and Tool Blue Book, 1985, 80, 10, 74-78, MTBBA3, 0024-9106

Cold extrusion is a press-working process which reforms a metal blank (called a slug) into a finished part of precise shape and size. This reshaping occurs in response to the stresses generated within the blank by the action of the punch and die. The term cold extrusion usually means that the slug is not heated prior to forming; however, in recent years, the term has been expanded to include 'warm' forming, or extrusion of parts at temperatures and deformation rates where recrystallization does not occur. Material savings, reduced machining and tooling costs, enhanced mechanical properties and outstanding part-to-part consistency are a few of the more important reasons for the growing interest in this high-volume metal forming method. COLD EXTRUSION CUTOFF SLUG MAKING IRONING UPSETTING

Conference Proceeding, 48, Edward Jones, C. Martin Marietta Aerospace, Orlando, FL, USA, Martin Marietta Aerospace, Orlando, FL, USA, AIRCRAFT SIMULATION SYSTEM. All About Simulators, 1984, Proceedings of the SCS Simulators Conference, 1984.Norfolk, VA, USA, Soc for Computer Simulation, La Jolla, CA, USA, 1984, 14, 252-256

Martin Marietta's Simulation and Test Laboratory (STL) is used for design, development, demonstration and integration of fixed and rotary wing aircraft. Simulations of aircraft's mission equipment package are performed. The lab also demonstrates pilot and crew performance efficiency. The feasibility is demonstrated by experimental studies of cockpit integration, operating techniques, control functions and display symbology that is accomplished during simulated mission flights against typical targets positioned on a three-dimensional terrain model. The STL consists of a 40 multiplied by 80 foot terrain model; two optical probes; cockpit, visual displays, control loaders; motion base, TV trackers, hybrid computers, and modular software. A brief review of simulation system requirements is furnished and simulation elements are described. The principal new design features of the simulation are the low altitude, helicopter, improved computation capability, and futuristic cockpit automation technology., AIRCRAFT SIMULATION SYSTEM

Book Whole, 49, AnonFlight Safety Foundation Inc, Arlington, VA, USA, 1984, 219p

This conference proceedings contains 16 papers. Various papers discuss: corporate aviation; accident reviews; communication attitudes; effective communication; management role; pilot performance communication; flight crew; cockpit management; emergency equipment storage/use; crash protection; in-flight icing; weather developments; radar interpretation; thunderstorm complexes; Canadian aviation safety board; rotorcraft programs; and government/industry communications. PILOT PERFORMANCE COMMUNICATION COCKPIT MANAGEMENT EMERGENCY EQUIPMENT STORAGE/USE CRASH PROTECTION IN-FLIGHT ICING EIREV

Conference Proceeding, 50, Traynor, William L. Stencel Aero Engineering Corp, Asheville, NC, USA, Stencel Aero Engineering Corp, Asheville, NC, USA, CONTINUING REQUIREMENT FOR HELICOPTER ESCAPE. Proceedings of the Twenty Second Annual Symposium - SAFE Association.Las Vegas, NV, USA, Survival and Flight Equipment Assoc, Van Nuys, CA, USA, 1985, 67-70

The requirement for in-flight escape from crew-only type helicopters has been a continuing requirement since the early 1960's, and is more critical today than ever before. A presentation is given of the history of in-flight escape system developments since the first Navy study in 1962 to the present. Refs. IN-FLIGHT ESCAPE REQUIREMENT ESCAPE SYSTEMS US NAVY STUDIES AIRCREW AUTOMATED ESCAPE SYSTEM

Conference Proceeding, 51, Cassidy, R. //Baker, A. H. Normalair-Garrett Ltd, Yeovil, Engl, Normalair-Garrett Ltd, Yeovil, Engl, MOLECULAR SIEVE OXYGEN SYSTEMS AND AIRCRAFT ROLE. Proceedings of the Twenty Second Annual Symposium - SAFE Association., Las Vegas, NV, USA, Survival and Flight Equipment Assoc, Van Nuys, CA, USA, 1985, 99-102

The possibility of using a molecular-sieve, pressure swing adsorbtion, on-board oxygen generation system (OBOGS) in an aircraft is now a demonstrable fact. The future application of this type of breathing gas system will necessitate a study of the manner in which the aircraft type will influence the system size and lay-out. This paper refers to some of these influences and discusses the features of typical systems as might be applicable to military single-seat, multi-crew fixed wing aircraft, trainers and rotary wing aircraft. ON-BOARD OXYGEN GENERATION SYSTEM STANDBY OXYGEN FACILITY MULTI CREW AIRCRAFT BED OPERATION SCHEMATIC PHYSIOLOGICAL REQUIREMENTS ROTARY WING AIRCRAFT SYSTEM

Conference Proceeding, 52, McCauley, Daniel S. US Naval Air Development Cent, Aircraft & Crew Systems Technology Directorate, Warminster, PA, USA, US Naval Air Development Cent, Aircraft & Crew Systems Technology Directorate, Warminster, PA, USA, LABORATORY AND FLIGHT TESTING OF BALLISTIC PROTECTIVE HEADGEAR FOR ROTARY WING AIRCREW. Proceedings of the Twenty Second Annual Symposium - SAFE Association.Las Vegas, NV, USA, Survival and Flight Equipment Assoc, Van Nuys, CA, USA, 1985, 263-268

During hostilities, helicopter aircrewmen are often required to perform their missions within range of small arms fire and shell fragmentation. The present helmet worn by these aircrewmen provides negligible protection against these hazards. The Naval Air Development Center, under the sponsorship of Naval Air Systems Command, has investigated ballistic protective headgear for the community of helicopter aircrew exposed to small arms fire and fragments. Two types of headgear were procured under this program: a complete ballistic protective helmet assembly (type 1 system) and a ballistic clip on unit which can be quickly and securely added to a lightweight, form-fit helmet (type 2 system). BALLISTIC TESTS IMPACT RESISTANCE RESULTS SYSTEM SOUND ATTENUATION REQUIREMENTS HELMETS BALLISTIC VS. NON-BALLISTIC HEADGEAR PROTECTIVE HEADGEAR

Conference Proceeding, 53, Mitchell, David G. //Hoh, Roger G. Systems Technology Inc, Hawthorne, CA, USA, Systems Technology Inc, Hawthorne, CA, USA, DEVELOPMENT OF TIME RESPONSE CRITERIA FOR ROTORCRAFT AT HOVER AND LOW SPEED. Collection of Technical Papers - AIAA 12th Atmospheric Flight Mechanics Conference.Snowmass, CO, USA AIAA (CP857), New York, NY, USA, 1985, 205-213

A revision to the rotorcraft flying qualities military specification, MIL-H-8501A, is currently being developed. As a part of this revision process, new flying qualities criteria are needed to define short-term response characteristics. Rotorcraft manufacturers have expressed a desire to use time-domain-based criteria as much as possible, and in response to this desire, a set of time response criteria for short-term attitude control of rotorcraft in the hover and low-speed range has been developed. This paper describes the process followed in deriving these criteria, and compares them with more conventional frequency-domain-based criteria. FLYING QUALITY ROTORCRAFT MIL-H-8501A TIME RESPONSE PILOT RATINGS

Conference Proceeding, 54, Hoh, Roger H. Systems Technology Inc, Hawthorne, CA, USA, Systems Technology Inc, Hawthorne, CA, USA, INVESTIGATION OF OUTSIDE VISUAL CUES REQUIRED FOR LOW SPEED AND HOVER. Collection of Technical Papers - AIAA 12th Atmospheric Flight Mechanics Conference.Snowmass, CO, USA, AIAA (CP857), New York, NY, USA, 1985, 337-349

The fundamental visual cues required to perform a stabilized hover are not currently well understood. Knowledge of these essential cues is required for the development of pilot displays for helicopter or VSTOL hover in low visibility and for visual systems used for ground based simulation. The primary objective of the work accomplished in this study has been to determine the viability of using experimental flight test techniques to identify the essential outside visual cues required to accomplish precision, aggressive low speed and hover tasks. VISUAL CUES HOVER SIMULATION COMPUTER GENERATED IMAGERY

Journal Long Form, 55, Flanagan, Patrick M. //Atherton, William J. Cleveland State Univ, Cleveland, OH, USA, Cleveland State Univ, Cleveland, OH, USA, INVESTIGATION ON EXPERIMENTAL TECHNIQUES TO DETECT, LOCATE, AND QUANTIFY GEAR NOISE IN HELICOPTER TRANSMISSIONS. NASA Contractor Reports, 1985, NSCRAQ, 0565-7059

A robotic system to automate the detection, location, and quantification of gear noise using acoustic intensity measurement techniques has been successfully developed. Major system components fabricated under this grant include an instrumentation robot arm, a robot digital control unit and system software. A commercial, desktop computer, spectrum analyzer and two microphone probes complete the equipment required for the Robotic Acoustic Intensity Measurement System (RAIMS). Large-scale acoustic studies of gear noise in helicopter transmissions cannot be performed accurately and reliably using presently available instrumentation and techniques. Operator safety is a major concern in certain gear noise studies due to the operating environment. The man-hours needed to document a noise field in situ is another shortcoming of present techniques.

Journal Long Form, 56, Negrin, M. //Grunwald, A. //Rosen, A. Technion-Israel Inst of Technology, Dep of Aeronautical Engineering, Haifa, Isr, Technion-Israel Inst of Technology, Dep of Aeronautical Engineering, Haifa, Isr, PRELIMINARY STUDY OF MAN-MACHINE PROBLEMS IN HOVERING ABOVE A MOVING PLATFORM. Vertica, 1985, 9, 1, 51-64

A simplified one-dimensional manual hovering task above a moving platform is investigated analytically, using a paper pilot model, based on optimal control theory. The analytical results are validated in a fixed base simulation program. The results indicate that the one-dimensional task can be performed satisfactorily in case display augmentation providing absolute position or velocity information is used. The results of the one-dimensional hovering task form the basis for follow-up research in which six degrees

of freedom of helicopter and ship motions are integrated. HOVERING TASK PILOT-HELICOPTER INTERACTION

Journal Long Form, 57, Chais, Richard I. //Simpson, William E. ORI Inc, Rockville, MD, USA, ORI Inc, Rockville, MD, USA, INVESTIGATION OF TECHNOLOGY NEEDS FOR AVOIDING HELICOPTER PILOT ERROR RELATED ACCIDENTS - FINAL REPORT. NASA Contractor Reports, 1985, NSCRAQ, 0565-7059

This report documents the study effort to investigate pilot error related accidents in helicopters to identify areas in which new technology could reduce or eliminate the underlying causes of these human errors. The study drew from the aircraft accident data base at the U. S. Army Safety Center at Ft. Rucker, Alabama, as the source of data on helicopter accidents. The analytical approach involved review of a randomly selected sample of 110 accident records on a case-by-case basis to assess the nature of problems which need to be resolved and applicable technology implications. The report identifies six technology areas in which there appears to be a need for new or increased emphasis.

Journal Long Form, 58, Curtiss, H. C. Jr. //Warburton, F. W. Princeton Univ, Dep of Mechanical & Aerospace Engineering, Princeton, NJ, USA, Princeton Univ, Dep of Mechanical & Aerospace Engineering, Princeton, NJ, USA, STABILITY AND CONTROL OF THE TWIN LIFT HELICOPTER SYSTEM. Journal of the American Helicopter Society, 1985, 30, 2, 14-23, JHESAK, 0002-8711

As a step towards a better understanding of the dynamics of helicopter twin lift systems utilizing a spreader bar, a linear seven-degree-of-freedom hover model was developed and a real-time interactive simulation study conducted. The inherent vertical stability provided by the spreader bar configuration, the effect of bar and cable geometry, and various control strategies for minimizing the pilot workload involved in maintaining separation were investigated. Pilot assessments of this simulation had led to the conclusions that manual control with only a conventional autopilot may be more feasible than originally thought, that vertical separation can be used safely to reduce horizontal separation, and that workload decreases as the payload is increased. HELICOPTER CYCLIC CONTROL SPREADER BAR MASTER HELICOPTER

Conference Proceeding, 59, Kenefeck, M. N. Motor Industry Research Assoc, Nuneaton, Engl, Motor Industry Research Assoc, Nuneaton, Engl, DROP TEST ON A LYNX HELICOPTER. Structural Impact and Crashworthiness. Volume 2: Conference Papers. London, Engl, Elsevier Applied Science Publ, London, Engl, 1984, 733-744, 0853342938

A drop test was carried out on a Lynx helicopter with instrumented airframe and anthropomorphic dummies as crew members. The airframe results were used by Westland Helicopters in damage analysis and the results from the anthropomorphic dummies were evaluated against injury criteria from the automotive and aeronautical fields. In terms of survival space for the crew aircraft deformation was minor. However, serious injuries due to acceleration were predicted. DROP TESTS INJURY CRITERIA DAMAGE ANALYSIS CRASHWORTHINESS SURVIVAL SPACE

Conference Proceeding, 60, Bergeron, Hugh P. NASA, Langley Research Cent, Hampton, VA, USA, NASA, Langley Research Cent, Hampton, VA, USA, ANALYSIS OF GENERAL AVIATION SINGLE-PILOT IFR INCIDENT DATA OBTAINED FROM THE NASA AVIATION SAFETY REPORTING SYSTEM. Controls, Displays, and Information Transfer for General Aviation IFR Operations.Hampton, VA, USA NASA, Scientific & Technical Information Branch, Washington, DC, USA, 1983, 57-63

An analysis of incident data obtained from the NASA Aviation Safety Reporting System (ASRS) has been made to determine the problem areas in general aviation single-pilot IFR (SPIFR) operations. The Aviation Safety Reporting System data base is a compilation of voluntary reports of incidents from any person who has observed or been involved in an occurrence which was believed to have posed a threat to flight safety. This paper examines only those reported incidents specifically related to general aviation single-pilot IFR operations. The frequency of occurrence of factors related to the incidents was the criterion used to define significant problem areas and, hence, to suggest where research is needed. The data was cataloged into one of five major problem areas: (1) controller judgment and response problems, (2) pilot judgment and response problems, (3) air traffic control (ATC) intrafacility and interfacility conflicts, (4) ATC and pilot communication problems, and (5) IFR-VFR conflicts. AIR TRAFFIC CONTROL CONFLICTS COMMUNICATION PROBLEMS IFR-VFR CONFLICTS AVIATION SAFETY REPORTING SYSTEM

Journal Long Form, 61, Haverdings, H. Natl Aerospace Lab, Amsterdam, Neth, Natl Aerospace Lab, Amsterdam, Neth, CONTROL MODEL FOR MANEUVERING FLIGHT FOR APPLICATION TO A COMPUTER-FLIGHT-TESTING PROGRAM. Vertica 1983, 7, 3, 259-269

A computer-flight-testing (CFT) program for helicopters has been under development at NLR for some time to evaluate helicopter dynamics and handling and control qualities. To eliminate problems in estimating control inputs during maneuvering flight, the nonlinear 6 degrees of freedom helicopter model is driven by control inputs generated by a specially developed control model (or 'pseudo pilot'). This is an adaptation of a linear optimal control model as used in human factor analysis. The helicopter model is based on 2-dim strip aerodynamics and steady-state rotor blade dynamics using only out-of-plane bending

mode shapes, which are suitable for various types of rotor articulation. The 'pilot' model consists of a flight path generation (FPG)-model and a perturbation control (PERTURB)-model. The FPG-model is based on linearized system dynamics using terminal optimal control, generating both the required flight path and the control inputs to achieve it. COMPUTER-FLIGHT-TESTING PROGRAM MANEUVERING FLIGHT

Journal Long Form, 62, Danneberg, E. DFVLR, Inst fuer Flugfuehrung, Braunschweig, West Ger, DFVLR, Inst fuer Flugfuehrung, Braunschweig, West Ger, FLYING WITH NIGHT-GOGGLES AND HEAD-DOWN DISPLAY AT NIGHT. Vertica, 1984, 8, 4, 423-431

Recent investigations have shown that helicopters may be operated at night efficiently in low level flight if the crew is provided with appropriate visual aids. The question is, however, what system fulfils the operational and human requirements best with respect to performance, cost and reliability. Within the last 10 years DFVLR Institute for Guidance and Control has conducted a rather comprehensive R & D program on components and systems suitable to achieve helicopter operation at night. Particular emphasis was placed on the role of the pilot in the system, on pilot workload and on the human engineering aspects of the interface between pilot and helicopter. Components and systems investigated for this purpose included electronic head-down display, helmet mounted display, night goggles, low light level TV and forward looking infrared cameras. NIGHT-GOGGLES HEAD-DOWN DISPLAY TANK ATTACK MISSIONS

Conference Proceeding, 63, Bornebroek, D. J. //Boone, W. STATE-OF-THE-ART ON FIRE BEHAVIOUR OF CABLES AND METHODS TO REDUCE FIRE PROPAGATION ALONG CABLES IN POWER STATIONS. International Conference on Large High Voltage Electric Systems, 1984 Session.Paris, Fr 1984

This report has been prepared within Working Group 06 of SC 23. It deals with fire behavior of cables in power stations, where normally large concentrations of cables are installed. The report gives a state-of-the-art of used installation methods to reduce fire propagation along cable bunches. National Standards on testing of fire behavior of cables are compared with IEC-rules. Refs. FIRE PROPAGATION ALONG CABLES FIRE BEHAVIOR OF CABLES TESTING STANDARDS

Conference Proceeding, 64, Krishnakumar, Kalmanje S. Univ of Alabama, University, AL, USA, Univ of Alabama, University, AL, USA, LOW COST SIMULATION OF A UH-1 TRAINING MISSION USING ARRAY PROCESSORS-PILOT PERFORMANCE EVALUATION. AIAA 23rd Aerospace Sciences Meeting.Reno, NV, USA AIAA, New York, NY, USA, 1985

A fixed-base simulation facility developed by The University of Alabama Flight Dynamics Laboratory (UAFDL) was utilized to develop and to implement a low-cost simulation of a UH-1 helicopter training mission. This research consisted of a step-by-step development of the simulation, conceptual design and implementation of a pilot performance scoring and evaluation system for the simulation. A NASA Ames UH-1 flight dynamics model with full non-linear kinematics and linearized aerodynamics was implemented in real time for this study utilizing a FPS100 array processor. FIXED-BASE SIMULATION FACILITY DIGITAL SIMULATION IMPLEMENTATION UH-1 HELICOPTER SIMULATION SIMULATOR VISUAL DISPLAYS PILOT PERFORMANCE EVALUATION SIMULATOR TRAINING MISSION

Journal Long Form, 65, Anon, PETERBOROUGH SOLAR PROJECT. Energy Digest, 13, 1, 14-17, ENDGBZ, 0367-1119

Three Peterborough Development Corporation houses incorporating a new form of solar heating which could cut heating bills by half have been developed. They are unusual because they use air, not water, as the means of gathering warmth from the sun. The Peterborough houses are the first in Britain to use the system in practical day-to-day use. Two will be rented to families while the third is used as a base for scientists and engineers monitoring the heating system. Home design, collector construction, air handling equipment, and control system are summarized.

Book Chapter, 66, Hackleton, M. D. REDCAR BY-PRODUCTS PLANT PROBLEMS EXPERIENCED AND ACTIONS TAKEN. r Coke Oven Managers' Assoc by COMA (Year Book) Ltd, Mexborough, Engl, 1984, 191-205

The purpose of this paper is to identify the major problems experienced at the Redcar byproducts plant during the first three years of operation, to explain the actions taken, and to give the results of such actions. The paper is divided into four sections: (a) A brief description of the plant; (b) The major problems experienced; (c) The actions taken to deal with the major problems; and (d) The results of actions taken.

Journal Long Form, 67, Lunkin, V. N. //Sharikov, V. V. BALANCE TESTS ON GLASS-MELTING FURNACES AS AN AID TO SAVING FUEL. Glass and Ceramics (English translation of Steklo i Keramika) 1984, 41, 3-4, 104-108, GLCEAV, 0017-100X

In order to reveal unproductive loss of energy, increase the thermal efficiency of the furnace operation, and improve the use of the fuel and energy resources, we have carried out some heat-engineering studies of furnaces. The variety of furnace designs and the difference in their thermal capacity and in the methods of working the glass make it difficult to standardize the unit consumption of fuel. The physical heat of the batch and

cullet was calculated from the thermophysical constants. The composition of the combustion products at the output end of the furnace was determined using a chromatograph. HEAT LOSSES FURNACE EFFICIENCY COOLING RECUPERATORS

Book Whole, 68, Casacci, S. //Bosc, J.Trends of Kaplan Turbines and Axial Sets for the Equipment of High Power, Low Head Installations. 1982, 37

The paper discusses a large development with 18 Kaplan turbines whose power exceeds 100 Mw. It analyzes the benefit provided by the use of bulb sets for heads presently harnessed with Kaplan turbines and for reducing the minimum head that can be harnessed to yield an economic return. KAPLAN TURBINES BULB TURBINES BRAZIL PIVOTS HEAD INSTALLATIONS

Conference Proceeding, 71, Edmunds, Rance S. //VanGaasbeek, James, PILOT MODELING AND CONTROL AUGMENTATION FOR THE XV-15 IN IN-GROUND-EFFECT HOVER. Collection of Technical Papers - AIAA Guidance and Control Conference. Seattle, WA, USA, AIAA (CP 848), New York, NY, USA, 1984, 368-378

GUIDANCE AND CONTROL SYSTEMS PILOT MODELING AND CONTROL AUGMENTATION XV 15 TILT ROTOR AIRCRAFT IN-GROUND EFFECT HOVER SCAS STABILITY AND CONTROL AUGMENTATION SYSTEM

Conference Proceeding, 72, Lebacqz, J. V. //Scott, B. C. GROUND-SIMULATION INVESTIGATION OF VTOL INSTRUMENT FLIGHT AIRWORTHINESS CRITERIA. Collection of Technical Papers - AIAA Atmospheric Flight Mechanics Conference.Seattle, WA, USA, AIAA (CP 849), USA 84. 2105, New York, NY, USA, 1984

FLIGHT MECHANICS GROUND BASED FLIGHT SIMULATION TILT ROTOR VTOL AIRCRAFT OPERATIONS AIRWORTHINESS VTOL AIRCRAFT CRITERIA VERTICAL MOTION SIMULATOR TERMINAL AREA FLIGHT OPERATIONS

Conference Proceeding, 73, Curtiss, H. C. Jr. //Warburton, F. W. STABILITY AND CONTROL OF THE TWIN LIFT HELICOPTER SYSTEM., 40th Annual Forum Proceedings - American Helicopter Society.Arlington, Va, USA, American Helicopter Soc, Alexandria, Va, USA, 1984, 33-48

SPREADER BAR LINEAR SEVEN DEGREE-OF-FREEDOM HOVER MODEL REAL-TIME INTERACTIVE SIMULATION STUDY VERTICAL STABILITY EFFECT OF BAR AND CABLE GEOMETRY CONTROL STRATEGIES FOR MINIMIZING PILOT WORKLOAD

Conference Proceeding, 80, Dix, M. J. RPV REQUIREMENT OF THE BRITISH ARMY. 3rd International Conference - Remotely Piloted VehiclesBristol, Engl Univ of Bristol, Bristol Engl, 1982, 1. 1, 0862920353

MIDGE DRONE SYSTEM PRE-PROGRAMMED MISSION AREA OF INTEREST PHOTOGRAPHY EFFECTIVE SURVEILLANCE ROTARY WING REMOTELY PILOTED VEHICLES HOSTILE ENVIRONMENT SURVIVAL

Conference Proceeding, 81, Clark, A. S. CANADAIR ROTARY WING R. P. V. TECHNOLOGY DEVELOPMENT - PART II. 3rd International Conference - Remotely Piloted Vehicles, Bristol, Engl, Univ of Bristol, Bristol Engl, 1982, 11. 1-11. 17, 0862920353

AIR-VEHICLE FLIGHT ENVELOPE GAS TURBINE ENGINE PITCH/ROLL ACTUATORS PERFORMANCE POTENTIAL REQUIRED TACTICAL PAYLOADS TACTICAL SENSOR

Conference Proceeding, 82, Chen, Robert T. N. SUMMARY OF ROTORCRAFT HANDLING QUALITIES RESEARCH AT NASA AMES RESEARCH CENTER. NASA Aircraft Controls Research 1983, Proceedings of a Workshop.Hampton, VA, USA NASA, Scientific & Technical Information Branch, Washington, DC, USA, 1984, 51-68

TERRAIN FLIGHT AGILITY VISUAL METEOROLOGICAL CONDITIONS COST-EFFECTIVE DESIGN DECISIONS ROTORCRAFT CONFIGURATION CERTIFICATION INSTRUMENT METEOROLOGICAL CONDITIONS NIGHT FLIGHT

Conference Proceeding, 83, Blake, Bruce, RESEARCH OPPORTUNITIES FOR ROTORCRAFT. NASA Aircraft Controls Research 1983, Proceedings of a Workshop.Hampton, VA, USA, NASA, Scientific & Technical Information Branch, Washington, DC, USA, 1984, 537-548

ROTOR VIBRATORY LOADS HELICOPTER VIBRATION CREW PERFORMANCE REDUCTION COMFORT FACTORS COMPONENT LIFE AIRCRAFT RELIABILITY

Conference Proceeding, 84, Wansong, Joseph F. T700 ENGINE - DESIGNED FOR THE PILOT AND MECHANIC. 39th Annual Forum Proceedings - American Helicopter

Society. St Louis, MO, USA, American Helicopter Soc, Alexandria, Va, USA, 1983, 102-107

ENGINE CONTROL SYSTEMS RELIABILITY FLIGHT LINE MAINTAINABILITY COMPARISON LINE REPLACEABLE UNITS SUPPORT EQUIPMENT SPARE PARTS

Conference Proceeding, 85, Debuse, A. W. //Whitney, J. R. A. TRAINING THE HELICOPTER TEST PILOT. 8th European Rotorcraft Forum.Aix-en-Provence, Fr, 1982, 12. 7. 1-12. 7. 11

HELICOPTER TEST PILOT TEST PILOTS' SCHOOL ROTARY WING FLEET GROUND SCHOOL EXERCISES NEED FOR PILOTS

Conference Proceeding, 86, Arzel, AVIATION EXPERIENCE IN HELICOPTER NIGHT FLYING PRACTICE. 8th European Rotorcraft Forum.Aix-en-Provence, Fr 1982, 12. 2. 1-12. 2. 4

NIGHT VISION CREW QUALIFICATION NIGHT FLYING TECHNIQUES THERMAL IMAGING

Conference Proceeding, 87, Eccles, E. S. FULL AUTHORITY DIGITAL ELECTRONIC CONTROL FOR THE PEGASUS POWERED HARRIER/AV8 AIRCRAFT. 8th European Rotorcraft Forum.Aix-en-Provence, Fr, 1982, 8. 2. 1-8. 2. 22

DIGITAL CONTROL SYSTEM SAFETY MISSION EFFECTIVENESS CREW WORKLOAD PERFORMANCE VERTICAL TAKE-OFF

Conference Proceeding, 88, Fortescue, P. W. //White, D. J. THREE-AXIS SIDE-ARM CONTROLLER FOR THE FLY-BY-WIRE HELICOPTER. 8th European Rotorcraft Forum.Aix-en-Provence, Fr, 1982, 5. 5. 1-5. 5. 10

REDUCING PILOT WORKLOAD COCKPIT LAYOUT FLY-BY-WIRE ERGONOMICS THREE AXIS SIDE ARM CONTROLLER

Conference Proceeding, 89, Andriano, M. //Marchis, V. //Mannini, A. TRADE-OFF CONSIDERATIONS FOR ENVIRONMENTAL CONTROL SYSTEM ON BOARD OF HELICOPTERS. 8th European Rotorcraft Forum.Aix-en-Provence, Fr 1982, 5. 4. 1-5. 4. 13

CABIN AIR CONDITIONING CREW PERFORMANCE POWER CONSUMPTION WEIGHT PENALTIES

Conference Proceeding, 90, Pausder, H. -J. //Gerdes, R. M. EFFECTS OF PILOT STRESS FACTORS ON HANDLING QUALITY ASSESSMENTS DURING US/GERMAN HELICOPTER AGILITY FLIGHT TESTS. 8th European Rotorcraft Forum.Aix-en-Provence, Fr, 1982, 5. 2. 1-5. 2. 18

HELICOPTER CHARACTERISTICS PILOT EFFECTS TASK DEMANDS PILOT STRESS HANDLING QUALITIES ASSESSMENT FLIGHT TESTS

Conference Proceeding, 91, Stevens, Story C. //Statler, Irving C. ARMY PILOT ERGONOMICS. 8th European Rotorcraft Forum.Aix-en-Provence, Fr, 1982, 5. 1. 1-5. 1. 12

NAP-OF-THE-EARTH FLIGHT LIGHT HELICOPTERS COMBAT CONDITIONS OPERATOR ENVIRONMENT HUMAN-MACHINE SYSTEMS INTEGRATED COCKPIT

Conference Proceeding, 96, Greenberg, Charles E. FLIGHT TESTING WITH HOT JP-4 FUEL. Collection of Technical Papers from Specialists' Meeting on Rotary Wing Propulsion Systems.Williamsburg, VA, USA, American Helicopter Soc, Washington, DC, USA, 1982

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Conference Proceeding, 101, Bertone, C. M. HUMAN FACTORS CONSIDERATIONS IN THE DEVELOPMENT OF A VOICE WARNING SYSTEM FOR HELICOPTERS. Behavioral Objectives in Aviation Automated System Symposium. Aerospace Congress & Exposition. Anaheim, Calif, USA, SAE, Warrendale, Pa, USA, 1982, 133-142 0898830796

VOICE ALARM MONITORING PILOT WORKLOAD S-76 HELICOPTERS AVIONICS HUMAN FACTORS

Conference Proceeding, 111, Turczeniuk, Bohdan, EXHAUST GAS REINGESTION MEASUREMENTS.1982, 27, 4-10

Results of flight tests to measure the magnitude and effects of engine exhaust gas reingestion and inlet pressure distortion are presented. The tandem rotor CH-47 and single rotor YUH-61A helicopters were flown with instrumented engine inlets using fast-response probes. A wide range of flight maneuvers was evaluated, including operating in and out of ground effect, flares, hovering turns, lateral and rearward flight. The dynamic inlet air temperature and pressure patterns, time histories, and variation of basic engine parameters during exhaust reingestion are provided. The effect of instrumentation time constant on the maximum inlet temperature rise is discussed. Conclusions are drawn as to the use of these data to establish turbine engine compressor stall margin requirements needed to avoid experiencing problems with the engine/helicopter integration.

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MILITARY AND CIVILIAN HELICOPTERS FLIGHT CONTROL FLIGHT TESTING FLIGHT SIMULATORS INSTRUMENT FLIGHT RULES AIRWORTHINESS COCKPIT DESIGN

Conference Proceeding, 114, Morris, James J. BOEING 234 FLIGHT CONTROL DEVELOPMENT. Helicopter Handling Qualities, Proceedings of a Specialists Meeting.Moffett Field, CA, USA, NASA, Sci and Tech Inf Branch, Washington, DC, USA, 1982, 15-22

COMMERCIALLY CERTIFIED DERIVATIVE OF CH-47 CHINOOK AUTOMATIC FLIGHT CONTROL SYSTEM AND FLIGHT DIRECTOR WITH COUPLER REDUCTION OF PILOT WORKLOAD AIRSPEED HOLD ATTITUDE HOLD MANEUVER ENHANCEMENT

Conference Proceeding, 115, Pausder, Heinz Juergen //Hummes, Dieter, FLIGHT TESTS FOR THE ASSESSMENT OF TASK PERFORMANCE AND CONTROL ACTIVITY. Helicopter Handling Qualities, Proceedings of a Specialists Meeting.Moffett Field, CA, USA, NASA, Sci and Tech Inf Branch, Washington, DC, USA, 1982, 35-46

INFLUENCE OF PILOT AND HELICOPTER SYSTEM ON PERFORMANCE VISUAL DOLPHIN COURSE MINIMIZATION OF TIME AND ALTITUDE OVER OBSTACLES STATISTICAL EVALUATION PARAMETERS CONTROL ACTIVITY OF PILOTS ACHIEVED TASK PERFORMANCE

Conference Proceeding, 116, Harper, Howard P. ROLE OF VOICE TECHNOLOGY IN ADVANCED HELICOPTER COCKPITS. Helicopter Handling Qualities, Proceedings of a Specialists Meeting.Moffett Field, CA, USA, NASA, Sci and Tech Inf Branch, Washington, DC, USA, 1982, P 163-170

VOICE INPUT AND VOICE RECOGNITION TECHNOLOGY HELICOPTER COCKPIT APPLICATIONS CREW WORKLOAD REDUCTION HELICOPTER OPERATING ENVIRONMENT POTENTIAL APPLICATION AREAS IMPACT ON ADVANCED COCKPIT DESIGN

Conference Proceeding, 117, Green, David L. COCKPIT INTEGRATION FROM A PILOT'S POINT OF VIEW. Helicopter Handling Qualities, Proceedings of a Specialists Meeting.Moffett Field, CA, USA, NASA, Sci and Tech Inf Branch, Washington, DC, USA, 1982, 171-181

HELICOPTER COCKPIT AND CONTROL SYSTEM DESIGN IMPROVEMENT OF PILOT PERFORMANCE MARGINAL AND INSTRUMENT FLIGHT CONDITIONS HELICOPTER USE OF COLLECTIVE NEED FOR GOOD DOWNWARD PERIPHERAL VISIBILITY HORIZONTAL GLARE SHIELD PROFILE

Conference Proceeding, 118, Heffley, Robert K. PILOT-IN-THE-LOOP ANALYSIS OF SEVERAL KINDS OF HELICOPTER ACCELERATION/DECELERATION MANEUVERS. Helicopter Handling Qualities, Proceedings of a Specialists Meeting.Moffett Field, CA, USA, NASA, Sci and Tech Inf Branch, Washington, DC, USA, 1982, 221-232

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Conference Proceeding, 119, Maurer, Rolf E. //O'Donnell, K. 'COAL IS A GAS'. Coal Technology '81: 4th International Coal Utilization Exhibition & Conference. Volume 5: Industrial/Utility Applications for Coal. Houston, TX, USA, Coal Technol Manage, Houston, Tex, USA, 1981, 293-307

ELECTRIC UTILITIES INDUSTRIAL BOILERS GAS PIPELINE SYSTEM LOCK HOPPER LIGNITE REACTOR VESSEL

Conference Proceeding, 123, Anon, 6TH EUROPEAN ROTORCRAFT AND POWERED LIFT AIRCRAFT FORUM. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, UnivEng, Bristol, 1980

Conference Proceeding, 124, Clark, J. E. U. K. DEVELOPMENT OF A ROTOR DE-ICING SYSTEM. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

Conference Proceeding, 125, Griffith, C. D. COMMERCIAL ROTORCRAFT AUTOMATIC CONTROLS - THE NEXT GENERATION. 6th European Rotorcraft and Powered Lift Forum. Bristol, Engl, Univ, Bristol, Engl, 1980

Conference Proceeding, 126, Guy, C. R. //Williams, M. J. //Gilbert, N. E. ASW HELICOPTER/SONAR DYNAMICS MATHEMATICAL MODEL., 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

Conference Proceeding, 127, Gerdes, Ronald M. PILOT'S ASSESSMENT OF HELICOPTER HANDLING-QUALITY FACTORS COMMON TO BOTH AGILITY AND INSTRUMENT FLYING TASKS. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

COLLECTIVE PITCH INPUT

Conference Proceeding, 128, Sanders, K. //Pausder, H. J. //Hummes, D. FLIGHT TESTS AND STATISTICAL DATA ANALYSIS FOR FLYING QUALITIES INVESTIGATIONS. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

Conference Proceeding, 129, Lloyd G. F. H. HELICOPTER COCKPIT DESIGN FOR NIGHT GOGGLE COMPATIBILITY. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

FILTER-SHARED APERTURE

Conference Proceeding, 130, Cort, A. FLIGHT EVALUATION OF A HELMET MOUNTED LED MATRIX DISPLAY IN A LYNX HELICOPTER. 6th European Rotorcraft and Powered Lift Forum.Bristol, Engl, Univ, Bristol, Engl, 1980

Conference Proceeding, 131, Campbell, Richard F. DESIGN OF A CRASHWORTHY CREW SEAT FOR THE BOEING VERTOL CHINOOK HELICOPTER., Proceedings of the 18th Annual Symposium - SAFE Association. (Survival and Flight Equipment)San Diego, CA, USA, SAFE Assoc, Canoga Park, Calif, USA, 1981, 202-208

Conference Proceeding, 132, Lebacqz, J. Victor //Forrest, Raymond D. //Gerdes, Ronald M. //Merrill, Robert K. INVESTIGATION OF CONTROL, DISPLAY, AND CREW-LOADING REQUIREMENTS FOR HELICOPTER INSTRUMENT APPROACH. Collection of Technical Papers - AIAA Guidance and Control Conference.Albuquerque, NM, USA, AIAA (CP 816), New York, NY, USA, 1981, AIAA 81-182s0, 281-295

INSPEC

TY - CONF
ID - 6865445
T1 - Lynx cockpit modernisation
A1 - Hall, A.
A1 - Jukes, M.
Y1 - 1999
N1 - Proceedings of 1999 Avionics Conference and Exhibition
N1 - London, UK
N1 - 17-18 Nov. 1999
N2 - In this paper we describe some of the initiatives being progressed to enhance the operational effectiveness of the Lynx helicopter. The areas discussed include engine instrumentation, flight instrumentation and the mission system displays. We describe a Crew Station which provides a suite of AMLCD displays which has the following functions: integrates information from the aircraft engine, electrical power and hydraulic systems onto two 5ATI displays; integrates primary flight, navigation and mission system sensor information onto four 6 1/4 " square format displays; and provides standby attitude and air data information in the event of major system failure on two 3ATI displays
KW - aircraft displays
KW - avionics
KW - liquid crystal displays
KW - military avionics
KW - sensor fusion
KW - 5ATI displays
KW - Lynx cockpit
KW - operational effectiveness

KW - Lynx helicopter
KW - engine instrumentation
KW - flight instrumentation
KW - mission system displays
KW - Crew Station
KW - AMLCD displays
KW - sensor
KW - 6 1/4 " square format displays
KW - air data information
KW - safety
KW - 6.25 in
JA - 1999 Avionics Conference and Exhibition. Civil and Military Convergence?. Conference Proceedings
SP - 12 pp.
CY - Leatherhead, UK
PB - ERA Technol
SN - 0700807012
AD - Smiths Ind. Aerosp., UK

TY - CONF
ID - 6852823
T1 - Aiding Navy helicopter aircrews in handling mechanical fault emergencies
A1 - Glenn, F.
A1 - Deaton, J.
A1 - Barba, C.
A1 - Popp, E.
Y1 - 2000
N1 - 19th Digital Avionics System Conference. Proceedings
N1 - vol.2
N1 - Philadelphia, PA, USA
N1 - 7-13 Oct. 2000
N1 - Also available on CD-ROM in PDF format
N2 - This paper presents an overview of a research program which is investigating how to generate and present information to Navy helicopter aircrews to help them handle mechanical problems in-flight. This work seeks to provide a mechanism for alerting aircrews to problems that are identified and potentially diagnosed by a Health and Usage Monitoring System (HUMS). HUMS alerting is combined with a concept for an interactive, electronic flight manual to produce a complete aircrew aiding system. Since the basis for the flight manual information is the Navy's NATOPS, the system is designated as Interactive Electronic NATOPS (IE-NATOPS). A prototype design, which will be presented, is planned for implementation on an electronic kneeboard device with aircraft 1553 bus connection to the Warning Caution and Advisory (WCA) cockpit alerting display and HUMS. Aircrew information requirements for HUMS-based aiding have been investigated through two studies that were conducted in a Navy H-46 simulator. The first study addressed aircrew performance in a baseline aircraft with no aiding. The second study examined performance with a hypothetical (scripted) aid which provided information in the categories of problem identification, diagnosis, confirmation, and action recommendation. Aircrew performance and preferences in using these various categories of information were studied. Results of both of these studies will be summarized. Human factors design issues will be discussed, focusing primarily on the cognitive issues of information characteristics. Implementation issues will also be addressed, including document information management, aircrew interface, and aircrew training implications
KW - aerospace simulation
KW - aircraft displays
KW - computerised monitoring
KW - document handling
KW - helicopters
KW - human factors
KW - training
KW - Navy helicopter aircrews
KW - mechanical fault emergencies
KW - Health and Usage Monitoring System
KW - HUMS
KW - electronic flight manual
KW - NATOPS
KW - electronic kneeboard device
KW - aircraft 1553 bus connection
KW - cockpit alerting display
KW - H-46 simulator
KW - problem identification
KW - human factors design issues
KW - cognitive issues
KW - information characteristics
KW - document information management
KW - aircrew interface
KW - aircrew training
JA - 19th DASC. 19th Digital Avionics Systems Conference. Proceedings (Cat. No.00CH37126)

SP - 5E5/1-9 vol.2
CY - Piscataway, NJ, USA
PB - IEEE
SN - 0780363957
AD - CHI Syst. Inc., Lower Gwynedd, PA, USA

TY - CONF
ID - 6847680
T1 - Effects of field-of-view on pilot performance in night vision goggles flight trials: preliminary findings
A1 - Jennings, S. A.
A1 - Craig, G.
Y1 - 2000
N1 - Helmet- and Head-Mounted Displays V
N1 - Orlando, FL, USA
N1 - 24-25 April 2000
N2 - Night vision goggles (NVGs) allow pilots to see and navigate under minimal levels of illumination. While NVGs allow the user to see more than they typically could under these levels of illumination, the visual information provided by NVGs has a limited field-of-view. The size of the field-of-view can diminish the pilot's spatial orientation ability in the night flying environment. We examined pilot performance in low level helicopter flight while the pilots were using NVGs with 40 degrees , and 52 degrees fields-of-view. The pilots flew a standardized ADS-33D hover maneuver in a Bell 206 helicopter equipped with an accurate position measurement system. The tests were conducted in simulated night conditions and both subjective and objective measures of task performance were obtained. Pilot Cooper-Harper ratings increased from Level 1 baseline ratings to Level 2 ratings when the NVGs were used, indicating worse performance when using the NVGs. Small rating differences were noticed between the 52 degrees and 40 degrees field-of-view conditions. Similar trends were noticed in the objective data of altitude, and lateral and longitudinal station keeping errors
KW - aircraft displays
KW - helicopters
KW - helmet mounted displays
KW - image sensors
KW - field of view
KW - helmet mounted display
KW - night vision goggle
KW - helicopter pilot
KW - low-level flight
KW - position measurement system
KW - Cooper-Harper rating
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 4021
SP - 335-42
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - CONF
ID - 6847652
T1 - Head-mounted ambient vision display for helicopter pilotage
A1 - Sharkey, T. J.
A1 - Hennessy, R. T.
Y1 - 2000
N1 - Helmet- and Head-Mounted Displays V
N1 - Orlando, FL, USA
N1 - 24-25 April 2000
N2 - The relatively new notion that visual perception is served by two functionally distinct visual systems, the focal and the ambient, is supported by research evidence accumulated over the past thirty years. The focal system provides detailed information about the world, is controlled by attention and receives input from the fovea. Its performance is highly dependent on image focus and luminance level. The ambient visual system contributes continuously and importantly to spatial orientation, stability of the visual world, and locomotion. It responds to large areas of optical flow in the visual field and therefore most of its input comes from the peripheral retina. Ambient functions are carried out largely without conscious awareness and are relatively impervious to image defocus and luminance level. The evidence for the ambient visual system is reviewed and its functional characteristics are described. Flight displays for peripheral vision that were developed during the past thirty years have been largely unsuccessful because they presented information in a "coded" form equivalent to focal displays placed off the line of sight. The head-mounted display (HMD) described here was specifically developed to be compatible with ambient functions. The presentation consists of moving objects that stimulate a

large area of the peripheral retina. Data are presented that show the effects of the ambient HMD on pilot performance in a PC-based helicopter simulator. Variables tested include ambient stimulus size, density, now rate and control laws governing the movement of the ambient stimuli
KW - aircraft displays
KW - helicopters
KW - helmet mounted displays
KW - head-mounted display
KW - helicopter pilotage
KW - visual perception
KW - focal system
KW - ambient vision
KW - image focus
KW - luminance level
KW - optical flow
KW - flight display
KW - peripheral vision
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 4021
SP - 46-57
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Monterey Technol. Inc., CA, USA

TY - CONF
ID - 6847646
T1 - Helmet- and Head-Mounted Displays V
Y1 - 2000
N1 - Helmet- and Head-Mounted Displays V
N1 - Orlando, FL, USA
N1 - 24-25 April 2000
N2 - The following topics were dealt with: noncombat HMD technologies; helicopter HMDs; HMD-related technologies; night vision and FLIR operation; miniature flat panel display technologies; HMD system integration; HMD symbology; human factors
KW - helmet mounted displays
KW - helmet mounted display
KW - head mounted display
KW - noncombat technology
KW - helicopter
KW - night vision
KW - FLIR operation
KW - flat panel display
KW - symbology
KW - system integration
KW - human factors
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 4021
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
SN - 081943647X

TY - CONF
ID - 6794553
T1 - VolksSim 2000: architecture and approach to low-cost flight and vehicle simulators
A1 - Alem, N. M.
A1 - Valentine, G. J.
A1 - James, G.
A1 - Stuart, M.
A1 - Simpkins, T.
A1 - Simpkins, T. J.
A1 - Chinni, M. J.
Y1 - 2000
N1 - Proceedings of the Military, Government and Aerospace Simulation
N1 - Washington, DC, USA
N1 - 16-20 April 2000
N2 - The US Army Aeromedical Research Laboratory (USAARL) conducts research into the human factors and human performance issues of helicopter pilots and crew. An active area of research at USAARL investigates the effects of head-supported devices on helicopter crew performance. Results of this research are applied to the design of more tolerable helmets, better controls and displays, and to improve operational procedures in the cockpit. To conduct their studies, USAARL, researchers use the multi-axis ride simulator, a laboratory facility located in Fort Rucker, Alabama, to create realistic whole-body vibration environments in which test subjects are evaluated for target head tracking, multi-task management, and vigilance. Until recently, testing of tracking skills used an electromechanical system to present the subject with a moving target. In June 1999, at the end of a Phase I of a

small business innovative research (SBIR) contract, Systran Federal Corp. (SFC) delivered a prototype VolksSim 2000 simulator to replace the mechanical moving target and the battery of performance tests with an integrated virtual reality system. The paper describes the requirements, constraints, and rationale used to formulate the VolksSim modular simulator prototype
KW - aerospace simulation
KW - aircraft computers
KW - digital simulation
KW - helicopters
KW - virtual reality
KW - VolksSim 2000
KW - low-cost flight
KW - vehicle simulators
KW - US Army Aeromedical Research Laboratory
KW - human factors
KW - human performance issues
KW - helicopter pilots
KW - head-supported devices
KW - helicopter crew performance
KW - tolerable helmets
KW - operational procedures
KW - cockpit
KW - multi-axis ride simulator
KW - realistic whole-body vibration environments
KW - test subjects
KW - target head tracking
KW - multi-task management
KW - vigilance
KW - tracking skills
KW - moving target
KW - small business innovative research
KW - SBIR contract
KW - VolksSim 2000 simulator
KW - integrated virtual reality system
KW - VolksSim modular simulator prototype
JA - Proceedings of the Military, Government and Aerospace Simulation Symposium
SP - 89-94
CY - San Diego, CA, USA
PB - SCS
SN - 1565551958
AD - US Army Res. Aeromed. Med. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 6684571
T1 - A vertical situation display for automated aircraft-design and evaluation in full mission simulation
A1 - Prevot, T.
A1 - Crane, B.
A1 - Bullinger, H. -J.
A1 - Ziegler, J.
Y1 - 1999
N1 - Proceedings of 8th International Conference on Human Computer Interaction and Special Session on Intelligent Tutoring and Learning Environments
N1 - vol.2
N1 - Munich, Germany
N1 - 22-26 Aug. 1999
N2 - The paper presents the design and evaluation of a flight deck display for "glasscockpit" aircraft that provides feedback for managing the vertical flight path. Capacity and economic constraints may require aircraft to use high levels of automation to follow predetermined 3D/4D flight paths precisely from takeoff to touchdown in the near future. Current aircraft displays provide excellent feedback for managing the automation in the lateral domain, but are lacking similar feedback for the vertical domain. Therefore, during climbs and descents automation surprises occur and may result in incidents or accidents. Additionally, flight crews may not be able to follow given vertical and speed profiles as efficiently and precisely as necessary to cope with the requirements of the increasing air traffic anticipated in the coming years
KW - aerospace simulation
KW - aircraft computers
KW - aircraft displays
KW - computer displays
KW - digital simulation
KW - ergonomics
KW - human factors
KW - vertical situation display
KW - automated aircraft
KW - full mission simulation
KW - flight deck display
KW - glasscockpit aircraft
KW - vertical flight path
KW - economic constraints

KW - predetermined 3D/4D flight paths
KW - aircraft displays
KW - automation surprises
KW - flight crews
KW - speed profiles
JA - Human-Computer Interaction: Ergonomics and User Interfaces. Proceedings of HCI International '99 (8th International Conference on Human-Computer Interaction)
SP - 1266-70 vol.2
CY - Mahwah, NJ, USA
PB - Lawrence Erlbaum Associates
SN - 0805833919
AD - San Jose State Univ., CA, USA

TY - CONF
ID - 6634912
T1 - User acceptance of an intelligent user interface: a rotorcraft pilot's associate example
A1 - Miller, C. A.
A1 - Hannen, M. D.
A1 - Maybury, M.
Y1 - 1999
N1 - Proceedings of IUI 99. Intelligent User Interfaces
N1 - Redondo Beach, LA, USA
N1 - 5-8 Jan. 1999
N2 - The U.S. Army's Rotorcraft Pilot's Associate (RPA) program is developing an advanced, intelligent "associate" system for flight demonstration in a future attack/scout helicopter. A significant RPA component is the intelligent user interface known as the Cockpit Information Manager (CIM). We describe the high level architecture of the CIM, with emphasis on its pilot-perceptible behaviors: crew intent estimation, page selection, symbol selection/declutter, intelligent window location, automated pan and zoom, and task allocation. We then present the subjective results of recent full mission simulation studies using the CIM to illustrate pilots' attitudes toward these behaviors and their perceived effectiveness
KW - aerospace computing
KW - helicopters
KW - human factors
KW - knowledge based systems
KW - military aircraft
KW - military computing
KW - user interfaces
KW - user acceptance
KW - intelligent user interface
KW - Army
KW - Rotorcraft Pilot Associate program
KW - flight demonstration
KW - helicopter
KW - Cockpit Information Manager
KW - high level architecture
KW - crew intent estimation
KW - page selection
KW - symbol selection
KW - symbol declutter
KW - intelligent window location
KW - automated pan
KW - automated zoom
KW - task allocation
KW - mission simulation
JA - IUI 99. 1999 International Conference on Intelligent User Interfaces
SP - 109-16
CY - New York, NY, USA
PB - ACM
SN - 1581130988
AD - Technol. Center, Honeywell Inc., Minneapolis, MN, USA

TY - CONF
ID - 6491271
T1 - Simulating the degraded visual environment: aeromedical assistance to an HMD research program
A1 - Crowley, J.
A1 - Johnson, P.
A1 - Ledford, M.
A1 - Rash, C.
Y1 - 1999
N1 - Helmet- and Head-Mounted Displays IV
N1 - Orlando, FL, USA
N1 - 5-6 April 1999
N2 - In order to conduct helmet-mounted display (HMD) helicopter research flights in daylight, two versions of a simulated degraded visual environment (SDVE) were developed. SDVE-1 consisted of a tailored fire-retardant black cloth hood that is draped over the pilot's helmeted head and ventilated with a

standard personal ventilator. While SDVE-1 successfully eliminated troublesome reflections, improved display readability, and was reasonably comfortable, pilots reported disturbing sensations of sensory deprivation and isolation. SDVE-2 combined colored filters on the hood and helicopter windscreen to allow the pilot a view of the cockpit interior while blocking light from the external environment. This system has been well accepted and has facilitated safe in-flight HMD research. Motion sickness remains an issue in HMD flight performance research

KW - aircraft displays
KW - helicopters
KW - helmet mounted displays
KW - human factors
KW - simulation
KW - degraded visual environment simulation
KW - aeromedical assistance
KW - HMD research program
KW - helmet-mounted display
KW - HMD helicopter research flights
KW - simulated degraded visual environment
KW - SDVE-1
KW - fire-retardant black cloth hood
KW - standard personal ventilator
KW - display readability
KW - sensory deprivation
KW - isolation effect
KW - SDVE-2
KW - coloured filters
KW - helicopter windscreen
KW - cockpit interior view
KW - safe in-flight HMD research
KW - motion sickness
KW - HMD flight performance research
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3689
SP - 45-53
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - US Army Aeromed. Res. Lab., Fort Rucker, AL, USA

TY - JOUR
ID - 6448253
T1 - Bridging the information transfer gap: measuring goodness of information fit
A1 - Miller, C. A.
Y1 - Oct. 1999
N2 - The ability to determine, a priori, how well an interface design meets the information needs of a user, i.e., to `bridge the information transfer gap, is a critical component of any intelligent interface design system. Yet most current approaches either sidestep the problem of computationally measuring `goodness of fit' by compiling design knowledge into a set of pattern matching rules or, at best, use a very limited set of parameters in scoring. We describe a formal representation for capturing the information needs associated with user tasks and the information conveying capabilities of interface elements. A multifaceted scoring technique, using this representation, is presented for assessing a design's goodness of fit against current user requirements. The hallmarks of this approach are the explicit representation of the goals of good user interface design, evaluation of a proposed design against these goals and a computational approach to performing tradeoffs among these goals when incompatible. Finally, we report on the implementation and user acceptance of this design in an adaptive interface application for military attack/scout helicopters
KW - helicopters
KW - human factors
KW - interactive systems
KW - knowledge based systems
KW - military aircraft
KW - military computing
KW - user interface management systems
KW - information transfer gap
KW - goodness of information fit
KW - information needs
KW - intelligent interface design system
KW - design knowledge
KW - pattern matching rules
KW - formal representation
KW - user tasks
KW - information conveying capabilities
KW - interface elements
KW - multifaceted scoring technique
KW - goodness of fit
KW - current user requirements

KW - explicit representation
KW - user interface design
KW - computational approach
KW - user acceptance
KW - adaptive interface application
KW - military attack
KW - scout helicopters
JF - Journal of Visual Languages and Computing
JA - J. Vis. Lang. Comput. (UK)
VL - 10
IS - 5
SP - 523-58
PB - Academic Press
SN - 1045-926X
AD - Technol. Centre, Honeywell Inc., Minneapolis, MN, USA

TY - CONF
ID - 6422862
T1 - Current Aeromedical Issues in Rotary Wing Operations (RTO-MP-19)
Y1 - 1999
N1 - Current Aeromedical Issues in Rotary Wing Operations
N1 - San Diego, CA, USA
N1 - 19-21 Oct. 1998
N2 - The following topics were dealt with: training for helicopter operations; rotorcraft operations under different conditions; psycho-physiological aspects in rotary-wing operations; human factors and life support equipment; rotorcraft accident and crashworthiness
KW - aerospace biophysics
KW - helicopters
KW - human factors
KW - rotary ring operations
KW - aeromedical issues
KW - helicopter operations training
KW - psycho-physiological aspects
KW - human factors
KW - life support equipment
KW - rotorcraft accident
KW - crashworthiness
CY - Neuilly-sur-Seine, France
PB - NATO Res. & Technol. Organ

TY - CONF
ID - 6397118
T1 - Enhanced and synthetic vision system concept for application to search and rescue missions
A1 - Swail, C.
A1 - Jennings, S.
Y1 - 1999
N1 - Sensor Data Fusion and Integration of the Human Element
N1 - Ottawa, Ont., Canada
N1 - 14-17 Sept. 1998
N2 - Search and rescue (SAR) aircraft operate in a demanding environment, often in remote areas, at night, or in inclement weather. Cockpit systems that reduce pilot workload and improve pilot situational awareness can save lives when appropriately integrated into the aircraft. NRC and partners are building, integrating and conducting research on an enhanced and synthetic vision system (ESVS) to help SAR helicopter pilots complete their missions in degraded visual environments. The ESVS will provide SAR pilots with a real-time display that mimics visual flight rules conditions. NRC plans to integrate and evaluate a prototype system by the year 2000. The prototype system will include a visually coupled helmet mounted display system, a synthetic image generated from a terrain database, an advanced sensor and an image fusion system. A complementary research program is under way at NRC to investigate fundamental human-machine interface issues relevant to the proposed prototype system
KW - aircraft displays
KW - computer vision
KW - emergency services
KW - helicopters
KW - helmet mounted displays
KW - human factors
KW - man-machine systems
KW - sensor fusion
KW - synthetic vision system
KW - enhanced vision
KW - search rescue missions
KW - aircraft displays
KW - cockpit
KW - helicopter
KW - real-time display
KW - helmet mounted display
KW - sensor fusion
KW - human-machine interface

JA - Sensor Data Fusion and Integration of the Human Element (RTO-MP-12)
SP - 15/1-6
CY - Neuilly-sur-Seine, France
PB - NATO
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

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JF - Journal of Visual Languages and Computing
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KW - rotary ring operations
KW - aeromedical issues

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KW - human factors
KW - life support equipment
KW - rotorcraft accident
KW - crashworthiness
CY - Neuilly-sur-Seine, France
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KW - cockpit
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KW - real-time display
KW - helmet mounted display
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KW - human-machine interface
JA - Sensor Data Fusion and Integration of the Human Element (RTO-MP-12)
SP - 15/1-6
CY - Neuilly-sur-Seine, France
PB - NATO
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - CONF
ID - 6314747
T1 - The use of a personal computer-based aviation training device in ab initio flight training
A1 - Vaden, E. A.
A1 - Westerlund, K. K.
A1 - Koonce, J. M.
A1 - Lewandowski, W.
Y1 - 1998
N1 - Proceedings of 42nd Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Chicago, IL, USA
N1 - 5-9 Oct. 1998
N2 - A personal computer-based aviation training device (PCATD) was used to train 63 ab initio flight students. Thirty-nine foreign airline trainees and 24 students from the U.S. participated in approximately 10 hours of basic VFR training between the completion of their ground school course work and flight lessons. All PCATD training followed a strict syllabus and was instructor-led. After the completion of their PCATD training, students followed the traditional flight lesson syllabus and training performance was tracked up to private pilot certification. Dual flight hours prior to the first solo flight, landings prior to the first solo flight, dual flight hours

between the first solo night and private certification, and landings between the first solo flight and private certification provided dependent variables for this study. The results suggest that the PCATD training was effective in improving training performance for some students. Those most influenced were students who traditionally require substantially more training prior to solo and private certification than that called for by the syllabus used at the facility where this study was conducted. Results also indicate that, as expected, the PCATD exposure had the greatest impact on training performance prior to solo
KW - aerospace computing
KW - computer based training
KW - human factors
KW - microcomputer applications
KW - personal computer
KW - computer-based aviation training
KW - flight students
KW - course work
KW - PCATD training
KW - pilot certification
JA - Proceedings of the Human Factors and Ergonomics Society. 42nd Annual Meeting
SP - 1374-7 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289111
AD - Div. of Training Syst., FlightSafety Inc., Daytona Beach, FL, USA

TY - CONF
ID - 6314714
T1 - Can 3-D auditory warnings enhance helicopter cockpit safety?
A1 - Haas, E. C.
Y1 - 1998
N1 - Proceedings of 42nd Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Chicago, IL, USA
N1 - 5-9 Oct. 1998
N2 - The design and use of 3-D auditory warning signals can potentially enhance helicopter cockpit safety. A study was conducted to determine how quickly helicopter pilots could respond to helicopter malfunction warning signals in a simulated cockpit environment when four different signal functions (fire in left engine, fire in right engine, chips in transmission, shaft-driven compressor failure) were presented in three different presentation modes (visual only, visual plus 3-D auditory speech signals, visual plus 3-D auditory icons). The dependent variable was pilot response time to the warning signal, from the time of signal onset to the time that the pilot manipulated the collective control in the correct manner. Subjects were 12 U.S. Army pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the U.S. Army. Results indicated that signal presentation was the only significant effect. Signal function and the signal presentation x signal function interaction were not significant. Post hoc test results indicated that pilot response time to the visual signals supplemented with 3-D audio speech or auditory icon signals was significantly shorter than that to visual signals only. The data imply that 3-D audio speech and auditory icon signals provide a safe and effective mode of warning presentation in the helicopter cockpit
KW - aircraft instrumentation
KW - alarm systems
KW - helicopters
KW - man-machine systems
KW - safety systems
KW - helicopter cockpit safety
KW - 3-D auditory warnings
KW - helicopter
KW - cockpit safety
KW - helicopter pilots
KW - malfunction warning signals
KW - simulated cockpit
KW - pilot response time
KW - auditory icon signals
JA - Proceedings of the Human Factors and Ergonomics Society. 42nd Annual Meeting
SP - 1117-21 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289111
AD - US Army Res. Lab., Aberdeen Proving Ground, MD, USA

TY - CONF
ID - 6313500
T1 - Measuring situation awareness in an attack helicopter domain: an

exploratory investigation
A1 - Entin, E. B.
Y1 - 1998
N1 - Proceedings of 42nd Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Chicago, IL, USA
N1 - 5-9 Oct. 1998
N2 - We contrasted two methods for assessing situation awareness (SA) in a dynamic, fast-paced military domain, a high-level measure based on subjects responses to global questions about a tactical situation and a detailed measure based on their answers to questions about specific elements of the situation. We hypothesized that the two measures would be correlated, and while they were initially, as a dynamic simulation progressed, the relationship between the two measures decreased. We also hypothesized that level of SA would be correlated over time, but the two approaches to the assessment of SA lead to different conclusions, with the high-level measure showing a significant correlation while the detailed measure was not correlated across the measurement periods. The internal consistency of the detailed measure also decreased over time, suggesting that SA becomes more fragmented as a dynamic situation develops, and calling into question the appropriateness of measuring SA as a unified concept
KW - digital simulation
KW - human factors
KW - military computing
KW - situation awareness
KW - attack helicopter domain
KW - dynamic simulation
JA - Proceedings of the Human Factors and Ergonomics Society. 42nd Annual Meeting
SP - 249-53 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289111
AD - Alphatech Inc., Burlington, MA, USA

TY - CONF
ID - 6313477
T1 - Evaluation of a formal methodology for developing aircraft vertical flight guidance training material
A1 - Feary, M.
A1 - Sherry, L.
Y1 - 1998
N1 - Proceedings of 42nd Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Chicago, IL, USA
N1 - 5-9 Oct. 1998
N2 - Aircraft automation, particularly the automation surrounding vertical navigation, has been cited as an area of training difficulty and a source of confusion during operation. A number of incidents have been attributed to a lack of crew understanding of what the automation is doing. This paper describes the translation of information from a formal methodology, used in the design of an automated vertical guidance system, to a training package, and an experiment that tested the new training. This study is part of a larger project to improve the recognition and understanding of the "objectives and behaviors" of automated systems through a formal methodology. The formal method, referred to as the "operational procedures methodology", integrates the design of the system with the design of the training and display information requirements for that system (Sherry, 1995). The study utilized a training package designed to teach the vertical guidance portion of the Flight Mode Annunciator (FMA), as seen in normal operations of the Boeing MD-11. The results of the study showed that this type of training can be successfully delivered via a computer-based training device. Additionally, a study in a full cockpit simulator showed that the training, coupled with the new display, provided significantly less errors on a simulated flight, although the training alone did not provide significantly better performance
KW - aerospace simulation
KW - aircraft control
KW - aircraft displays
KW - aircraft navigation
KW - computer based training
KW - formal methodology
KW - aircraft vertical flight guidance training material development
KW - aircraft automation
KW - vertical navigation
KW - flight crew understanding
KW - information translation
KW - automated systems objectives
KW - automated system behaviour
KW - operational procedures methodology

KW - system design
KW - display information requirements
KW - Flight Mode Annunciator
KW - Boeing MD-11
KW - computer-based training
KW - cockpit simulator
KW - simulated flight
KW - performance
JA - Proceedings of the Human Factors and Ergonomics Society. 42nd Annual Meeting
SP - 72-6 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289111
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 6313469
T1 - Subjective measurement assessment in a full mission scout-attack helicopter simulation
A1 - Heers, S. T.
A1 - Casper, P. A.
Y1 - 1998
N1 - Proceedings of 42nd Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Chicago, IL, USA
N1 - 5-9 Oct. 1998
N2 - A full mission helicopter simulation was conducted in support of the US Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration. Four crews flew four doctrinally correct scenarios under two mission equipment package conditions. The Advanced Mission Equipment Package (AMEP) contained additional equipment and longer sensor ranges than the Baseline Mission Equipment Package (BMEP). Following each run, pilots filled out the NASA Task Load Index (TLX) workload scales and a perceived situation awareness (SA) scale. TLX ratings were lower for the AMEP, while SA ratings were higher for the AMEP. A similar inverse relationship was found in the scenario effects. A stepwise multiple regression found a significant relationship between SA ratings and three of the component TLX subscale ratings. Both perceived workload and situation awareness ratings indicate a benefit from the advanced technologies available on the AMEP. These measures were also sensitive to the varying demands of the scenarios and pilot responsibilities
KW - aerospace simulation
KW - digital simulation
KW - helicopters
KW - human factors
KW - military aircraft
KW - military computing
KW - statistical analysis
KW - subjective measurement assessment
KW - scout-attack helicopter simulation
KW - full mission helicopter simulation
KW - Army
KW - Rotorcraft Pilot
KW - Advanced Mission Equipment Package
KW - sensor ranges
KW - Baseline Mission Equipment Package
KW - NASA Task Load Index
KW - situation awareness
KW - stepwise multiple regression
JA - Proceedings of the Human Factors and Ergonomics Society. 42nd Annual Meeting
SP - 26-30 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289111
AD - Monterey Technol. Inc., Los Gatos, CA, USA

TY - CONF
ID - 6195789
T1 - The effects of dynamic updating of tactical information on situation awareness and performance in an attack helicopter domain
A1 - Entin, E. B.
Y1 - 1998
N1 - SMC '98 Conference Proceedings. 1998 IEEE International Conference on Systems, Man, and Cybernetics
N1 - vol.4
N1 - San Diego, CA, USA
N1 - 11-14 Oct. 1998
N2 - As part of a research program investigating tactical situation awareness (SA) in attack helicopter missions, we investigated alternative methods for displaying dynamically changing tactical

information to maintain high levels of SA and task performance. We conducted two experiments in which we investigated display features that could improve SA and performance, including automatic updating of enemy and friendly unit locations, and availability of unit history information. Subjects reported higher awareness of tactical changes with periodic updates than continual real-time updates, but the periodic updates did not help the crew ascertain which units had moved since the previous update, a very important aspect of maintaining awareness of enemy and friendly status and determining enemy intent. We also compared textual and graphical methods for displaying traces of unit movements, but found no differences in SA or performance between the two methods. The research raised a number of cognitive issues associated with dynamic updating of tactical information and the display of unit histories
KW - aircraft communication
KW - aircraft displays
KW - helicopters
KW - human factors
KW - military aircraft
KW - dynamic updating
KW - tactical information
KW - attack helicopter
KW - tactical situation awareness
KW - task performance
KW - display features
KW - unit history information
KW - enemy intent
KW - graphical methods
KW - textual methods
KW - cognitive issues
JA - SMC'98 Conference Proceedings. 1998 IEEE International Conference on Systems, Man, and Cybernetics (Cat. No.98CH36218)
SP - 3602-7 vol.4
CY - New York, NY, USA
PB - IEEE
SN - 0780347781
AD - Alphatech Inc., Burlington, MA, USA

TY - CONF
ID - 6160275
T1 - Nonlinear robust control for a helicopter model in vertical flight
A1 - Kaloust, J.
A1 - Ham, C.
A1 - Qu, Z.
A1 - Johnson, R.
A1 - Hamza, M. H.
Y1 - 1995
N1 - Proceedings of IASTED International Conference on Applications of Control and Robotics
N1 - Orlando, FL, USA
N1 - 8-10 Jan. 1996
N2 - Illustrates a robust control scheme for application to helicopters in vertical flight mode to guarantee altitude stabilization. A nonlinear helicopter model is used to derive the proposed control in which Lyapunov's direct method is used to establish the overall system stability. A recursive design technique is applied to design a nonlinear robust controller using the highly coupled system structure. It is shown that the proposed robust controller provides global stabilization of uniform ultimate boundedness for achieving desired altitude
KW - aircraft control
KW - asymptotic stability
KW - control system synthesis
KW - helicopters
KW - Lyapunov methods
KW - nonlinear control systems
KW - robust control
KW - nonlinear robust control
KW - helicopter model
KW - vertical flight
KW - altitude stabilization
KW - recursive design technique
KW - highly coupled system structure
KW - global stabilization
KW - uniform ultimate boundedness
JA - Proceedings of the IASTED International Conference. Applications of Control and Robotics
SP - 133-6
CY - Anaheim, CA, USA
PB - IASTED-ACTA Press
SN - 0889861897
AD - Dept. of Electr. Eng., Univ. of Central Florida, Orlando, FL, USA

TY - CONF

ID - 6120812
T1 - Flight testing of a binocular, bisensor HMD for helicopter: some human factors aspects
A1 - Leger, A.
A1 - Roumes, C.
A1 - Bergeaud, J. M.
A1 - Dareoux, P.
A1 - Gardelle, C.
Y1 - 1998
N1 - Helmet- and Head-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 13-14 April 1998
N2 - The need for night vision system in military helicopter has been recognized for many years. Besides fixed FLIR and night vision goggles, helmet-mounted systems coupled with head-slaved IR sensor have been introduced during the last decade in modern attack helicopters. Monocular HMDs have been fielded on the AH-64 and used in operation. Human factors aspects pertaining to such night vision devices has been extensively reviewed and published. Full scale flight tests of binocular HMDs with integrated I/sup 2/ and head coupled IR sensors have rarely been reported. A binocular helmet, with a 40 degree full overlap FOV has been developed under a contract of the French DGA. Two image intensifiers tubes located on each side of the head are integrated on the helmet, which also has full raster and stroke capacity. Both images are projected on the visor of the helmet and collimated to infinity. IR sensor imagery and navigation system are coupled to the helmet using an electro-magnetic head-tracker. Test flight of the helmet have been conducted by the French Flight Test Center on specially equipped Puma test-bed aircraft. Approximately 150 flight hours have been devoted to testing of the helmet, either with I/sup 2/ and IR sensors
KW - aircraft testing
KW - electronic equipment testing
KW - helicopters
KW - helmet mounted displays
KW - human factors
KW - image intensifiers
KW - infrared detectors
KW - military avionics
KW - binocular bisensor HMD
KW - helicopter
KW - night vision
KW - military helicopter
KW - fixed FLIR
KW - night vision goggles
KW - helmet-mounted system
KW - head-slaved IR sensor
KW - attack helicopters
KW - human factors
KW - flight tests
KW - integrated I/sup 2/
KW - head coupled IR sensors
KW - binocular helmet
KW - image intensifiers tubes
KW - navigation
KW - electro-magnetic head-tracker
KW - test flight
KW - French Flight Test Center
KW - Puma test-bed aircraft
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3362
SP - 136-43
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - IHM, Sextant Avionique, St.-Medard-en-Jalles, France

TY - CONF
ID - 6120811
T1 - In flight evaluation of a fiber optic helmet mounted display
A1 - Jennings, S.
A1 - Gubbels, A. W.
A1 - Swail, C. P.
A1 - Craig, G.
Y1 - 1998
N1 - Helmet- and Head-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 13-14 April 1998
N2 - The National Research Council of Canada (NRC), in conjunction with the Canadian Department of National Defence (DND), is investigating the use of helmet-mounted displays (HMD) to improve pilot situational awareness in all-weather search and rescue helicopter operations. The National Research Council has installed a visually coupled HMD system in the NRC Bell 205 Airborne Simulator. Equipped with a full authority fly-by-wire

control system, the Bell 205 has variable stability characteristics, which makes the airborne simulator the ideal platform for the integrated flight testing of HMDs in a simulated operational environment. This paper presents preliminary results from flight test of the NRC HMD. These results are in the form of numerical head tracker data, and subjective handling qualities ratings. Flight test results showed that the HMD degraded handling qualities due to reduced acuity, limited field-of-view, time delays in the sensor platform, and fatigue caused by excessive helmet inertia. Some evidence was found to support the hypothesis of an opto-kinetic cervical reflex whereby a pilot pitches and rolls his head in response to aircraft movements to maintain a level horizon in their field-of-view

KW - aircraft testing
KW - electronic equipment testing
KW - helicopters
KW - helmet mounted displays
KW - human factors
KW - optical fibres
KW - flight evaluation
KW - fiber optic helmet mounted display
KW - National Research Council of Canada
KW - Canadian Department of National Defence
KW - helmet-mounted displays
KW - pilot situational awareness
KW - all-weather search and rescue helicopter
KW - visually coupled HMD
KW - NRC Bell 205 Airborne Simulator
KW - fly-by-wire control
KW - Bell 205
KW - variable stability characteristics
KW - airborne simulator
KW - integrated flight testing
KW - simulated operational environment
KW - flight test
KW - numerical head tracker data
KW - subjective handling qualities ratings
KW - flight test results
KW - acuity
KW - field-of-view
KW - time delays
KW - sensor platform
KW - fatigue
KW - helmet inertia
KW - opto-kinetic cervical reflex
KW - pilot
KW - level horizon
KW - symbology
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3362
SP - 126-35
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - CONF
ID - 6120808
T1 - HMDs: a standard and a design guide
A1 - Newman, R. L.
A1 - Greeley, K. W.
A1 - Turpin, T. S.
Y1 - 1998
N1 - Helmet- and Head-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 13-14 April 1998
N2 - The head-mounted display (HMD) presents flight, navigation, and weapon information in the pilot's line-of-sight. The HMD was developed to allow the pilot to retain aircraft and weapon information while looking off-boresight. Recent work has produced an HMD design guide and a draft Aeronautical Design Standard to provide guidance for the development and testing of HMD designs for rotorcraft applications. Several key issues have been identified: display coordinates, data latency, field-of-view, and image resolution. ADS-46 will outline the display design process in terms of the documents required to be prepared for several program mile-stones, including the operational requirements document, the mission analysis and information requirements report, and crew station design document, and the test and evaluation master plan. The major shortcoming in existing display standards and specification is the absence of objective performance criteria. This has led to an over-reliance on subjective opinion-based testing. The proposed ADS-46 will require the development of objective, mission-based performance objectives and test to ensure that these objectives are met.

Several new tests are included: an aggressive visual tracking task to identify deficiencies in display latency; a spatial awareness test; a geographic awareness test; and a subjective performance assessment test
KW - aircraft displays
KW - electronic equipment testing
KW - head-up displays
KW - helicopters
KW - human factors
KW - military avionics
KW - standards
KW - head-mounted display
KW - weapon
KW - navigation
KW - line-of-sight
KW - rotorcraft applications
KW - data latency
KW - field-of-view
KW - image resolution
KW - ADS-46
KW - mission analysis
KW - crew station design
KW - display standards
KW - specification
KW - performance objectives
KW - visual tracking
KW - display latency
KW - spatial awareness test
KW - geographic awareness tes
KW - subjective performance assessment test
KW - pilot
KW - aircraft displays
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3362
SP - 103-9
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Crew Syst., San Marcos, TX, USA

TY - CONF
ID - 6120804
T1 - Perception of distance in a binocular helmet-mounted display. Data from helicopter in-flight video tapes
A1 - Roumes, C.
A1 - Plantier, J.
A1 - Leger, A.
Y1 - 1998
N1 - Helmet- and Head-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 13-14 April 1998
N2 - An experiment was performed to determine if the geometrical arrangement of sensors delivering images from the environment, could influence distance perception is a binocular helmet-mounted display (HMD). A pair of cameras were settled in the front part of a PUMA helicopter. Video tapes were recorded during low altitude flights. Six camera settings were tested resulting from 3 magnitudes of the separation between the sensors, and 2 arrangements of the optical axes of the cameras: parallel or convergent. Displaying the image of a single camera on both optics of the HMD provided an additional condition which served as a reference free of binocular depth cue. The video tapes were displayed on a 40 degrees full overlap HMD. Eleven helicopter pilots ran the experiment. Objective comparison of the sensor configurations was based on distance or height estimation following a bi-section paradigm. As a subjective comparison, the pilots classified the sensor configurations according to the quality of 3D perception of the environment. Objective data show that flight safety is increased when the separation between the sensor is larger in both convergent and parallel settings. Subjectively, the pilots preferred the wide separation and convergent setting of the cameras
KW - avionics
KW - helicopters
KW - helmet mounted displays
KW - human factors
KW - three-dimensional displays
KW - visual perception
KW - binocular helmet-mounted display
KW - helicopter
KW - in-flight video tapes
KW - PUMA helicopter
KW - camera settings
KW - optical axes
KW - HMD
KW - video tapes

KW - bi-section paradigm
KW - 3D perception
KW - flight safety
KW - convergent setting
KW - human factors
KW - stereoscopic display
KW - cockpit display
KW - 80 to 240 mm
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3362
SP - 66-70
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - CERMA, IMASSA, Bretigny-sur-Orge, France

TY - CONF
ID - 6120798
T1 - New simulator for helmet-mounted display symbology research and training
A1 - Rogers, S. P.
A1 - Asbury, C. N.
Y1 - 1998
N1 - Helmet- and Head-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 13-14 April 1998
N2 - With the emergence of helmet-mounted display (HMD) technologies, unlimited numbers of new flight symbols and symbol behaviors become possible. Rapid, insightful evaluation of these many potential capabilities is imperative. Because flight tests are risky, time-consuming, and expensive, simulators must be employed for the majority of these studies. Unfortunately, existing research simulators often are extremely expensive to construct and operate, dependent upon a team of technical support personnel, time-consuming to reprogram, not portable, and in such demand that it is impossible for most researchers to access them. This paper describes a powerful, but inexpensive, flight simulator specifically developed in response to these shortcomings, providing many of the features of simulators costing hundreds of times as much. The pilot-rotorcraft intelligent symbology management simulator (PRISMS) is easy to operate and is portable for use in a variety of on-site research, demonstration, and training applications. PRISMS includes an immersive, head-tracked HMD, with symbology in screen-, aircraft- and earth-fixed frames of reference, overlaying realistic terrain adapted from the SouthWestern USA database. The system includes cyclic, collective, and rudder pedal flight controls, a helicopter flight model, voice recognition and synthesis, 3D sound generation, user-definable symbol appearance and behavior, and full data recording capabilities
KW - aerospace simulation
KW - aircraft displays
KW - computer based training
KW - helicopters
KW - human factors
KW - military avionics
KW - helmet-mounted display symbology
KW - research
KW - training
KW - flight symbols
KW - flight tests
KW - research simulators
KW - flight simulator
KW - pilot
KW - rotorcraft
KW - intelligent symbology management simulator
KW - portable simulator
KW - on-site research
KW - demonstration
KW - training applications
KW - SouthWestern USA database
KW - situation awareness
KW - PRISMS
KW - rudder pedal flight control
KW - helicopter flight model
KW - voice recognition
KW - synthesis
KW - 3D sound generation
KW - user-definable symbol appearance
KW - data recording
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3362
SP - 2-14
PB - SPIE-Int. Soc. Opt. Eng

SN - 0277-786X
AD - Anacapa Sci. Inc., Santa Barbara, CA, USA

TY - CONF
ID - 6117460
T1 - AIAA Modeling and Simulation Technologies Conference
Y1 - 1997
N1 - Proceedings of AIAA Modeling and Simulation Technologies Conference
N1 - New Orleans, LA, USA
N1 - 11-13 Aug. 1997
N2 - The following topics were dealt with: motion systems; rotorcraft and air cushion vehicles; pilot training; weapons and engagement; simulator networks; vision and radar; testing and evaluation; Space systems; simulator fidelity; aircraft dynamics; development and software reuse; human factors; and research and test facilities
KW - aerospace computing
KW - aerospace simulation
KW - digital simulation
KW - military computing
KW - aerospace simulation
KW - helicopters
KW - hovercraft
KW - motion systems
KW - rotorcraft
KW - air cushion vehicles
KW - pilot training
KW - weapons
KW - engagement
KW - simulator networks
KW - vision
KW - radar
KW - Space systems
KW - simulator fidelity
KW - aircraft dynamics
KW - software reuse
KW - human factors
KW - test facilities
KW - research facilities
CY - Reston, VA, USA
PB - American Inst. Aeronaut. & Astronautics
SN - 1563472368

TY - CONF
ID - 6111489
T1 - Demonstration of a gimbal mounted, high resolution charge coupled device (CCD) television camera in lieu of direct view optics for air to ground targeting
A1 - Schreck, P. C.
Y1 - 1998
N1 - 1998 IEEE Aerospace Conference. Proceedings
N1 - vol.3
N1 - Snowmass at Aspen, CO, USA
N1 - 21-28 March 1998
N2 - The process of air to ground targeting for military attack aircraft involves three distinct, sequential phases of visual discrimination: detection, recognition, and identification (DRI). The intent of this paper is to discuss the tactical merits of charged coupled device (CCD) technology in air to ground target DRI, while contrasting the limitations imposed by the loss of direct view optics (DVO). During an extensive flight and ground test program conducted at the Naval Air Warfare Center Aircraft Division, Patuxent River, MD, an experimental airborne electo-optical targeting sensor suite featuring high resolution CCD cameras was evaluated by direct comparison to an existing system based on DVO. The results indicated superior performance of the CCD cameras in low ambient lighting conditions, but the absence of color was a major hindrance to rapid target area acquisition. Test results indicated that high resolution and magnification are not the most critical design criteria for an airborne electo-optical targeting suite; human factors must influence the design based upon a thorough, systematic analysis conducted during flight test
KW - CCD image sensors
KW - helicopters
KW - human factors
KW - military aircraft
KW - object detection
KW - object recognition
KW - target tracking
KW - television cameras
KW - gimbal-mounted high-resolution charge coupled device television camera
KW - CCD television camera
KW - air-to-ground targeting

KW - military attack aircraft
KW - visual discrimination
KW - detection
KW - recognition
KW - identification
KW - DRI
KW - test program
KW - airborne electo-optical targeting sensor suite
KW - low ambient lighting conditions
KW - rapid target area acquisition
KW - airborne electo-optical targeting suite
KW - human factors
KW - attack helicopter
KW - AH-1W SuperCobra
JA - 1998 IEEE Aerospace Conference Proceedings (Cat. No.98TH8339)
SP - 17-27 vol.3
CY - New York, NY, USA
PB - IEEE
SN - 0780343115
AD - Naval Rotary Wing Aircraft Test Squadron, Patuxent River, MD, USA

TY - JOUR
ID - 5859145
T1 - Wind detection in a microcosm: Ship/aircraft environment sensors
A1 - Platt, J. R.
Y1 - Feb. 1998
N2 - One of the most demanding aspects of a Navy helicopter pilot's job is landing his aircraft on the flight deck of a pitching, rolling, heaving and yawing ship. The complex airwake velocity field associated with the ship and aircraft interface directly affects the pilot's ability to control the aircraft during takeoff, approach, hover, landing, and deck operations. Dynamic Interface (DI) testing is performed to define safe aircraft operational envelopes; however, not all conditions can be realized within the limited test period and asset/condition availability. In addition, exact wind conditions that affect the aircraft cannot be measured with existing wind sensors. These sensors measure wind in the ship's mast area which does not represent the wind flow field encountered by the aircraft. A means of non-intrusively measuring the appropriate wind data is required. This paper presents an overview of the unique aspects of the ship/aircraft interface, the overall naval DI environment and the sensor requirements for measuring this complex environment
KW - aerodynamics
KW - atmospheric turbulence
KW - flow measurement
KW - helicopters
KW - human factors
KW - safety
KW - sensors
KW - ships
KW - wind
KW - wind detection
KW - microcosm
KW - Navy helicopter
KW - flight deck
KW - pitching
KW - rolling
KW - heaving
KW - yawing ship
KW - airwake velocity field
KW - aircraft interface
KW - takeoff
KW - dynamic interface testing
KW - safe aircraft operational envelopes
KW - wind data
KW - ship/aircraft interface
KW - naval DI environment
JF - IEEE Aerospace and Electronic Systems Magazine
JA - IEEE Aerosp. Electron. Syst. Mag. (USA)
VL - 13
IS - 2
SP - 26-33
PB - IEEE
SN - 0885-8985
AD - J.R. Platt Associates Inc., Princeton, NJ, USA

TY - CONF
ID - 5851439
T1 - The Draper Laboratory small autonomous aerial vehicle
A1 - DeBitetto, P. A.
A1 - Johnson, E. N.
A1 - Bosse, M. C.
A1 - Trott, C. A.
Y1 - 1997

N1 - Enhanced and Synthetic Vision 1997
N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - The Charles Stark Draper Laboratory, Inc. and students from Massachusetts Institute of Technology and Boston University have cooperated to develop an autonomous aerial vehicle that won the 1996 International Aerial Robotics Competition. This paper describes the approach, system architecture and subsystem designs for the entry. This entry represents a combination of many technology areas: navigation, guidance, control, vision processing, human factors, packaging, power, real-time software, and others. The aerial vehicle, an autonomous helicopter, performs navigation and control functions using multiple sensors: differential GPS, inertial measurement unit, sonar altimeter, and a flux compass. The aerial transmits video imagery to the ground. A ground based vision processor converts the image data into target position and classification estimates. The system was designed, built, and flown in less than one year and has provided many lessons about autonomous vehicle systems, several of which are discussed. In an appendix, our current research in augmenting the navigation system with vision-based estimates is presented
KW - aircraft navigation
KW - Global Positioning System
KW - helicopters
KW - sensor fusion
KW - sonar
KW - navigation
KW - small autonomous aerial vehicle
KW - Charles Stark Draper Laboratory
KW - guidance
KW - vision processing
KW - human factors
KW - real-time software
KW - autonomous helicopter
KW - multiple sensors
KW - differential GPS
KW - inertial measurement unit
KW - sonar altimeter
KW - flux compass
KW - ground based vision processor
KW - vision-based estimates
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3088
SP - 110-20
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Charles Stark Draper Lab. Inc., Cambridge, MA, USA

TY - CONF
ID - 5803344
T1 - Helmet-mounted display research activity on the NRC Bell 205 airborne simulator
A1 - Swail, C. P.
A1 - Gubbels, A. W.
A1 - Jennings, S.
Y1 - 1997
N1 - Head-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - The National Research Council of Canada, in conjunction with the Canadian Department of National Defence, is investigating the use of helmet-mounted displays as an aid in improving pilot situational awareness in all-weather search and rescue helicopter operations. For over 30 years, the NRC Bell 205 Airborne Simulator has been an integral part of valuable research programs. Equipped with a full authority fly-by-wire control systems, the Bell 205 has variable stability characteristics, which makes the airborne simulator the ideal platform for the integrated flight testing of helmet-mounted displays in a simulated operational environment. This paper describes the test facility in detail, including a description of the airborne simulator, the fiber-optic helmet-mounted display hardware, the camera system, the head tracking system, and the sensor platform. In addition, the paper provides a complete description of the symbology overlaid on the camera image that was developed for use with the helmet mounted display. The paper concludes with the description of a planned preliminary handling-qualities investigation into the effects of using helmet-mounted displays on the pilot's workload and performance while performing standard manoeuvres
KW - aerospace simulation
KW - aircraft control
KW - aircraft displays
KW - electronic equipment testing
KW - helicopters

KW - human factors
KW - military avionics
KW - optical fibres
KW - helmet-mounted display
KW - NRC Bell 205 airborne simulator
KW - Canadian Department of National Defence
KW - pilot situational awareness
KW - all-weather search and rescue
KW - helicopter
KW - fly-by-wire control
KW - airborne simulator
KW - fiber-optic
KW - camera
KW - head tracking
KW - sensor platform
KW - symbology
KW - pilot's workload
KW - pilot's performance
KW - military aircraft
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3058
SP - 323-31
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - CONF
ID - 5803342
T1 - Enhanced spatial state feedback for night vision goggle displays
A1 - Bachelder, E. N.
A1 - Hansman, R. J. , Jr.
Y1 - 1997
N1 - Head-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - A preliminary study was conducted to investigate the use of visual flow cues as an aid to ground and vertical drift awareness during helicopter flight and targeting while using night vision goggles (NVG's). Three displays wee compared: (1) NVG display: simulated NVG image of cockpit and external environment. (2) Overlay display: NVG image with an overlay display but with symbology flow cue field and a surrounding wire-frame globe; (3) Cut-out display: same as the overlay display but with symbology removed from the central region (leaving an unobscured 20 degree field-of-view of the NVG image). Three levels of contrast were also compared using each display type. The visual scenery was displayed to subjects using a helmet-mounted virtual reality device that had a 40*50 degree field-of-view liquid crystal display. The study involved six pilots. Three tasks were given: (1) Search task: designate enemy targets with a helmet-mounted sight; (2) Hover task: null out all translational and yaw rates while in a hover; (3) Search/Hover task: perform both Search and Hover tasks simultaneously. These tasks were conducted in a fixed-based helicopter simulator which used the dynamics of a small-scale model helicopter. From the control input and drift rate time histories it appears that the motion cues were more compelling in the overlay and cut-out displays than those perceived in the NVG display. A significant decrease in instrument-scanning time (both Hover and Search/Hover tasks) was observed for both the overlay and cut-out displays compared to the NVG display, with pilots flying essentially head-out-of-cockpit while using the rate-cueing displays. Contrast was not observed to have a significant effect on hover performance in any of the displays
KW - aerospace simulation
KW - aircraft displays
KW - avionics
KW - helicopters
KW - image intensifiers
KW - optical transfer function
KW - spatial state feedback
KW - night vision goggle displays
KW - helicopter flight
KW - targeting
KW - NVG display
KW - simulated NVG image
KW - overlay display
KW - symbology flow cue field
KW - wire-frame globe
KW - cut-out display
KW - contrast
KW - visual scenery
KW - liquid crystal display
KW - search task

KW - hover task
KW - fixed-based helicopter simulator
KW - pilot performance
KW - target detection scores
KW - helmet mounted displays
KW - 3D flow cuing
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3058
SP - 299-310
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Dept. of Aeronaut. & Astronaut., MIT, Cambridge, MA, USA

TY - CONF
ID - 5803339
T1 - An operationally-applicable objective method for the analysis and evaluation of the flights of helicopter mission task elements during field-of-view trials
A1 - Edwards, K. L.
A1 - Buckle, J. W.
A1 - Doherty, M. J.
A1 - Lee, L. J.
A1 - Pratty, A. C.
A1 - White, J. F.
Y1 - 1997
N1 - Head-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - In 1995 the United Kingdom Defence Evaluation and Research Agency (DERA) conducted a series of pilotage field of view (FOV) trials on a Lynx helicopter. These were performed under the auspices of the Technical Co-operation Program (TTCP), subgroup H, Technical Panel 6 (HTP6). Before the commencement of the trials it was clear that it would be necessary to have available an objective method of determining not only the accuracy with which the various trial mission task elements would be flown, but also the relevance of the flying accuracy to the operational application. Such an objective method was not known to exist, therefore a suitable technique was derived, and deliberately tailored to give some read-across to the widely accepted subjective Cooper-Harper handling qualities rating. The derivation, application and usefulness of the composite objective rating (COR) technique are described herein, together with a synopsis of the trials themselves. The paper concludes with a summary of the trials results to date, which indicate a relationship between both objectively-and subjectively-gathered data concerning the flying performance, and the FOV of the evaluation pilot
KW - aircraft displays
KW - data analysis
KW - helicopters
KW - human factors
KW - image intensifiers
KW - military aircraft
KW - operationally-applicable objective method
KW - helicopter mission
KW - field-of-view trials
KW - United Kingdom Defence
KW - objective method
KW - operational application
KW - Cooper-Harper handling
KW - composite objective rating
KW - flying performance
KW - pilot
KW - helmet mounted display
KW - mission task element
KW - night vision goggles
KW - DERA
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3058
SP - 235-51
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Defence Evaluation & Res. Agency, Farnborough, UK

TY - CONF
ID - 5796685
T1 - Novel flight instrument display to minimize the risk of spatial disorientation
A1 - Braithwaite, M. G.
A1 - Durnford, S. J.
Y1 - 1997
N1 - Head-Mounted Displays II

N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - This novel flight instrument display presents information to the pilot in a simple and easily comprehensible format by integrating the five orientational flight parameters (aircraft attitude, airspeed, altitude, rate of climb or descent and aircraft heading). It allows the pilot to select specific orientation parameters and then follow a simple tracking task which ensures that these parameters are maintained or, if necessary, recovered. The pilot can at any time check any parameter he wishes, but is free from the requirement to continually sample and combine information from the traditional instruments to maintain stable flight. Cognitive workload to maintain orientation is thus reduced. Our assessment of the display in a UH-60 helicopter simulator showed that the novel display makes recovery from unusual aircraft attitudes and instrument flying easier than when using the standard instrument panel
KW - aerospace simulation
KW - aircraft displays
KW - flat panel displays
KW - helicopters
KW - human factors
KW - military aircraft
KW - flight instrument display
KW - spatial disorientation
KW - pilot
KW - orientation parameters
KW - tracking task
KW - stable flight
KW - cognitive workload
KW - UH-60 helicopter simulator
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3058
SP - 146-52
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - US Army Aeromed. Res. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 5796674
T1 - Effects of in-flight field of view restriction on rotorcraft pilot head movement
A1 - Kasper, E. F.
A1 - Haworth, L. A.
A1 - Szoboszlay, Z. P.
A1 - King, R. D.
A1 - Halmos, Z. L.
Y1 - 1997
N1 - Head-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 21-22 April 1997
N2 - The work reported in this paper examines the effect of restricting visual field-of-view (FOV) on rotorcraft pilot head movement. To simulate the FOVs of current and future helmet mounted displays (HMDs) used for night vision pilotage, a FOV restrictor was attached to the helmets of the test subject pilots. The restrictor limited horizontal FOV to 100, 80, 60, 40, and 20 degrees. Ten test subject pilots executed a set of low altitude flight maneuvers in an instrumented NAH-1S helicopter at the NASA Crows' Landing Airfield. Head movement was measured with an IR head tracker for those pilots who flew in the rear seat and by a video camera for those who flew in the front seat. Test data indicated that pilots responded to restrictions in horizontal FOV by changing their pattern of head movement, both in azimuth and elevation. These compensation strategies change as FOV decreases and vary from pilot to pilot. Test results reported in this paper, in conjunction with referenced data outlining FOV effects on flight performance, handling qualities, and visual cue ratings, give visionic system designers and users predictive information on pilot workload and performance
KW - aircraft displays
KW - helicopters
KW - human factors
KW - image intensifiers
KW - image sensors
KW - infrared imaging
KW - military aircraft
KW - in-flight field of view restriction
KW - rotorcraft pilot head movement
KW - helmet mounted displays
KW - night vision pilotage
KW - low altitude flight maneuvers
KW - NAH-1S helicopter
KW - IR head tracker
KW - azimuth

KW - elevation
KW - compensation strategies
KW - flight performance
KW - handling qualities
KW - visual cue ratings
KW - pilot workload
KW - pilot performance
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3058
SP - 34-45
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Army/NASA Rotorcraft Div., Army Aviation Res., Dev., & Eng. Center, Moffett Field, CA, USA

TY - CONF
ID - 5796652
T1 - Cockpit Displays IV: Flat Panel Displays for Defense Applications
Y1 - 1997
N1 - Cockpit Displays IV: Flat Panel Displays for Defense Applications
N1 - Orlando, FL, USA
N1 - 23-25 April 1997
N2 - The following topics were dealt with: affordability, manpower, capability and requirements; human system interface; fighter aircraft and combat land vehicles; AMLCD technology; field emission and plasma display technology; electroluminescent display technology; projection display technology; transport aircraft, helicopters and automobiles; mission crewstations; 3D display technology; testing and backlights; lightweight display technology
KW - aircraft displays
KW - electroluminescent displays
KW - flat panel displays
KW - gas-discharge displays
KW - human factors
KW - liquid crystal displays
KW - military avionics
KW - optical projectors
KW - three-dimensional displays
KW - cockpit displays
KW - flat panel displays
KW - affordability
KW - manpower
KW - capability
KW - requirements
KW - human system interface
KW - fighter aircraft
KW - combat land vehicles
KW - AMLCD
KW - field emission display
KW - plasma display
KW - electroluminescent display
KW - projection display
KW - transport aircraft
KW - helicopters
KW - automobiles
KW - mission crewstations
KW - 3D display
KW - testing
KW - backlights
KW - lightweight display
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3057
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
SN - 0819424722

TY - CONF
ID - 5789073
T1 - An in-flight evaluation of stereoscopic imagery in helicopter cockpits
A1 - Jennings, S.
A1 - Baillie, S. W.
Y1 - 1997
N1 - Cockpit Displays IV: Flat Panel Displays for Defense Applications
N1 - Orlando, FL, USA
N1 - 23-25 April 1997
N2 - The NRC Cockpit Technologies Program flight tested a stereoscopic three-dimensional display format to determine the feasibility of using pictorial and stereoscopic cues during helicopter instrument approach procedures (IAP). Three qualified test pilots flew a series of approach procedures using a modified

conventional electronic flight instrumentation format, a pictorial display format, and a pictorial stereoscopic display format. The preliminary evaluation focused on the effect of display format on pilot performance during the approach task, from an approach intercept to the decision height. Performance criteria such as aircraft speed error, localizer error, and glide slope error were measured. Additionally, pilots answered a questionnaire on each display format, and rated the workload required to fly the approaches using the Cooper-Harper scale. Pilots were able to complete approaches to safe landings using any of the display formats. Pilots reported that the pictorial format improved their situation awareness during the approach. Pilots also reported that the stereo cues incorporated in the display design did not significantly enhance their ability to perform IAP. The pictorial display contained several strong monocular depth cues such as occlusion, linear perspective, and motion flow; therefore the stereo cues were of limited value. Pilots most preferred the conventional display, which provided the most accurate tracking capabilities and lowest workload. Pilots encountered a few acceptance problems with the stereo display, most notably, losing the stereo effect when viewing the prototype stereo display off the central viewing axis
KW - aircraft displays
KW - helicopters
KW - human factors
KW - instrument landing systems
KW - three-dimensional displays
KW - helicopter cockpits
KW - stereoscopic imagery
KW - in-flight evaluation
KW - three-dimensional display format
KW - stereoscopic cues
KW - pictorial cues
KW - instrument approach procedures
KW - pictorial display format
KW - pictorial stereoscopic display format
KW - pilot performance
KW - approach intercept
KW - decision height
KW - aircraft speed error
KW - localizer error
KW - glide slope error
KW - required workload
KW - Cooper-Harper scale
KW - situation awareness
KW - display design
KW - monocular depth cues
KW - acceptance problems
KW - occlusion
KW - motion flow
KW - tracking capability
KW - linear perspective
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 3057
SP - 108-17
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Flight Res. Lab., Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - CONF
ID - 5787188
T1 - Factors affecting user response to polygon displays
A1 - Pionek, J.
A1 - Heidenreich, M.
A1 - Shanahan, M.
A1 - Schoepke, D.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Albuquerque, NM, USA
N1 - 1997
N2 - The concept of polygon displays as error detection devices is an area of interest in such environments as nuclear power plants and airplane and helicopter cockpits. Operators in these areas are concerned about the flooding of important information upon the limited capacity of the human eye and brain. A polygon display may alleviate the problem of confusing information by encompassing many fault displays into one simple, symmetric display. This type of visual display is an optimal method for "at a glance" scanning and lower order perception. If a problem arises in the relevant system, the vertex that corresponds to the fault location will become skewed, and the polygon will appear irregular. The authors propose that polygon displays of different

sizes and types will elicit varying reaction times of the detection of faults in these displays. A pilot study was conducted to determine preliminary answers to this query
KW - display instrumentation
KW - human factors
KW - user interfaces
KW - user response
KW - polygon displays
KW - error detection devices
KW - nuclear power plants
KW - airplane
KW - helicopter cockpits
KW - confusing information
KW - fault displays
KW - symmetric display
KW - visual display
KW - at a glance scanning
KW - lower order perception
KW - fault location
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997
SP - 1052-5 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - Wisconsin Univ., Madison, WI, USA

TY - CONF
ID - 5787172
T1 - A novel flight instrument display to minimize the risk of spatial disorientation
A1 - Braithwaite, M. G.
A1 - Durnford, S. J.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Albuquerque, NM, USA
N1 - 1997
N2 - This novel flight instrument display presents information to the pilot in a simple and easily comprehensible format by integrating the five orientational flight parameters (aircraft attitude, airspeed, altitude, rate of climb or descent and aircraft heading). It allows the pilot to select specific orientation parameters and then follow a simple tracking task which ensures that these parameters are maintained or, if necessary, recovered. Our assessment of the display in a UH-60 helicopter simulator showed that the novel display makes recovery from unusual aircraft attitudes and instrument flying more accurate, and easier than when using a standard instrument panel
KW - aircraft displays
KW - human factors
KW - man-machine systems
KW - flight instrument display
KW - spatial disorientation
KW - pilot
KW - aircraft attitude
KW - airspeed
KW - altitude
KW - climbing rate
KW - descending rate
KW - aircraft heading
KW - tracking
KW - UH-60 helicopter simulator
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997
SP - 897 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - US Army Aeromed. Res. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 5787168
T1 - Enhancing system safety with 3D audio displays
A1 - Haas, E. C.
A1 - Gainer, C.
A1 - Wightman, D.
A1 - Couch, M.
A1 - Shilling, R.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Albuquerque, NM, USA
N1 - 1997

N2 - The enhancement of multiple radio communications can be an important system safety consideration. This study was conducted to determine how accurately helicopter pilots could process radio communications information in a simulated cockpit environment when the messages were presented under different modes (diotic, dichotic and 3D audio). The dependent variable was the total number of points scored in the radio communications identification task. Subjects were 11 certified US Army AH-64 pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the US Army (US Army, 1989). Multivariate statistical analysis indicated that presentation mode was significant. Pilots scored the greatest number of points in the identification task while using 3D audio, fewer with dichotic presentation, and the least with diotic presentation. There was a statistically significant difference between the 3D and the diotic presentation. The data imply that 3D audio provides an effective mode of message presentation in systems with multiple radio communications
KW - helicopters
KW - human factors
KW - radiocommunication
KW - safety
KW - statistical analysis
KW - system safety
KW - 3D audio displays
KW - multiple radio communications
KW - helicopter
KW - pilots
KW - diotic mode
KW - dichotic mode
KW - 3D audio mode
KW - US Army
KW - multivariate statistical analysis
KW - message presentation
KW - human factors
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997
SP - 868-72 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - US Army Ballistic Res. Lab., Aberdeen Proving Ground, MD, USA

TY - CONF
ID - 5786428
T1 - A full mission simulation success story: RPA simulation at CSRDF yields promising results
A1 - Casper, P. A.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Albuquerque, NM, USA
N1 - 1997
N2 - In support of the US Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration Program, the Crew Station Research and Development Branch (CSRDB) at NASA's Ames Research Center has recently completed a full mission simulation (FMS) experiment testing two alternative mission equipment packages (MEPs). Four crews of Army helicopter pilots flew 64 trials, performing representative combat helicopter tasks. Objective and subjective performance metrics provided statistically significant data supporting a priori hypotheses about performance differences between the two systems. Crews flying the advanced MEP killed more targets more efficiently, and were killed fewer times than when flying the baseline MEP. In addition, their workload was lower, and subjectively assessed situation awareness was higher with the advanced system. These results are encouraging for full mission simulation research, and suggest that a standard empirical model may in fact be applicable to full mission simulation
KW - aerospace simulation
KW - aerospace testing
KW - aircraft displays
KW - helicopters
KW - military aircraft
KW - military computing
KW - RPA simulation
KW - US Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration Program
KW - Crew Station Research and Development Branch
KW - full mission simulation
KW - Army helicopter pilots
KW - performance metrics
KW - mission equipment packages
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997

SP - 95-9 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - Monterey Technol. Inc., Los Gatos, CA, USA

TY - CONF
ID - 5786422
T1 - Mechanical fault management in Navy helicopters
A1 - Deaton, J. E.
A1 - Glenn, F. A. , III
A1 - Federman, P. J.
A1 - Nickerson, G. W.
A1 - Byington, C. S.
A1 - Malone, R.
A1 - Stout, R.
A1 - Oser, R.
A1 - Tyler, R. R.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Albuquerque, NM, USA
N1 - 1997
N2 - Research on mechanical diagnostics technology has revealed the possibility of utilizing advanced mechanical diagnostics technology capabilities in real-time environments. The goal of the current investigation was to conduct systematic interviews with flight crew regarding their information requirements for using new diagnostic systems to predict and mitigate inflight mechanical system emergencies. Future research in this area will determine how best to present information to the aircrew in order to improve aircrew safety and enhance mission effectiveness
KW - aircraft displays
KW - aircraft maintenance
KW - fault diagnosis
KW - helicopters
KW - human factors
KW - knowledge based systems
KW - military aircraft
KW - user interfaces
KW - mechanical fault management
KW - Navy helicopters
KW - mechanical diagnostics technology
KW - real-time environments
KW - flight crew
KW - information requirements
KW - inflight mechanical system emergencies
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997
SP - 66-9 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - CHI Syst. Inc., Lower Gwynedd, PA, USA

TY - CONF
ID - 5786415
T1 - An investigation of helmet-mounted display field-of-view and overlap tradeoffs
A1 - Jennings, S.
A1 - Dion, M.
Y1 - 1997
N1 - Proceedings of 41st Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Albuquerque, NM, USA
N1 - 1997
N2 - NRC researchers investigated the tradeoffs between binocular-overlap and field-of-view in helmet-mounted displays. Four test pilots performed a series of maneuvers in a helicopter while wearing field-of-view (FOV) limiting goggles. They evaluated a monocular FOV, a range of binocular overlaps, and unrestricted vision. Pilots evaluated the system performance and handling qualities using Cooper-Harper handling qualities ratings (1969), visual cue ratings, and subjective comments. The handling qualities of the helicopter/pilot system changed in a nonlinear fashion as the binocular overlap increased. Pilot comments, preferences, and visual cue ratings showed the same trends as the handling qualities data. Practical applications of the results are discussed, including helicopter control system augmentation to allow improved performance in degraded visual conditions
KW - aircraft control
KW - aircraft displays
KW - display devices
KW - helicopters

KW - human factors
KW - helmet-mounted display field-of-view
KW - overlap tradeoffs
KW - binocular-overlap
KW - field-of-view limiting goggles
KW - monocular FOV
KW - Cooper-Harper handling qualities ratings
KW - visual cue ratings
KW - subjective comments
KW - helicopter/pilot system
KW - helicopter control system augmentation
KW - degraded visual conditions
JA - Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting 1997
SP - 32-6 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
SN - 0945289073
AD - Nat. Res. Council of Canada, Ottawa, Ont., Canada

TY - JOUR
ID - 5762236
T1 - Nonlinear autopilot control design for a 2-DOF helicopter model
A1 - Kaloust, J.
A1 - Ham, C.
A1 - Qu, Z.
Y1 - Nov. 1997
N2 - Illustrates a robust control scheme for application to helicopters in vertical flight mode (both take-off and landing) to guarantee altitude stabilisation. A nonlinear helicopter model is used to derive the proposed control in which Lyapunov's direct method is used to establish the overall system stability. A recursive design technique is applied to design a nonlinear robust controller using the highly coupled system structure. It is shown that the proposed robust controller provides semiglobal stabilisation of uniform ultimate boundedness for achieving the desired altitude. That is, the control design is valid for all values of the helicopter's collective pitch angle away from zero. The vertical flight application demonstrates a unique robust control mechanisation for helicopter and V/STOL autopilot augmentation systems
KW - aircraft control
KW - control system synthesis
KW - helicopters
KW - Lyapunov methods
KW - nonlinear control systems
KW - robust control
KW - nonlinear autopilot control design
KW - 2 DOF helicopter model
KW - robust control scheme
KW - vertical flight mode
KW - altitude stabilisation
KW - Lyapunov's direct method
KW - recursive design technique
KW - highly coupled system structure
KW - semiglobal stabilisation
KW - uniform ultimate boundedness
KW - collective pitch angle
KW - V/STOL autopilot augmentation systems
JF - IEE Proceedings-Control Theory and Applications
JA - IEE Proc., Control Theory Appl. (UK)
VL - 144
IS - 6
SP - 612-16
PB - IEE
SN - 1350-2379
AD - Lockheed Martin Vought Syst., Dallas, TX, USA

TY - CONF
ID - 5753417
T1 - The application of value-driven decision-making in air combat simulation
A1 - Lazarus, E.
Y1 - 1997
N1 - 1997 IEEE International Conference on Systems, Man, and Cybernetics. Computational Cybernetics and Simulation
N1 - vol.3
N1 - Orlando, FL, USA
N1 - 12-15 Oct. 1997
N2 - The use of constructive computer simulations of air-to-air combat has long been a tool used to evaluate the effectiveness of hardware improvements, to investigate new or improved tactics, to provide threats for man-in-the-loop simulators, and to provide environment generators for hardware-in-the-loop systems. Value-driven based decision models, used in air-to-air combat models such as BRAWLER (aircraft) and TRACES (helicopters), are

based upon a relatively straightforward paradigm much like the one used implicitly by many chess players. Using this approach, the selection of a course of action consists of: (1) the selection of a set alternative courses of actions which span the decision space, (2) projection of each alternative into the future, (3) evaluation (scoring) of the future for each alternative using a value function, and (4) selection of the highest scoring alternative. Since the value function is constructed to be sensitive to the many goals of a given decision, it intrinsically performs tradeoffs among conflicting objectives. In addition, the effects of orders from higher level entities in the decision hierarchy are easily implemented by passing weights to the decision-maker which affect the importance of various components of his value scoring function
KW - digital simulation
KW - hierarchical systems
KW - human factors
KW - military computing
KW - value-driven decision-making
KW - air combat simulation
KW - air-to-air combat models
KW - highest scoring alternative
KW - decision hierarchy
KW - value scoring function
KW - computer simulations
JA - 1997 IEEE International Conference on Systems, Man, and Cybernetics. Computational Cybernetics and Simulation (Cat. No.97CH36088-5)
SP - 2302-7 vol.3
CY - New York, NY, USA
PB - IEEE
SN - 0780340531
AD - Decision-Sci. Appl. Inc., VA, USA

TY - CONF
ID - 5729758
T1 - Preliminary design of a tandem-wing tail-sitter UAV using multi-disciplinary design optimisation
A1 - Stone, H.
A1 - Wong, K. C.
Y1 - 1996
N1 - Proceedings of AUVSI 96
N1 - Orlando, FL, USA
N1 - 15-19 July 1996
N2 - The optimisation of a tail-sitter UAV (unmanned aerial vehicle) that uses a stall-tumble manoeuvre to transition from vertical to horizontal flight and a pull-up manoeuvre to regain the vertical, is investigated. The tandem wing vehicle is controlled in the hover and vertical flight phases by prop-wash over wing mounted control surfaces. It represents an innovative and potentially simple solution to the dual requirements of VTOL (vertical take-off and landing) and high speed forward flight by obviating the need for complex mechanical systems such as rotor heads or tilt-rotor systems
KW - aerodynamics
KW - aerospace computing
KW - aerospace propulsion
KW - aircraft control
KW - optimisation
KW - tandem-wing tail-sitter UAV
KW - unmanned aerial vehicle
KW - multidisciplinary design optimisation
KW - stall-tumble manoeuvre
KW - vertical flight
KW - horizontal flight
KW - pull-up manoeuvre
KW - VTOL
KW - flight control
KW - aerodynamics
KW - wing propeller
JA - AUVSI '96 Proceedings
SP - 163-78
CY - Arlington, VA, USA
PB - AUVSI - Assoc. Unmanned Vehicle Syst. Int
AD - Dept. of Aeronautical Eng., Sydney Univ., NSW, Australia

TY - JOUR
ID - 5720447
T1 - Open system concepts for modular avionics
A1 - Thedens, J. R.
Y1 - Oct. 1997
N2 - Advanced communications, guidance and navigation systems play key roles in determining superiority of one combat aircraft over another. The use of advanced technology is essential to meeting the mission requirements of present as well as future aircraft. Modular avionics are being used in next generation aircraft, such

as the Air Force F-22 fighter and the Army Comanche helicopter, as the means of achieving higher levels of performance, including reduced volume and improved adaptability, maintainability, and expandability. New system acquisitions such as Joint Strike Fighter will attempt to achieve these same performance levels but at dramatically reduced life cycle cost. Retrofit applications will also take on increasing roles in meeting this affordability need as the Department of Defense (DoD) struggles to maintain readiness in the face of the shrinking defense budget. The government is encouraging the use of open standards practices as a means of addressing the affordability issue. The Open Systems Joint Task Force (OS-JTF), formed in September 1994, is chartered to "sponsor and accelerate the adoption of open systems in weapons systems and subsystem electronics to reduce life-cycle costs and facilitate effective weapon system intra- and interoperability". The purpose of this paper is to relate the concept of open systems to modular avionics. It discusses the key attributes of an open systems approach and identifies key technologies necessary for its success
KW - aircraft computers
KW - aircraft control
KW - costing
KW - human factors
KW - military aircraft
KW - military avionics
KW - military computing
KW - open systems
KW - weapons
KW - modular avionics
KW - open system concepts
KW - mission requirements
KW - combat aircraft
KW - next generation aircraft
KW - Air Force F-22 fighter
KW - Army Comanche helicopter
KW - Joint Strike Fighter
KW - reduced life cycle cost
KW - retrofit applications
KW - open standards practices
KW - affordability issue
KW - weapons systems
KW - subsystem electronics
KW - interoperability
KW - intraoperability
KW - sensor technology
KW - processor technology
KW - human machine interface
JF - IEEE Aerospace and Electronics Systems Magazine
JA - IEEE Aerosp. Electron. Syst. Mag. (USA)
VL - 12
IS - 10
SP - 30-4
PB - IEEE
SN - 0885-8985
AD - Collins Avionics & Commun. Div., Rockwell Int. Corp., Cedar Rapids, IA, USA

TY - CONF
ID - 5609551
T1 - Rotorcraft safety-the industry view
A1 - Wilson, A. J.
Y1 - 1997
N1 - IEE Rotocraft Safety. Symposium (Ref. No.1997/309)
N1 - London, UK
N1 - 9 April 1997
N2 - These notes discuss the special problems faced by helicopters, how these affect the safety process, and how the helicopter industry is addressing these issues
KW - aerospace industry
KW - aircraft control
KW - helicopters
KW - human factors
KW - safety
KW - rotorcraft safety
KW - industry view
KW - helicopter industry
KW - safety process
KW - safety expectations
KW - accidents
KW - health monitoring
JA - IEE Rotorcraft Safety. Symposium (Ref. No.1997/309)
SP - 4/1-13
CY - London, UK
PB - IEE

TY - CONF

ID - 5609550
T1 - Rotorcraft safety: the end-users view
A1 - Clark, E.
Y1 - 1997
N1 - IEE Rotocraft Safety. Symposium (Ref. No.1997/309)
N1 - London, UK
N1 - 9 April 1997
N2 - The author's presentation covers the following: exposure and safety trends, safety targets, safety initiatives, safety management, safety research, airworthiness, human factors, secondary safety, minimum equipment standards
KW - aircraft control
KW - helicopters
KW - human factors
KW - research initiatives
KW - safety
KW - standards
KW - rotorcraft safety
KW - end-users view
KW - safety trends
KW - exposure
KW - safety targets
KW - safety initiatives
KW - safety management
KW - safety research
KW - minimum equipment standards
KW - airworthiness
KW - human factors
KW - secondary safety
KW - fatal accidents
KW - risk
JA - IEE Rotorcraft Safety. Symposium (Ref. No.1997/309)
SP - 3/1-14
CY - London, UK
PB - IEE

TY - CONF
ID - 5609549
T1 - The regulators view of rotorcraft safety
A1 - Chapman, D. J.
Y1 - 1997
N1 - IEE Rotocraft Safety. Symposium (Ref. No.1997/309)
N1 - London, UK
N1 - 9 April 1997
N2 - The author has discussed the alignment of the current Requirement codes and the procedures in place to improve the codes and also aid the harmonisation process between the JAA and FAA requirements. The problems of the Requirements codes, as related to the many different uses of the helicopter, have also been examined. Finally, a list has been given of the top 10 items that the author thinks will need to be addressed in the certification codes in the foreseeable future
KW - certification
KW - government policies
KW - helicopters
KW - human factors
KW - legislation
KW - safety
KW - rotorcraft safety
KW - regulators view
KW - Requirement codes
KW - harmonisation process
KW - FAA requirements
KW - JAA requirements
KW - certification codes
KW - helicopter airworthiness
KW - human factors
KW - safety assessment
JA - IEE Rotorcraft Safety. Symposium (Ref. No.1997/309)
SP - 2/1-9
CY - London, UK
PB - IEE

TY - CONF
ID - 5609548
T1 - An industry initiative for Total Air Transport Safety
A1 - Moulton, M.
Y1 - 1997
N1 - IEE Rotocraft Safety. Symposium (Ref. No.1997/309)
N1 - London, UK
N1 - 9 April 1997
N2 - An introduction is given to the aims of the Total Air Transport Safety (TATS) working group. This is followed by discussions of human error effects, the need for cooperation, the Shell Pilot Study and present liaisons. Practical proposals, and what we need to do, are finally presented

KW - air traffic
KW - air traffic control
KW - helicopters
KW - human factors
KW - research initiatives
KW - safety
KW - total air transport safety
KW - industry initiative
KW - working group
KW - human error effects
KW - cooperation need
KW - Shell Pilot Study
KW - airworthiness
KW - operations
KW - aircraft
KW - air traffic infrastructure
KW - helicopter safety
KW - incident analysis
JA - IEE Rotorcraft Safety. Symposium (Ref. No.1997/309)
SP - 1/1-20
CY - London, UK
PB - IEE

TY - CONF
ID - 5545459
T1 - The 1996 MIT/Boston University/Draper Laboratory autonomous helicopter system
A1 - Johnson, E. N.
A1 - DeBitetto, P. A.
A1 - Trott, C. A.
A1 - Bosse, M. C.
Y1 - 1996
N1 - 15th DASC. AIAA/IEEE Digital Avionics Systems Conference
N1 - Atlanta, GA, USA
N1 - 27-31 Oct. 1996
N2 - The Massachusetts Institute of Technology, Boston University and Draper Laboratory have cooperated to develop an autonomous aerial vehicle that won the 1996 International Aerial Robotics Competition. This paper describes the approach, system architecture and subsystem designs for the entry. This entry represents a combination of many technology areas: navigation, guidance, control, vision processing, human factors, packaging, power, real-time software, and many others. The aerial vehicle, an autonomous helicopter, performs navigation and control functions using multiple sensors: differential GPS, inertial measurement unit, sonar altimeter, and a flux compass. The aerial transmits video imagery to the ground. A ground based vision processor converts the image data into target position and classification estimates. The system was designed, built, and flown in less than one year and has provided many lessons about autonomous vehicle systems, several of which are discussed
KW - aircraft navigation
KW - Global Positioning System
KW - height measurement
KW - helicopters
KW - inertial navigation
KW - mobile robots
KW - autonomous helicopter system
KW - aerial vehicle
KW - system architecture
KW - subsystem designs
KW - navigation functions
KW - control functions
KW - differential GPS
KW - inertial measurement unit
KW - sonar altimeter
KW - flux compass
KW - video imagery
KW - ground based vision processor
KW - target position
KW - classification estimates
JA - 15th DASC. AIAA/IEEE Digital Avionics Systems Conference (Cat. No.96CH35959)
SP - 381-6
CY - New York, NY, USA
PB - IEEE
SN - 0780333853
AD - Charles Stark Draper Lab. Inc., Cambridge, MA, USA

TY - CONF
ID - 5418865
T1 - Piloted simulation in rotorcraft design and development. EUROCOPTER experience and future trends
A1 - Rollet, P.
Y1 - 1996
N1 - Flight Simulation - Where are the Challenges? (AGARD-CP-577)

N1 - Braunschweig, Germany
N1 - 22-25 May 1995
N2 - Piloted simulation has largely been used in EUROCOPTER's developments for the last 10 years. For the TIGER attack helicopter, piloted simulation was extensively used from the very beginning of the development to the prototypes' flights. Today, the development of the NH-90 helicopter requires a lot of experimentation on the SPHERE simulator. Piloted simulation is also used for research related to handling qualities, such as the ACT European program, or to man-machine interfaces (MMIs). The implementation of demonstrators, such as the FEW DAUPHIN, as well as the study of the EUROFAR Tilt-Rotor have also largely involved piloted simulations. Significant experience in testing procedures has been acquired. Environmental and human factors appear to be of the greatest importance. In the future, evolutions are planned to further enhance the representativeness of SPHERE simulator. The emergence of new design standards, such as ADS-33C, leads to envisage new applications of piloted simulation
KW - aerospace simulation
KW - aircraft testing
KW - digital simulation
KW - helicopters
KW - human factors
KW - military aircraft
KW - standards
KW - user interfaces
KW - piloted simulation
KW - rotorcraft design
KW - rotorcraft development
KW - EUROCOPTER developments
KW - TIGER attack helicopter
KW - prototype flights
KW - NH-90 helicopter
KW - SPHERE simulator
KW - ACT European program
KW - man-machine interfaces
KW - FEW DAUPHIN
KW - demonstrators
KW - EUROFAR Tilt-Rotor
KW - testing procedures
KW - environmental factors
KW - human factors
KW - design standards
KW - ADS-33C standard
JA - Flight Simulation - Where are the Challenges? (AGARD-CP-577)
SP - 18/1-10
CY - Neuilly sur Seine, France
PB - AGARD
AD - Eurocopter France, Marignane, France

TY - CONF
ID - 5418863
T1 - The use of piloted simulation for civil tiltrotor integrated cockpit design
A1 - Decker, W. A.
A1 - Simmons, R. C.
A1 - Tucker, G. E.
Y1 - 1996
N1 - Flight Simulation - Where are the Challenges? (AGARD-CP-577)
N1 - Braunschweig, Germany
N1 - 22-25 May 1995
N2 - Ground-based flight simulators are receiving increased use in the design of civil aircraft. In addition to traditional simulation roles in support of cockpit control and display design, simulators are now used to develop new flight procedures and to assist in airport design. This is particularly true for the concept of a civil tiltrotor transport. This presentation summarizes recent simulation activity at NASA's Ames Research Center focused on the design requirements for the introduction of tiltrotor aircraft as economic vertical flight transports
KW - aerospace simulation
KW - aircraft control
KW - aircraft displays
KW - airports
KW - helicopters
KW - piloted simulation
KW - civil tiltrotor integrated cockpit design
KW - helicopter
KW - ground-based flight simulators
KW - civil aircraft design
JA - Flight Simulation - Where are the Challenges? (AGARD-CP-577)
SP - 16/1-23
CY - Neuilly sur Seine, France
PB - AGARD
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 5418851
T1 - Visual scenes for battlefield helicopter operations: evaluation of requirements and how to specify them
A1 - Deighton, C. D. B.
A1 - Woodfield, A. A.
Y1 - 1996
N1 - Flight Simulation - Where are the Challenges? (AGARD-CP-577)
N1 - Braunschweig, Germany
N1 - 22-25 May 1995
N2 - The structured specification and evaluation of simulated visual scenes for training pilots is required to ensure that cost effective flight simulator training is being achieved. Historically this has been a difficult process because of a lack of consistent and prioritised descriptions of different visual flight activities within the intended training missions; limited evaluations of the contributions and relative importance of different scene features within appropriate operational scenes; and lack of any structured way of collating and presenting such information to those who design visual scene databases for flight training simulators. A research programme funded by the UK Defence Research Agency was conducted in collaboration with Cranfield University, UK to address these challenges. Specific aims were to identify and prioritise visual flight activities in the content of a battlefield nap-of-the-earth (NoE) attack mission; to determine the relative importance of visual scene components (e.g. woods, farm buildings, roads, livestock) to the achievement of visual flight activities; and to assess the impact of removing or adding information to the scene upon the achievement of visual flight activities in a mission simulator. The purpose of the paper is twofold: describe the human factors procedures and techniques used to address these aims; and describe the proposed structure of a computer based relational database to integrate the results of the programme. Selected findings from the study are used to highlight the structure of the database
KW - aerospace simulation
KW - computer based training
KW - digital simulation
KW - helicopters
KW - human factors
KW - military computing
KW - natural scenes
KW - relational databases
KW - battlefield helicopter operations
KW - simulated visual scenes
KW - pilot training
KW - cost effective flight simulator training
KW - visual flight activities
KW - visual scene databases
KW - battlefield nap-of-the-earth
KW - NoE attack mission
KW - visual scene components
KW - mission simulator
KW - human factors procedures
KW - computer based relational database
JA - Flight Simulation - Where are the Challenges? (AGARD-CP-577)
SP - 3/1-11
CY - Neuilly sur Seine, France
PB - AGARD
AD - Dept. of Appl. Psychol., Cranfield Univ., Bedford, UK

TY - CONF
ID - 5340524
T1 - Overlap binocular field-of-view flight experiment
A1 - Bui, T. H.
A1 - Vollmerhausen, R. H.
A1 - Tsou, B. H.
A1 - Morreale, J.
Y1 - 1994
N1 - Proceedings of SID '94 Symposium
N1 - San Jose, CA, USA
N1 - 14-16 June 1994
N2 - A flight experiment was conducted to determine any objective differences and the subjective impact on flight performance between two simulated helmet mounted display systems. Both displays have the same field-of-view but one uses fully overlapped oculars whereas the other uses partially overlapped oculars such that each eye sees only part of the image. With the partial overlap configuration, we found constricted eye movements, frequent head movements, higher workload and lower confidence
KW - aerospace simulation
KW - aircraft displays
KW - human factors
KW - military avionics
KW - visual perception

KW - overlap binocular field-of-view flight
KW - flight experiment
KW - objective differences
KW - subjective impact
KW - flight performance
KW - simulated helmet mounted display
KW - partially overlapped oculars
KW - constricted eye movements
KW - workload
KW - lower confidence
KW - US Army
KW - helicopter avionics
JA - 1994 SID International Symposium Digest of Technical Papers. SID
SP - 306-8
CY - Santa Ana, CA, USA
PB - SID
AD - Night Vision & Sensors Directorate, Ft. Belvoir, VA, USA

TY - JOUR
ID - 5244830
T1 - Oculomotor responses with aviator helmet-mounted displays and their relation to in-flight symptoms
A1 - Kotulak, J. C.
A1 - Morse, S. E.
Y1 - Dec. 1995
N2 - Previous experiments have raised the possibility that abnormal oculomotor functioning could be the substrate for visual problems among aviators who use helmet-mounted displays. However, until the present investigation, no direct evidence linked the two. In our experiments, experienced Apache helicopter pilots, using the same helmet-mounted display that they use in flight, viewed Apache symbology and sensor imagery while we measured their accommodation and vergence eye movements in the laboratory. We found three circumstances that frequently occur in flight in which aviators with visual symptoms had different oculomotor responses than did asymptomatic aviators. Further work needs to be done to determine why symptomatic aviators respond differently from asymptomatic ones
KW - aircraft displays
KW - display devices
KW - helicopters
KW - human factors
KW - abnormal oculomotor functioning
KW - aviator helmet-mounted displays
KW - in-flight symptoms
KW - visual problems
KW - Apache helicopter pilots
KW - symbols
KW - sensor images
KW - accommodation eye movements
KW - vergence eye movements
JF - Human Factors
JA - Hum. Factors (USA)
VL - 37
IS - 4
SP - 699-710
PB - Human Factors & Ergnomics Soc
SN - 0018-7208
AD - Evans US Army Community Hospital, Fort Carson, CO, USA

TY - CONF
ID - 5184933
T1 - Synthetic Vision for Vehicle Guidance and Control
Y1 - 1995
N1 - Synthetic Vision for Vehicle Guidance and Control
N1 - Orlando, FL, USA
N1 - 17-18 April 1995
N2 - The following topics were dealt with: millimetre-wave systems for low visibility; avionic millimetre-wave radiometers; FMCW radar; infared-optical landing guidance; ladar sensors; colour night vision; morphological connected operators; helicopter square tracking, and machine vision simulation; electro-optic precision landing; landing trajectory measurement; flight safety; generic view simulation; simulated head-up display evaluation; radar scene obscuration; pilot visual behaviour modelling; perspective; autonomous road navigation; radar waterway navigation; radar collision warning; coupled filters for pattern recognition; and 2D image obstacle detection
KW - computer vision
KW - mobile robots
KW - vehicles
KW - synthetic vision
KW - computer vision
KW - vehicle guidance
KW - vehicle control
KW - human factors

KW - millimetre-wave systems
KW - low visibility
KW - avionic millimetre-wave radiometers
KW - FMCW radar
KW - infared-optical landing guidance
KW - ladar sensors
KW - colour night vision
KW - morphological connected operators
KW - helicopter square tracking
KW - machine vision simulation
KW - electro-optic precision landing
KW - landing trajectory measurement
KW - flight safety
KW - generic view simulation
KW - simulated head-up display evaluation
KW - radar scene obscuration
KW - pilot visual behaviour modelling
KW - perspective
KW - autonomous road navigation
KW - radar waterway navigation
KW - radar collision warning
KW - coupled filters
KW - pattern recognition
KW - 2D image obstacle detection
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 2463
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X

TY - CONF
ID - 5182783
T1 - Experimental study of vertical flight path mode awareness
A1 - Johnson, E. N.
A1 - Pritchett, A. R.
A1 - Sheridan, T. B.
Y1 - 1995
N1 - Proceedings of 6th IFAC/IFIP/IFORS/IEA Symposium on Analysis, Design and Evaluation of Man-Machine Systems
N1 - vol.1
N1 - Cambridge, MA, USA
N1 - 27-29 June 1995
N2 - An experimental simulator study was run to test pilot detection of an error in autopilot mode selection. Active airline air crew were asked to fly landing approaches by commanding the Flight Path Angle mode while monitoring the approach with both a head up display and head down displays. During one approach, the vertical speed mode was intentionally triggered by an experimenter instead, causing a high rate of descent below the intended glide path. Of the 12 pilots, 10 did not act to decrease the high descent rate prior to significant glide path deviation
KW - aerospace simulation
KW - aircraft computers
KW - aircraft displays
KW - digital simulation
KW - human factors
KW - user interfaces
KW - vertical flight path mode awareness
KW - experimental simulator study
KW - pilot error detection
KW - autopilot mode selection
KW - active airline air crew
KW - landing approaches
KW - Flight Path Angle mode
KW - head up display
KW - head down displays
KW - vertical speed mode
KW - high descent rate
KW - glide path deviation
JA - Analysis, Design and Evaluation of Man-Machine Systems 1995. Postprint volume from the Sixth IFAC/IFIP/IFORS/IEA Symposium
SP - 153-8 vol.1
CY - Oxford, UK
PB - Pergamon
SN - 0080423701
AD - Aeronaut. Syst. Lab., MIT, MA, USA

TY - CONF
ID - 5178693
T1 - Effect of field-of-view restriction on rotorcraft pilot workload and performance-preliminary results
A1 - Szoboszlay, Z.
A1 - Haworth, L.
A1 - Reynolds, T.
A1 - Lee, A.

A1 - Halmos, Z.
Y1 - 1995
N1 - Helmet- and Head-Mounted Displays and Symbology Design Requirements II
N1 - Orlando, FL, USA
N1 - 18-19 April 1995
N2 - A study to determine the effects of limiting a rotorcraft pilot's field-of-view (FOV) on performance and workload is descibed. Pilot FOV was restricted to simulate current and next generation helmet mounted display FOVs used in night vision systems. A helmet visor was constructed for this test to restrict the horizontal peripheral limits of the square shaped FOV to values of 100, 80, 60, 40, and 20 degrees. The vertical limits and overlap were held constant at 40 degrees (except for the 20 degree FOV). Six pilots executed a series of prescribed low altitude maneuvers with an instrumented rotorcraft. The aircraft flight path was measured with a laser tracker. On board data was recorded, as well as pilot handling quality ratings and visual cue ratings. Some preliminary observations and results are provided. It was observed that reducing FOV increased the difficulty of controlling the aircraft and altered head movement. Reducing FOV also diminished the pilots' situational awareness. The reduction in situational awareness affected the ability of the pilots to provide an accurate report of their own flying performance, and the ability to observe warning indicators inside the cockpit
KW - aerospace simulation
KW - aircraft control
KW - aircraft displays
KW - helicopters
KW - human factors
KW - image intensifiers
KW - image sensors
KW - infrared imaging
KW - rotorcraft pilot workload
KW - pilot performance
KW - field-of-view restriction effect
KW - night vision systems
KW - helmet mounted display
KW - horizontal peripheral limits restriction
KW - low altitude maneuvers
KW - pilot handling quality ratings
KW - visual cue ratings
KW - situational awareness
KW - head movement
KW - FOV control
KW - subjective observations
KW - pilot compensation
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 2465
SP - 142-53
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - US Army Aviation Res., Dev. & Eng. Center, Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 5178689
T1 - Helmet mounted display symbology research in the United Kingdom
A1 - Gillow, C.
A1 - Southam, T.
Y1 - 1995
N1 - Helmet- and Head-Mounted Displays and Symbology Design Requirements II
N1 - Orlando, FL, USA
N1 - 18-19 April 1995
N2 - The DRA's research effort into Visually Coupled Systems is intended to assist the operational pilot fly aggressively at night and day, by giving him an informative view of the near-earth environment. A number of simulator trials have been conducted to explore some of the issues identified in Helmet-Mounted Display symbol set development. The development of successful symbol sets will be iterative. A careful study of the operational requirement should produce a series of tests which will demonstrate compliance; however, we must be cautious, when we are testing the ability of the visionic system to feed cues to a pilot, in how we set out the cues to define the task. The paper outlines past research, describes the planned future activities and raises some human factors issues which have been identified. It is specifically written from the perspective of a test pilot who has benefited from a unique opportunity to participate in prototyping, simulation, night studies and brainstorming sessions in both the UK and the USA. This is not a formal report on the various trials described and raises several issues that may be seen as controversial; this is a deliberate attempt to provoke

the wider discussion needed in any new area of activity
KW - aerospace simulation
KW - aircraft displays
KW - helicopters
KW - human factors
KW - military avionics
KW - military standards
KW - motion compensation
KW - realistic images
KW - symbol manipulation
KW - virtual reality
KW - visual perception
KW - helmet mounted display
KW - visually coupled systems
KW - simulator trials
KW - symbol set development
KW - operational requirement
KW - human factors issues
KW - flight simulation
KW - research strategy
KW - assessment methods
KW - international collaboration
KW - hardware development
KW - imagery stabilisation
KW - conformality
KW - motion problems
KW - artificial world construction
KW - UK research activity
KW - military helicopters
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 2465
SP - 102-10
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X
AD - Exp. Flying Squadron, A&AEE Boscombe Down, Amesbury, UK

TY - CONF
ID - 5147451
T1 - Cockpit Displays II
Y1 - 1995
N1 - Cockpit Displays II
N1 - Orlando, FL, USA
N1 - 19-21 April 1995
N2 - The following topics were dealt with: human-system interface; flat panel technologies; helicopters and transports; fighters; flight instrument update to AMLCD; mission crew station and display generation; avionic and military AMLCD production; backlights and drivers for military LCDs
KW - aircraft displays
KW - avionics
KW - flat panel displays
KW - helicopters
KW - human factors
KW - liquid crystal displays
KW - military avionics
KW - transport aircraft
KW - cockpit displays
KW - avionic AMLCD production
KW - human-system interface
KW - flat panel technologies
KW - helicopters
KW - fighters
KW - flight instrument
KW - mission crew station
KW - display generation
KW - military AMLCD production
KW - backlights
KW - drivers
KW - military LCDs
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 2462
PB - SPIE-Int. Soc. Opt. Eng
SN - 0277-786X

TY - CONF
ID - 5139340
T1 - EEG and subjective measures of private pilot workload
A1 - Wilson, G. F.
A1 - Hankins, T.
Y1 - 1994
N1 - Proceedings of 38th Annual Meeting of the Human Factors and Ergonomics Society

N1 - vol.2
N1 - Nashville, TN, USA
N1 - 24-28 Oct. 1994
N2 - Complex systems can place high levels of mental demand on human operators and methods of assessing these demands are needed. Subjective and performance metrics are typically employed while psychophysiological assessment has been used to a more limited extent. In this study, civilian pilots flew a single engine propeller aircraft on a flight profile designed to produce several levels of cognitive workload using VFR and IFR conditions. Subjective and brain wave (EEG) measures were used to assess mental workload. EEG theta band activity was sensitive to a wider range of workload levels and was more sensitive than the alpha and beta bands or the subjective reports. The alpha and beta bands reliably discriminated between ground and flight segments as did the subjective data
KW - aerospace simulation
KW - electroencephalography
KW - human factors
KW - EEG
KW - subjective measures
KW - private pilot workload
KW - mental demand
KW - human operators
KW - performance metrics
KW - psychophysiological assessment
KW - flight profile
KW - cognitive workload
KW - VFR
KW - IFR conditions
KW - brain wave
KW - beta bands
KW - alpha bands
KW - subjective data
JA - Proceedings of the Human Factors and Ergonomics Society. 38th Annual Meeting
SP - 1322-5 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
AD - ALCFHP, Wright-Patterson AFB, OH, USA

TY - CONF
ID - 5139329
T1 - Using the backward transfer paradigm to validate the AH-64 simulator training research advanced testbed for aviation
A1 - Stewart, J. E. , II
Y1 - 1994
N1 - Proceedings of 38th Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Nashville, TN, USA
N1 - 24-28 Oct. 1994
N2 - The Simulator Training Research Advanced Testbed for Aviation (STRATA) is a modular research simulator which in its current configuration represents the AH-64 helicopter. The backward transfer of training paradigm was employed to determine if AH-64 piloting skills transfer to STRATA. Ten AH-64 pilots participated in the experiment. They performed a mission scenario consisting of 13 Aircrew Training Manual (ATM) tasks. No orientation or practice was allowed. Most participants rated STRATA as highly similar to the AH-64 in handling. Real-time performance ratings indicated that of 130 task events, 88.5% were performed to ATM standards. After the experiment, four independent judges rank-ordered performance on the hover task using output from STRATA's performance measurement system. Rankings showed high concordance and a high correlation with real-time ratings
KW - aerospace simulation
KW - computer based training
KW - human factors
KW - backward transfer paradigm
KW - AH-64
KW - simulator training research advanced testbed for aviation
KW - STRATA
KW - performance ratings
JA - Proceedings of the Human Factors and Ergonomics Society. 38th Annual Meeting
SP - 1238-41 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
AD - US Army Res. Inst. Aviation Res. & Dev. Activity, Fort Ruckler, AL, USA

TY - CONF
ID - 5137369
T1 - Expanding the envelope of performance: training pilots to use helmet mounted displays

A1 - Seagull, F. J.
A1 - Gopher, D.
Y1 - 1994
N1 - Proceedings of 38th Annual Meeting of the Human Factors and Ergonomics Society
N1 - vol.1
N1 - Nashville, TN, USA
N1 - 24-28 Oct. 1994
N2 - Helmet Mounted flight Displays (HMDs) of a through-the-window field-or-view (FOV) are widely used in modern aircraft for night vision. Unfortunately, pilots using such displays are susceptible to spatial disorientation due to the limited field-of-view and its consequent lack of orientation cues. This problem is especially pronounced when pilots move their heads, though this is precisely the behavior that enables them to counteract the limited FOV. The current experiment attempted to train pilots to move their heads without becoming disoriented. Twenty-five subjects participated in five treatment groups in a between-subjects design. Subjects piloted a simulated helicopter through a computer-generated winding canyon with either a single-eye HMD, or a binocular through-the-window "screen" display. Results indicate that after training, treatment groups completed significantly more flights without crashing using the HMD than did the control groups. They also had a significantly higher probability of surviving a given flight at any time. Treatment groups learned to increase their head movement, while control groups spontaneously reduced theirs. These findings indicate that spontaneous experience with an HMD does not lead to optimal performance. Development of attention control strategies focusing on the difficulties of HMDs increased considerably the ability of operators to cope with the problems
KW - aircraft displays
KW - training
KW - training pilots
KW - helmet mounted displays
KW - modern aircraft
KW - night vision
KW - spatial disorientation
JA - Proceedings of the Human Factors and Ergonomics Society. 38th Annual Meeting
SP - 11-15 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
AD - Fac. of Ind. Eng. & Manage., Technion-Israel Inst. of Technol., Haifa, Israel

TY - CONF
ID - 5132759
T1 - Visual-motion cueing in the control of altitude
A1 - Johnson, W. W.
A1 - Schroeder, J. A.
Y1 - 1995
N1 - 1995 IEEE International Conference on Systems, Man and Cybernetics. Intelligent Systems for the 21st Century
N1 - vol.3
N1 - Vancouver, BC, Canada
N1 - 22-25 Oct. 1995
N2 - The vertical motion simulator at the NASA Ames Research Center was used to examine how platform motion and visual level-of-detail (LOD) cueing affected altitude repositioning and vertical rate control in two tasks utilizing a simulated AH-64 Apache helicopter. The LOD manipulation caused optical density to change across altitudes by a small, moderate, or large amount. The platform motion manipulation resulted in platform motion being either present, and 1:1 (full), or totally absent. Both small optical density changes and platform motion improved altitude judgements in the altitude repositioning task, while platform motion improved performance in a vertical rate control task. These findings show that: 1) vertical platform motion mitigates the tendency of pilots to mistake optical flow rate (angular visual speed) as proportional to vehicle speed during altitude change, and contributes to the perception of movement amplitude; and 2) maintaining nearly constant optical density across altitudes improves altitude judgements
KW - aerospace simulation
KW - aircraft control
KW - attitude control
KW - human factors
KW - motion estimation
KW - visual perception
KW - visual-motion cueing
KW - altitude control
KW - NASA Ames Research Center
KW - platform motion
KW - visual level-of-detail cueing
KW - vertical rate control
KW - AH-64 Apache helicopter

KW - optical density
KW - optical flow rate
KW - movement amplitude perception
JA - 1995 IEEE International Conference on Systems, Man and Cybernetics. Intelligent Systems for the 21st Century (Cat. No.95CH3576-7)
SP - 2676-81 vol.3
CY - New York, NY, USA
PB - IEEE
SN - 0780325591
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 4847639
T1 - AIAA/IEEE Digital Avionics Systems Conference. 13th DASC
Y1 - 1994
N1 - AIAA/IEEE Digital Avionics Systems Conference. 13th DASC
N1 - Phoenix, AZ, USA
N1 - 30 Oct.-3 Nov. 1994
N2 - The following topics were dealt with: commercial avionics; optical technology; spacecraft avionics; systems engineering; software engineering; rotorcraft avionics; global airspace operation; cockpit technology; operation interface; artificial intelligence; expert systems; fault tolerance; signal processing; data links; aeronautical communications; airports; modular avionics; sensors; and vehicle management;
KW - aerospace computing
KW - aerospace expert systems
KW - aerospace instrumentation
KW - aircraft control
KW - aircraft instrumentation
KW - artificial intelligence
KW - digital instrumentation
KW - fault tolerant computing
KW - helicopters
KW - human factors
KW - sensors
KW - signal processing
KW - software engineering
KW - space communication links
KW - user interfaces
KW - commercial avionics
KW - optical technology
KW - spacecraft avionics
KW - systems engineering
KW - software engineering
KW - rotorcraft avionics
KW - global airspace operation
KW - cockpit technology
KW - operation interface
KW - artificial intelligence
KW - expert systems
KW - fault tolerance
KW - signal processing
KW - data links
KW - aeronautical communications
KW - airports
KW - modular avionics
KW - sensors
KW - vehicle management
CY - New York, NY, USA
PB - IEEE
SN - 0780324250

TY - CONF
ID - 4806123
T1 - Methods for correlating visual scene elements with simulator sickness incidence
A1 - Kennedy, R. S.
A1 - Berbaum, K. S.
A1 - Smith, M. G.
Y1 - 1993
N1 - Proceedings of 37th Annual Meeting on the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Seattle, WA, USA
N1 - 11-15 Oct. 1993
N2 - Simulator sickness occurs in a large number of Army, Navy, and Marine Corps simulators, and is most prevalent in moving-base, rotary-wing devices which employ cathode-ray tube (CRT) video displays as opposed to fixed-wing, dome-display trainers with no motion base. Based on data from a factor analysis of over 1000 Navy and Marine Corps pilot simulation exposures, a new scoring procedure was applied to two helicopter simulators with similar rates of simulator sickness incidence. Based on the factor analytic scoring key, the two simulators showed slightly

different sickness profiles. Preliminary work was begun to record the visual scene by video frame-by-frame decomposition and automated scoring algorithms were developed. The findings are discussed from the standpoints of (1) recommendations for future design and use of simulators and (2) the metric advantages and other merits of the "field experiment" methodology to address human factors problems with simulator sickness
KW - cathode-ray tube displays
KW - digital simulation
KW - health hazards
KW - human factors
KW - military computing
KW - military systems
KW - video recording
KW - visual scene elements
KW - simulator sickness incidence
KW - Army
KW - Navy
KW - Marine Corps
KW - moving-base, rotary-wing devices
KW - cathode-ray tube displays
KW - CRT video displays
KW - fixed-wing, dome-display trainers
KW - factor analysis
KW - pilot simulation exposures
KW - automated scoring algorithms
KW - helicopter simulators
KW - video frame-by-frame decomposition
KW - future designs
KW - metric advantages
KW - field experiment methodology
KW - human factors
JA - Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting. Designing for Diversity
SP - 1252-6 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc

TY - CONF
ID - 4806088
T1 - Active man machine interface for advanced rotorcraft
A1 - Weiland, M. Z.
A1 - Convery, B. A.
A1 - Zaklad, A. L.
A1 - Zachary, W. W.
A1 - Fry, C. A.
A1 - Voorhees, J. W.
Y1 - 1993
N1 - Proceedings of 37th Annual Meeting on the Human Factors and Ergonomics Society
N1 - vol.2
N1 - Seattle, WA, USA
N1 - 11-15 Oct. 1993
N2 - The proliferation of digital avionic information presented to pilots has produced a critical need for intelligent avionic information management, particularly in the area of caution, warning and advisory (CWA) systems. This demonstration illustrates the role of an active man-machine interface (AMMI) in the context of CWA systems in rotorcraft of the future. The basis of the AMMI's intelligence is provided by a cognitive model that (1) prunes the alert stream to only those messages that have meaning to the pilot depending on the tactical context, and (2) provides context-sensitive advice on the basis of the tactical context. The CWA AMMI is currently being designed using COGNET, a cognitive modelling methodology (Zachary, 1989), and implemented using BATON, a set of software tools used to implement and embed COGNET models into existing systems (Zachary et al., 1991)
KW - aerospace computing
KW - aircraft instrumentation
KW - alarm systems
KW - cognitive systems
KW - computerised instrumentation
KW - decision support systems
KW - helicopters
KW - software tools
KW - technological forecasting
KW - user interfaces
KW - advanced rotorcraft
KW - digital avionic information
KW - pilot information
KW - intelligent avionic information management
KW - caution, warning and advisory systems
KW - active man-machine interface
KW - BATON
KW - alert stream pruning
KW - messages
KW - tactical context

KW - context-sensitive advice
KW - COGNET
KW - cognitive modelling methodology
KW - software tools
JA - Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting. Designing for Diversity
SP - 1032 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors & Ergonomics Soc
AD - CHI Syst. Inc., Spring House, PA, USA

TY - CONF
ID - 4740373
T1 - Real-time neural network control of a miniature helicopter in vertical flight
A1 - Pallett, T. J.
A1 - Ahmad, S.
A1 - Grierson, D. E.
A1 - Rzevski, G.
A1 - Adey, R. A.
Y1 - 1992
N1 - Proceedings of AIENG 92. Applications of Artificial Intelligence in Engineering
N1 - Waterloo, Ont., Canada
N1 - 14-17 July 1992
N2 - We address the application of neural networks in the flight control of a miniature helicopter during hover. Neural networks have received a great deal of attention lately, especially in the areas of pattern recognition and control of unknown systems. We discuss how to set up and update a two-layer neural network. We also present an online control system which can be implemented using neural networks. Finally, we show how neural networks can be used to improve the controlled response of a miniature helicopter in vertical flight by learning and adapting to changes in the plant online. Experimental helicopter flight control results are also given
KW - aerospace computer control
KW - helicopters
KW - neural nets
KW - real-time neural network control
KW - miniature helicopter
KW - vertical flight
KW - hover
KW - pattern recognition
KW - two-layer neural network
KW - online control system
KW - controlled response
KW - helicopter flight control results
JA - Applications of Artificial Intelligence in Engineering VII
SP - 143-60
CY - Southampton, UK
PB - Comput. Mech. Pubications
SN - 1851667873
AD - Real-Time Robot Control Lab., Purdue Univ., West Lafayette, IN, USA

TY - CONF
ID - 4730267
T1 - Aircraft trajectory optimization with application to a Lockheed L1011-100
A1 - Tolle, C. R.
A1 - Rodriguez, A. A.
Y1 - 1992
N1 - Proceedings of 1992 31st IEEE Conference on Decision and Control
N1 - Tucson, AZ, USA
N1 - 16-18 Dec. 1992
N2 - Two forms of optimal dynamic interpolation are discussed. Two cost functions are considered. The first cost function penalizes acceleration; the second penalizes both acceleration and velocity excursion. Both have been applied to the L1011-100 vertical guidance problem, and results are presented. A flight management system's (FMS) vertical flight plan is used to obtain way points which serve as inputs to the dynamic interpolation algorithm. The algorithm produces reference commands which are issued to a certified FAA L1011-100 model and an autopilot. The resulting dynamic behavior is compared to the results obtained from reference commands produced by an L1011-like commercial aircraft's FMS model. Cubic spline solutions for the two different dynamic interpolation cost functional minimization problems are presented
KW - acceleration control
KW - aircraft control
KW - interpolation
KW - optimal control
KW - velocity control
KW - cubic spline solutions

KW - Lockheed L1011-100
KW - optimal dynamic interpolation
KW - cost functions
KW - acceleration
KW - velocity excursion
KW - vertical guidance problem
KW - flight management system
KW - reference commands
JA - Proceedings of the 31st IEEE Conference on Decision and Control (Cat. No.92CH3229-2)
SP - 530-5 vol.1
CY - New York, NY, USA
PB - IEEE
SN - 0780308727
AD - Dept. of Electr. Eng., Utah State Univ., Logan, UT, USA

TY - CONF
ID - 4727264
T1 - An apparatus for rapid prototyping and evaluation of wide field of view helmet-mounted display symbology
A1 - Marshall, B.
Y1 - 1994
N1 - Helmet- and Head-Mounted Displays and Symbology Design Requirements
N1 - Orlando, FL, USA
N1 - 5-7 April 1994
N2 - This paper documents an inexpensive apparatus intended for rapid prototyping and evaluation of alphanumeric and symbolic display formats. Emphasis is placed on symbology design for use in wide field of view (FOV) helmet-mounted displays (HMDs). The apparatus consists of a Silicon Graphics, Inc. (SGI) computer with standard monitor and mouse, Virtual Applications Prototyping System (VAPS) software, a rapidly reconfigurable flight simulator program (FLSIM), and a Fresnel lens-based optical system affording an 85 degrees *70 degrees field of view. A preliminary experiment was conducted to verify the suitability of the apparatus for objective measurement of pilot performance during flight simulation. Five test participants attempted to maintain specified altitude and airspeed parameters while maneuvering an aircraft around a simulated airfield. Necessary flight information was presented via symbols located to the left and right of display centerline. Lateral separation between these symbols was varied; values of total angular separation ranged from 30 degrees to 70 degrees , in 10 degrees increments. Test results indicate that the apparatus is suitable for the purpose intended
KW - aerospace computing
KW - aerospace simulation
KW - aerospace testing
KW - aircraft instrumentation
KW - CAD
KW - display devices
KW - performance evaluation
KW - software prototyping
KW - rapid prototyping
KW - wide field of view
KW - helmet-mounted display symbology
KW - symbolic display formats
KW - alphanumeric display formats
KW - FOV
KW - airspeed parameters
KW - rapidly reconfigurable flight simulator program
KW - Virtual Applications Prototyping System
KW - Silicon Graphics
KW - objective measurement
KW - pilot performance
KW - flight simulation
KW - altitude parameters
KW - simulated airfield
KW - helicopters
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 2218
SP - 261-73
SN - 0277-786X
AD - United States Naval Acad., Annapolis, MD, USA

TY - CONF
ID - 4701094
T1 - A human factors evaluation using tools for automated knowledge engineering
A1 - Gomes, M. E.
A1 - Lind, S.
A1 - Snyder, D. E.
Y1 - 1993

N1 - Proceedings of NAECON '93 - National Aerospace and Electronics Conference
N1 - vol.2
N1 - Dayton, OH, USA
N1 - 24-28 May 1993
N2 - The purpose of this paper is to describe a human factors evaluation of the MH-53J helicopter cockpit. This evaluation was an application and further development of the Tools for Automated Knowledge Engineering (TAKE) process. The process is used to acquire and analyze knowledge from subject matter experts (aircrew members, system designers, maintenance personnel, human factors engineers, or others). TAKE was successfully utilized for the purpose of recommending improvements for the man-machine interfaces (MMI) in the MH-53J cockpit
KW - aerospace computing
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - knowledge based systems
KW - man-machine systems
KW - human factors
KW - automated knowledge engineering
KW - MH-53J helicopter cockpit
KW - TAKE
KW - Tools for Automated Knowledge Engineering
KW - aircrew members
KW - system designers
KW - maintenance personnel
KW - human factors engineers
KW - man-machine interfaces
KW - pilots
KW - Interpreter
JA - Proceedings of the IEEE 1993 National Aerospace and Electronics Conference. NAECON 1993 (Cat. No.93CH3306-8)
SP - 661-4 vol.2
CY - New York, NY, USA
PB - IEEE
SN - 0780312953
AD - Armstrong Lab., Wright Res. & Dev. Center, Wright-Patterson AFB, OH, USA

TY - CONF
ID - 4700515

T1 - Vertical guidance in turbulence using optimal dynamic interpolation with application to a Lockheed L 1011-100
A1 - Tolle, C. R.
A1 - Rodriguez, A. A.
Y1 - 1993
N1 - Proceedings of 1993 American Control Conference - ACC '93
N1 - San Francisco, CA, USA
N1 - 2-4 June 1993
N2 - Two forms of optimal dynamic interpolation guidance (ODIG) and the effects of turbulence on its performance are discussed. The first form of ODIG is based on a cost functional that penalizes acceleration. The second form of ODIG penalizes both acceleration and velocity excursion. Both have been applied to the L 1011-100 vertical guidance problem in the presence of turbulence (the Dryden turbulence model is used). A flight management system vertical flight plan is used to obtain waypoints which serve as inputs to the ODIG algorithm. The algorithm produces reference commands which are issued to a certified FAA L 1011-100 model and an autopilot. The resulting dynamic behavior is compared to the results obtained from reference commands produced by an L 1011-like commercial aircraft flight management system model under the same turbulence
KW - aerospace computer control
KW - aircraft control
KW - atmospheric turbulence
KW - interpolation
KW - optimal control
KW - vertical guidance
KW - turbulence
KW - optimal dynamic interpolation
KW - Lockheed L 1011-100
KW - ODIG
KW - cost functional
KW - Dryden turbulence model
KW - flight management system
KW - vertical flight plan
KW - certified FAA L 1011-100 model
KW - autopilot
JA - Proceedings of the 1993 American Control Conference (IEEE Cat. No.93CH3225-0)
SP - 51-5 vol.1
CY - Evanston, IL, USA
PB - American Autom. Control Council
SN - 0780308603

AD - Dept. of Electr. Eng., Utah State Univ., Logan, UT, USA
AD - IEEE Service Center, Piscataway, NJ, USA

TY - JOUR
ID - 4650047
T1 - Optimum flight trajectory guidance based on total energy control of aircraft
A1 - Shu-Fan Wu
A1 - Suo-Feng Guo
Y1 - March-April 1994
N2 - The guidance technique for optimal vertical flight trajectory with a total energy control system (TECS) is discussed. The flight profile is optimized based on the point-mass energy state approximation model of aircraft with direct operating cost as its index function. The guidance law is developed with the total energy control concept used in TECS. To improve the guidance precision, several methods are adopted in the optimization and tracking process, and two preprocessing algorithms, the lead-compensation algorithm and the smooth filtering algorithm, are developed for the ideal optimal trajectory. Satisfactory digital simulation results for a Boeing-707 transport model are finally obtained
KW - aircraft control
KW - compensation
KW - digital simulation
KW - filtering and prediction theory
KW - tracking
KW - optimum flight trajectory guidance
KW - total energy control
KW - aircraft
KW - optimal vertical flight trajectory
KW - flight profile
KW - point-mass energy state approximation model
KW - direct operating cost
KW - index function
KW - precision
KW - optimization
KW - tracking
KW - preprocessing algorithms
KW - lead-compensation algorithm
KW - smooth filtering algorithm
KW - digital simulation
KW - Boeing-707 transport model
JF - Journal of Guidance, Control, and Dynamics
JA - J. Guid. Control Dyn. (USA)
VL - 17
IS - 2
SP - 291-6
SN - 0731-5090
AD - Dept. of Autom. Control, Nanjing Univ. of Aeronaut. & Astronautics, China

TY - CONF
ID - 4648089
T1 - The fourth dimensional cockpit
A1 - Voorhees, J. W.
A1 - Zaklad, A. L.
A1 - Weiland, M. Z.
A1 - Zachary, W. W.
A1 - Fry, C. A.
Y1 - 1993
N1 - Proceedings of 1993 IEEE.AIAA 12th Digital Avionics Systems Conference
N1 - Fort Worth, TX, USA
N1 - 25-28 Oct. 1993
N2 - The major challenge for aircraft pilots has always been the timely management of information. This includes information about the systems of the aircraft that he is flying as well as information from the environment in which he is operating. The first key design limitation that cockpit designers encountered was space. The two-dimensional cockpit quickly ran out of physical space, resulting in the placement of lights, switches, and gauges in front, above, and to both sides of the pilot. Recent development of CRTs have led cockpit designers to exploit the third dimension by having displays in depth accessible through software switches and menus. With the space problem solved, the second key design limitation that the cockpit designers encountered was time. The pilot became quickly overwhelmed with the information available on the CRTs and the complexity of how to get to it. In a rapidly changing military environment there simply is not enough time to access, absorb, process, and act upon the amount of data available. The latest solution is to use Decision Support System (DSS) technologies to expand the time available by pre-processing information before it reaches the pilot-allowing him to become a decision maker rather than an information manager. But the DSSs with multiple

information processing capability that tremendously enhance the operator's potential information and therefore his decision making also requires additional mental effort to manage, prioritize, and operate the systems. Thus there is often a time-based tradeoff between information processing capability of the DSS and mental workload of the pilot. The central focus of this paper is that the effective fourth dimension cockpit requires both modem DSS technology and an intelligent, or active man-machine interface (AMMI), which "understands" the unfolding mission situation
KW - aircraft instrumentation
KW - cathode-ray tube displays
KW - decision support systems
KW - helicopters
KW - human factors
KW - knowledge based systems
KW - military computing
KW - military equipment
KW - user interfaces
KW - fourth dimensional cockpit
KW - aircraft pilots
KW - two-dimensional cockpit
KW - CRT
KW - military environment
KW - Decision Support System
KW - information processing
KW - mental workload
KW - pilot
KW - man-machine interface
KW - intelligent interface architecture
KW - rotorcraft
KW - COGNET model
JA - AIAA/IEEE Digital Avionics Systems Conference. 12th DASC (Cat. No.93CH3327-4)
SP - 153-9
CY - New York, NY, USA
PB - IEEE
SN - 0780313437
AD - Adv. Simulation Eng., Washington, WA, USA

TY - JOUR
ID - 4644908
T1 - Visual field information in low-altitude visual flight by line-of-sight slaved helmet-mounted displays
A1 - Grunwald, A. J.
A1 - Kohn, S.
Y1 - Jan. 1994
N2 - The pilot's ability to derive control-oriented visual field information from teleoperated helmet-mounted displays in nap-of-the-earth flight is investigated in this paper. The visual field with these types of displays, commonly used in Apache and Cobra helicopter night operations, originates from a relatively narrow field-of-view forward looking infrared radiation (FLIR) camera, gimbal-mounted at the nose of the aircraft and slaved to the pilot's line of sight, providing a wide-angle field of regard. Pilots have encountered considerable difficulties in controlling the aircraft by these devices. The experimental simulator results presented here indicate that part of these difficulties can be attributed both to the narrow camera field of view and to head/camera slaving system phase lags and errors. In the presence of voluntary head rotation, these shortcomings are shown to impair the control-oriented visual field information vital in vehicular control, such as the perception of the anticipated flight path or the vehicle yaw rate. Since the pilot will tend to minimize head rotation in the presence of slaving system imperfections, the full wide-angle field of regard of the line-of-sight slaved helmet-mounted display is not always fully utilized. The findings in this paper are valid for a general class of head-slaved displays which are used in teleoperation and virtual environments and in which correct self-motion estimation is an essential part of the operator task
KW - aircraft control
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - telecontrol
KW - visual field information
KW - low-altitude visual flight
KW - line-of-sight slaved helmet-mounted displays
KW - teleoperated helmet-mounted displays
KW - nap-of-the-earth flight
KW - Apache helicopter
KW - Cobra helicopter
KW - night operations
KW - forward looking infrared radiation camera
KW - FLIR camera
KW - head/camera slaving system

KW - phase lags
KW - voluntary head rotation
KW - vehicular control
KW - anticipated flight path
KW - vehicle yaw rate
KW - teleoperation
KW - virtual environments
KW - self-motion estimation
JF - IEEE Transactions on Systems, Man and Cybernetics
JA - IEEE Trans. Syst. Man Cybern. (USA)
VL - 24
IS - 1
SP - 120-34
SN - 0018-9472
AD - Fac. of Aerosp. Eng., Technion-Israel Inst. of Technol., Haifa, Israel

TY - CONF
ID - 4642046
T1 - Proceedings of 1993 IEEE.AIAA 12th Digital Avionics Systems Conference
Y1 - 1993
N1 - Proceedings of 1993 IEEE.AIAA 12th Digital Avionics Systems Conference
N1 - Fort Worth, TX, USA
N1 - 25-28 Oct. 1993
N2 - The following topics are dealt with: industry direction and experiences in systems engineering; synthetic vision; sensors and signal processing; pilot-automation interface; aeronautical communications; commercial avionics; modular avionics; artificial intelligence and expert systems; HIRF (high-energy radio-frequency) testing; fault-tolerant avionics; rotorcraft avionics; cockpit technology; optical technology; system integration and testing; cockpit space systems; airport surface operations; software engineering; fly-by-light/power-by-wire; and vehicle management systems
KW - aerospace computer control
KW - aerospace computing
KW - aerospace industry
KW - aerospace testing
KW - aircraft communication
KW - aircraft instrumentation
KW - airports
KW - artificial intelligence
KW - computer vision
KW - computerised instrumentation
KW - expert systems
KW - fault tolerant computing
KW - helicopters
KW - human factors
KW - man-machine systems
KW - signal processing
KW - software engineering
KW - systems engineering
KW - high energy RF testing
KW - industry direction
KW - systems engineering
KW - synthetic vision
KW - sensors
KW - signal processing
KW - pilot-automation interface
KW - aeronautical communications
KW - commercial avionics
KW - modular avionics
KW - artificial intelligence
KW - expert systems
KW - fault-tolerant avionics
KW - rotorcraft avionics
KW - cockpit technology
KW - optical technology
KW - system integration
KW - airport surface operations
KW - software engineering
KW - fly-by-light
KW - power-by-wire
KW - vehicle management
CY - New York, NY, USA
PB - IEEE
SN - 0780313437

TY - JOUR
ID - 4637523
T1 - Dynamical sliding mode control approach for vertical flight regulation in helicopters
A1 - Sira-Ramirez, H.
A1 - Zribi, M.

A1 - Ahmad, S.
Y1 - Jan. 1994
N2 - A dynamical multivariable discontinuous feedback control strategy of the sliding mode type is proposed for the altitude stabilisation of a nonlinear helicopter model in vertical flight. While retaining the basic robustness features associated with sliding mode control policies, the proposed approach also results in smoothed out (i.e. nonchattering) input trajectories and controlled state variable responses
KW - aerospace control
KW - feedback
KW - helicopters
KW - multivariable control systems
KW - nonlinear control systems
KW - stability
KW - variable structure systems
KW - dynamical sliding mode control
KW - vertical flight regulation
KW - helicopters
KW - multivariable discontinuous feedback control
KW - altitude stabilisation
KW - robustness features
KW - smoothed out input trajectories
JF - IEE Proceedings-Control Theory and Applications
JA - IEE Proc., Control Theory Appl. (UK)
VL - 141
IS - 1
SP - 19-24
SN - 1350-2379
AD - Dept. Sistemas de Control, Univ. de Los Andes, Merida, Venezuela

TY - CONF
ID - 4635397
T1 - Evaluation of a pilot interface with an automated Nap-of-the-Earth rotorcraft system
A1 - Coppenbarger, R. A.
A1 - Hardy, G. H.
A1 - Dearing, M. G.
A1 - Lam, T.
Y1 - 1992
N1 - Proceedings of 1992 IEEE/AIAA 11th Digital Avionics Systems Conference
N1 - Seattle, WA, USA
N1 - 5-8 Oct. 1992
N2 - An effective pilot interface with the Ames Automated NOE (nap-of-the earth) Guidance and Control System (ANGCS) was evaluated in a versatile, workstation-based piloted simulation. The interface allows the pilot to fly the vehicle with a two-degree-of-freedom control stick while maintaining adequate control of the desired flight path, and with added OA (obstacle avoidance) protection. This evaluation of the PDG (pilot-directed guidance) concept resulted in the development and refinement of display symbology that greatly enhanced overall pilot acceptance. Two experiments designed to tune the ANGCS/PDG system for optimal pilot acceptability were successfully completed. The first resulted in an optimal range for the prediction time, as a function of velocity, that governs the look-ahead time response of the automatic OA subsystem. The second resulted in pilot selection of a desirable azimuthal search domain that forces vertical maneuvering under conditions otherwise requiring excessive lateral deviation from the nominal course. Initial pilot reaction suggests that the PDG interface concept is more acceptable to pilots than past implementations involving pilot override of fully automatic NOE hands-off systems. This evaluation demonstrated the potential for the PDG interface to reduce pilot OA workload while allowing for continuous pilot autonomy over the general guidance of the vehicle
KW - aerospace computer control
KW - aircraft control
KW - digital simulation
KW - helicopters
KW - human factors
KW - man-machine systems
KW - pilot interface
KW - automated Nap-of-the-Earth rotorcraft
KW - Ames Automated NOE
KW - guidance and control System
KW - workstation
KW - simulation
KW - two-degree-of-freedom control stick
KW - obstacle avoidance
KW - optimal pilot acceptability
KW - look-ahead time response
KW - azimuthal search domain
KW - vertical maneuvering
KW - lateral deviation
JA - Proceedings IEEE/AIAA 11th Digital Avionics Systems Conference

(Cat. No.92CH3212-8)
SP - 74-84
CY - New York, NY, USA
PB - IEEE
SN - 0780308204
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 4635396
T1 - Proceedings of 1992 IEEE/AIAA 11th Digital Avionics Systems Conference
Y1 - 1992
N1 - Proceedings of 1992 IEEE/AIAA 11th Digital Avionics Systems Conference
N1 - Seattle, WA, USA
N1 - 5-8 Oct. 1992
N2 - The following topics are dealt with: vehicle management systems; communication, navigation, and identification; synthetic vision; avionics systems; system engineering methods and tools; rotorcraft avionics; airport safety systems; fault-tolerant avionics; artificial intelligence and expert systems; modular avionics technology; Ada applications and methods; commercial avionics; sensors and signal processing; crew station technology; software engineering; optical technologies and systems; crew station human factors; and space systems
KW - Ada
KW - aerospace computing
KW - aircraft communication
KW - aircraft control
KW - aircraft instrumentation
KW - airports
KW - artificial intelligence
KW - computer vision
KW - computerised instrumentation
KW - computerised navigation
KW - detectors
KW - digital instrumentation
KW - digital simulation
KW - display instrumentation
KW - expert systems
KW - fault tolerant computing
KW - ground support systems
KW - helicopters
KW - human factors
KW - identification
KW - optical fibres
KW - safety
KW - signal processing
KW - software engineering
KW - systems engineering
KW - vehicle management
KW - communication
KW - navigation
KW - identification
KW - synthetic vision
KW - system engineering
KW - rotorcraft avionics
KW - airport safety
KW - fault-tolerant avionics
KW - artificial intelligence
KW - expert systems
KW - modular avionics
KW - Ada
KW - commercial avionics
KW - sensors
KW - signal processing
KW - crew station technology
KW - software engineering
KW - optical technologies
KW - human factors
KW - space systems
CY - New York, NY, USA
PB - IEEE
SN - 0780308204

TY - CONF
ID - 4595731
T1 - Stereo effectiveness evaluation for precision hover tasks in a helmet-mounted display simulator
A1 - Andre, A. D.
A1 - Johnson, W. W.
Y1 - 1992
N1 - Chicago, IL, USA
N1 - 18-21 Oct. 1992
N2 - A quantification of the effects of visual scene information on precision hovering tasks under biocular and binocular (stereo)

viewing conditions in a rotorcraft helmet-mounted display simulator is considered. Four NASA test pilots performed a series of precision hover maneuvers (hover, bob-up, side step, etc.) in the context of three different scene contents (near several buildings in a village, near a single tree, and in an open field), two ground textures (amorphous ground texture without sharp edges vs. a patterned ground texture with sharp edges), and three levels of control configuration difficulty. The results revealed that vertical position variability was greatest when vertical cues (e.g., building, trees) were absent, and that patterned ground texture aided hover stability only when other position-reference cues were absent from the scene. The stereo viewing condition showed no uniform advantages over the biocular condition. The results are discussed in terms of their implications for simulator design and qualification
KW - aerospace simulation
KW - computer based training
KW - digital simulation
KW - display devices
KW - helicopters
KW - human factors
KW - stereo effectiveness evaluation
KW - helicopter
KW - binocular viewing
KW - biocular viewing
KW - precision hover tasks
KW - helmet-mounted display simulator
KW - rotorcraft helmet-mounted display simulator
KW - vertical position variability
KW - patterned ground texture
KW - position-reference cues
KW - stereo viewing
JA - 1992 IEEE International Conference on Systems, Man and Cybernetics (Cat. No.92CH3176-5)
SP - 1136-40 vol.2
CY - New York, NY, USA
PB - IEEE
SN - 0780307208
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 4566222
T1 - Flying with dichoptic displays: the interplay between display characteristics and attention control
A1 - Gopher, D.
A1 - Kimchi, R.
A1 - Seagull, F. J.
A1 - Catz, I.
A1 - Trainin, O.
Y1 - 1992
N1 - Atlanta, GA, USA
N1 - 12-16 Oct. 1992
N2 - Interest in the study of attention control under dichoptic conditions is instigated by the contemporary development of night-vision systems based on single-eye helmet-mounted displays. Two experiments were conducted to investigate the concurrent performance of a tracking task and letter classification under dichoptic display conditions. Subjects were required to fly a simulated helicopter path while classifying letter pairs presented intermittently. Experimental instructions in Experiment A specifically emphasized a two-dimensional interpretation of the visual field. Under these instructions, the presentation of a common visual axis to the two eyes provided by the flight-tunnel did not aid subjects, and their performance deteriorated in dichoptic conditions. In Experiment B, the instructions to subjects were changed to advocate a three-dimensional interpretation of the display. Under these instructions, dichoptic performance-levels were substantially improved when the tunnel was present. These results imply that the presence of a common visual axis is not automatically beneficial. In order to improve performance, attention could be intentionally directed to utilize information supporting a three-dimensional frame of mind. These findings have important implications for understanding the dynamics of performance with single-eye helmet-mounted displays, and the training of pilots in their use
KW - aerospace instrumentation
KW - display devices
KW - human factors
KW - CRT screen
KW - FLIR sensor
KW - dichoptic displays
KW - display characteristics
KW - attention control
KW - night-vision systems
KW - single-eye helmet-mounted displays
KW - simulated helicopter path
KW - visual field

KW - flight-tunnel
KW - training
KW - pilots
JA - Proceedings of the Human Factors Society 36th Annual Meeting. Innovations for Interactions
SP - 1469-73 vol. 2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Technion-Israel Inst. of Technol., Haifa, Israel

TY - CONF
ID - 4559595
T1 - Application of the subjective workload assessment technique to aviation test and evaluation
A1 - Hale, S.
A1 - Piccione, D.
Y1 - 1992
N1 - Atlanta, GA, USA
N1 - 12-16 Oct. 1992
N2 - A study was performed to assess pilot workload associated with the employment of an air-to-air weapon system integrated onto an attack helicopter. Mental workload was assessed using the subjective workload assessment technique (SWAT). Pilots performed simulated engagements against an airborne target under varying conditions of engagement type, time of day, target background, and target range. The results indicated significant differences in SWAT ratings as a function of time of day and engagement type. To a lesser degree, SWAT ratings were also sensitive to changes in target background and range. These results are consistent with laboratory and simulation studies which have shown SWAT to be sensitive to changes in task demand and further demonstrate the utility of SWAT for assessing operator workload in the less structured test and evaluation environment
KW - aerospace simulation
KW - aerospace testing
KW - helicopters
KW - human factors
KW - military computing
KW - weapons
KW - pilot workload
KW - air-to-air weapon system
KW - attack helicopter
KW - subjective workload assessment technique
KW - SWAT
KW - simulated engagements
KW - airborne target
KW - simulation studies
KW - task demand
KW - operator workload
JA - Proceedings of the Human Factors Society 36th Annual Meeting. Innovations for Interactions
SP - 1185-9 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Essex Corp., Fort Rucker, AL, USA

TY - CONF
ID - 4559583
T1 - Aircrew coordination training for all crew members: enhancing the capability of full mission flight simulators
A1 - Oser, R. L.
A1 - Franz, T. M.
A1 - Zovko, J.
Y1 - 1992
N1 - Atlanta, GA, USA
N1 - 12-16 Oct. 1992
N2 - According to aviators and researchers, the optimal environment for aircrew coordination training (ACT) is in flight simulators. However, most flight simulators are designed solely for cockpit personnel, and additional personnel in multi-crewed aircraft (e.g. crew chiefs, flight attendants) are typically excluded from this vial phase of training. This demonstration presents a PC-based Crew Chief Station specifically designed to enable the inclusion of military helicopter crew chiefs into simulator-based ACT scenarios
KW - aerospace computing
KW - aerospace simulation
KW - computer based training
KW - microcomputer applications
KW - crew members
KW - full mission flight simulators
KW - aircrew coordination training
KW - cockpit personnel
KW - multi-crewed aircraft
KW - crew chiefs
KW - flight attendants

KW - PC-based Crew Chief Station
KW - military helicopter crew chiefs
JA - Proceedings of the Human Factors Society 36th Annual Meeting. Innovations for Interactions
SP - 1047 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Naval Training Syst. Center, Orlando, FL, USA

TY - CONF
ID - 4529542
T1 - Helmet Mounted Displays and Night Vision Goggles (AGARD-CP-517)
Y1 - 1991
N1 - Pensacol, FL, USA
N1 - 2 May 1991
N2 - The following topics were dealt with: flight performance; crew protection; and visual performance
KW - aerospace biophysics
KW - aircraft instrumentation
KW - display devices
KW - display instrumentation
KW - ergonomics
KW - human factors
KW - military equipment
KW - protection
KW - vision
KW - sensor fusion
KW - night attack
KW - helmet mounted displays
KW - helicopter requirements
KW - virtual displays
KW - night pilotage
KW - human factors
CY - Neuilly Sur Seine, France
PB - AGARD

TY - CONF
ID - 4460468
T1 - IR systems for helicopter pilotage
A1 - Bauman, B.
A1 - Wolfe, W. L.
Y1 - 1992
N1 - Infrared Technology XVIII
N1 - San Diego, CA, USA
N1 - 19-22 July 1992
N2 - As part of a team headed by the McDonnell Douglas Helicopter Company and including the Honeywell Systems and Research Division, the authors have investigated several advanced real-time viewing systems. The study was predicated upon human factors drivers that lead to specifications for several different types of systems. These include systems with 0.6 mr resolution and 170 degrees *50 degrees , 100 degrees *50 degrees , and 50 degrees *50 degrees fields of view
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - infrared detectors
KW - pilots
KW - pixel size
KW - lenses
KW - MTF
KW - frame time
KW - IR systems
KW - helicopter pilotage
KW - real-time viewing
KW - human factors
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1762
SP - 50-5
SN - 0277-786X
AD - Opt. Sci. Center, Arizona Univ., Tucson, AZ, USA

TY - CONF
ID - 4407650
T1 - Dynamical variable structure control of a helicopter in vertical flight
A1 - Sira-Ramirez, H.
A1 - Zribi, M.
A1 - Ahmad, S.
Y1 - 1992
N1 - Chicago, IL, USA
N1 - 24-26 June 1992
N2 - A dynamical multivariable discontinuous feedback control strategy

of the sliding mode type is proposed for the altitude stabilization of a nonlinear helicopter model in vertical flight. The authors present the nonlinear model and the corresponding dynamical sliding mode controller design for altitude and the rotor pitch angle regulation. Computer-generated simulation results are presented and discussed. While retaining the basic robustness features associated to sliding mode control policies, the proposed approach also results in smoothed out, i.e. nonchattering, input trajectories and controlled state variable responses
KW - aircraft control
KW - attitude control
KW - feedback
KW - helicopters
KW - multivariable control systems
KW - stability
KW - variable structure systems
KW - aircraft control
KW - attitude control
KW - stability
KW - variable structure systems
KW - dynamical multivariable discontinuous feedback
KW - helicopter
KW - vertical flight
KW - sliding mode
KW - altitude stabilization
KW - nonlinear model
KW - rotor pitch angle regulation
KW - nonchattering
JA - Proceedings of the 1992 American Control Conference (IEEE Cat. No.92CH3072-6)
SP - 1546-50 vol.2
CY - Evanston, IL, USA
PB - American Autom. Control Council
SN - 0780302109
AD - Dept. Sistemas de Control, los Andes Univ., Merida, Venezuela
AD - IEEE Service Center, Piscataway, NJ, USA

TY - CONF
ID - 4407647
T1 - Vertical guidance for a Lockheed L1011-100 using optimal dynamic interpolation
A1 - Tolle, C. R.
A1 - Rodriguez, A. A.
Y1 - 1992
N1 - Chicago, IL, USA
N1 - 24-26 June 1992
N2 - Dynamic interpolation is applied to an L1011-100 vertical guidance problem. A flight management system's (FMS's) optimized vertical flight plan is used to obtain way points which serve as inputs to the dynamic interpolation algorithm. The algorithm produces reference commands which are issued to a FAA certified six degree of freedom L1011-100 model, valid up to 20,000 feet, and a L1011 simulated autopilot. The resulting dynamic behavior is compared to the results obtained from reference commands produced by an L1011-like commercial aircraft FMS. Quadratic and cubic spline solutions to the dynamic interpolation problem are presented. Performance degradation with respect to weight uncertainty is examined for both the FMS and the dynamic interpolation commands
KW - aerospace computer control
KW - aircraft control
KW - attitude control
KW - dynamics
KW - interpolation
KW - flight management system
KW - aircraft control
KW - vertical guidance
KW - Lockheed L1011-100
KW - optimal dynamic interpolation
KW - optimized vertical flight plan
KW - reference commands
KW - cubic spline
JA - Proceedings of the 1992 American Control Conference (IEEE Cat. No.92CH3072-6)
SP - 1534-8 vol.2
CY - Evanston, IL, USA
PB - American Autom. Control Council
SN - 0780302109
AD - Dept. of Electr. Eng., Arizona State Univ., Tempe, AZ, USA
AD - IEEE Service Center, Piscataway, NJ, USA

TY - CONF
ID - 4337868
T1 - Visual illusions and other effects with night vision devices
A1 - Crowley, J. S.

A1 - Rash, C. E.
A1 - Stephens, R. L.
Y1 - 1992
N1 - Helmet-Mounted Displays III
N1 - Orlando, FL, USA
N1 - 21-22 April 1992
N2 - To investigate the breadth of visual illusions experienced by aviators flying with night vision devices (NVDs), an open-ended questionnaire was distributed to the military helicopter community. Of the 242 returned questionnaires, there were 221 image intensification (I/sup 2/) reports and 21 thermal imaging system reports. Most sensory events occurred at night, during low illumination, good weather, and over varied terrain. Contributing factors included inexperience, division of attention, and fatigue. Frequently reported illusions were misjudgments of drift, clearance, height above the terrain, and attitude. Also reported were illusions due to external lights and disturbed depth perception caused by differences in brightness between I/sup 2/ tubes. Other respondents cited hardware problems and physiological effects. There were no obvious differences between the experiences of I/sup 2/ users and FLIR (forward-looking infrared) users. Although incidence rates cannot be inferred from these data, the variety of aviator reports will be useful to all those concerned with the human factors and safety of NVDs
KW - aerospace testing
KW - aircraft instrumentation
KW - display instrumentation
KW - image intensifiers
KW - image sensors
KW - infrared imaging
KW - military equipment
KW - military aviation
KW - night vision devices
KW - visual illusions
KW - military helicopter
KW - image intensification
KW - thermal imaging
KW - fatigue
KW - drift
KW - clearance
KW - height
KW - attitude
KW - external lights
KW - depth perception
KW - brightness
KW - physiological effects
KW - FLIR
KW - human factors
KW - safety
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1695
SP - 166-80
SN - 0277-786X
AD - US Army Aeromed. Res. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 4254440
T1 - MIDAS TLM: man-machine integrated design and analysis system task loading model
A1 - Staveland, L.
Y1 - 1991
N1 - Charlottesville, VA, USA
N1 - 13-16 Oct. 1991
N2 - The MIDAS task loading model (TLM) was developed to predict the visual, auditory, cognitive, and motor loads that would be imposed on a pilot while flying various cockpit designs. This model classifies the task demands imposed on a pilot with a set of psychological attributes that represent the demands with the most impact. These attributes are uniquely classified by the MIDAS TLM for each task, and the classifications are used to predict the imposed task loads. An experiment was conducted with helicopter pilots to verify the predicted loads of a set of flight tasks. The results indicated some significant correlations between the predicted loads for the single tasks and pilot responses, but none between the predicted loads for the dual tasks and pilot responses
KW - aerospace biophysics
KW - aerospace computing
KW - aerospace simulation
KW - digital simulation
KW - human factors
KW - integrated analysis system
KW - visual load
KW - auditory load
KW - cognitive load

KW - man-machine integrated design
KW - task loading model
KW - motor loads
KW - MIDAS TLM
KW - helicopter pilots
JA - Conference Proceedings 1991 IEEE International Conference on Systems, Man, and Cybernetics. 'Decision Aiding for Complex Systems (Cat. No.91CH3067-6)
SP - 1219-23 vol.2
CY - New York, NY, USA
PB - IEEE
SN - 0780302338
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 4239859
T1 - Human factors issues in the use of night vision devices
A1 - Kaiser, M. K.
A1 - Foyle, D. C.
Y1 - 1991
N1 - San Francisco, CA, USA
N1 - 2-6 Sept. 1991
N2 - Electro-optical imaging systems have been integrated into rotorcraft operations, allowing pilots to fly at very low altitudes and avoid obstacles in reduced visibility. The hardware characteristics of these systems result in visual displays which differ significantly from unaided, daylight vision. The impact of these differences on perceptual performance (and, ultimately, on pilotage) is poorly understood. The authors identify critical human factors concerns suggested by field data and review empirical studies of performance on flight-relevant perceptual tasks, notably depth and distance perception. Hardware modifications to improve man-system performance are suggested
KW - aerospace computing
KW - ergonomics
KW - human factors
KW - user interfaces
KW - visual perception
KW - night vision devices
KW - rotorcraft operations
KW - visual displays
KW - perceptual performance
KW - critical human factors concerns
KW - empirical studies
KW - flight-relevant perceptual tasks
KW - depth
KW - distance perception
KW - man-system performance
JA - Proceedings of the Human Factors Society 35th Annual Meeting
SP - 1502-6 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 4234759
T1 - The effect of roll-stabilized sensor information on pilot performance
A1 - Montazer, M. A.
A1 - Ferranti, M. J.
Y1 - 1991
N1 - San Francisco, CA, USA
N1 - 2-6 Sept. 1991
N2 - A study of the night vision sensor systems on helicopters was conducted at the flight simulation facilities at Sikorsky Aircraft. The study was concerned with determining possible pilot performance improvements with the sensor system being roll-stabilized with respect to the airframe as opposed to it being non-roll-stabilized. A six-pilot*two-sensor factorial experiment was designed and data were collected with respect to nine response variables. The results of the statistical analysis performed on the data were mixed in terms of the superiority of one sensor design over the other. The power collective input was significantly greater for the roll-stabilized design. However, the pilots also flew faster and made fewer errors, though the differences were not significant. One reason for such results might be that the pilots were less familiar with the roll-stabilized design, as it is a more recent technology
KW - aerospace simulation
KW - aircraft instrumentation
KW - attitude control
KW - helicopters
KW - human factors
KW - image sensors
KW - infrared detectors
KW - stability

KW - statistical analysis
KW - flight speed
KW - roll-stabilized sensor information
KW - pilot performance
KW - night vision sensor systems
KW - helicopters
KW - flight simulation
KW - factorial experiment
KW - response variables
KW - statistical analysis
KW - sensor design
KW - power collective input
KW - errors
JA - Proceedings of the Human Factors Society 35th Annual Meeting
SP - 17-21 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - New Haven Univ., West Haven, CT, USA

TY - CONF
ID - 4230747
T1 - Empirical comparisons of knowledge acquisition techniques
A1 - McCloskey, B. P.
A1 - Geiwitz, J.
A1 - Kornell, J.
Y1 - 1991
N1 - San Francisco, CA, USA
N1 - 2-6 Sept. 1991
N2 - The degree to which a knowledge-acquisition technique (KAT) extracts useful information from a human expert varies, in large part, as a function of the type of expert system being developed. The present study employed two KATs, ARK (a structured-interview technique) and Repertory Grid (a similarity-judgment technique), to elicit knowledge from US Army helicopter pilots with expertise in mission planning. The resultant knowledge bases were compared in terms of their applicability to two tasks: attack route evaluation and attack route planning. The study revealed important qualitative and quantitative differences in the knowledge bases elicited by the two KATs. The Repertory Grid method elicited dimensions with which the efficiency of attack routes could be classified and, in general, appears to be well-suited for use in development of 'convergent' expert systems intended to perform tasks involving categorization or evaluation. In contrast, ARK elicited procedural information with which route planning could be performed, and appears better suited for obtaining information to be used in the development of 'divergent' expert systems designed to conduct tasks involving planning or scheduling. The results have implications for the selection of KATS and the design of knowledge elicitation sessions, and suggest that further analyses of the knowledge acquisition process be conducted
KW - classification
KW - expert systems
KW - helicopters
KW - human factors
KW - knowledge acquisition
KW - military computing
KW - planning (artificial intelligence)
KW - convergent expert systems
KW - divergent expert systems
KW - knowledge acquisition techniques
KW - ARK
KW - structured-interview technique
KW - Repertory Grid
KW - similarity-judgment technique
KW - US Army helicopter pilots
KW - mission planning
KW - knowledge bases
KW - attack route evaluation
KW - attack route planning
KW - efficiency
KW - categorization
KW - procedural information
KW - planning
KW - scheduling
KW - knowledge elicitation
JA - Proceedings of the Human Factors Society 35th Annual Meeting
SP - 268-72 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Anacapa Sci., Inc., Santa Barbara, CA, USA

TY - JOUR
ID - 4222885
T1 - Flight investigation of variations in rotorcraft control and display dynamics for hover

A1 - Eshow, M. M.
Y1 - March-April 1992
N2 - Describes a flight investigation of the handling qualities issues associated with variations in display dynamics for varying levels of vehicle augmentation. The experiment was conducted on the NASA/Army CH-47B variable-stability research helicopter using its model-following control system and a color, panel-mounted display. A display law design method developed and flight tested previously was refined and expanded to account for guidance effects. Specifically, for rate, attitude, and velocity command vehicle response types, both integrator-like and gain-like display controlled element dynamics were evaluated in two hovering tasks conducted in simulated zero-visibility condition. Quantitative and subjective data describing the pilots' ability to perform the tasks were collected and analyzed, and pilot-vehicle-display dynamics were identified
KW - aircraft control
KW - aircraft instrumentation
KW - display instrumentation
KW - helicopters
KW - human factors
KW - man-machine systems
KW - human factors
KW - man-machine systems
KW - flight control
KW - aircraft instrumentation
KW - colour panel mounted display
KW - rotorcraft control
KW - display dynamics
KW - flight investigation
KW - CH-47B
KW - variable-stability research helicopter
KW - model-following control system
KW - hovering tasks
JF - Journal of Guidance, Control, and Dynamics
JA - J. Guid. Control Dyn. (USA)
VL - 15
IS - 2
SP - 482-90
SN - 0731-5090
AD - NASA, Ames Res. Center, Moffett Field, CA, USA

TY - CONF

ID - 4071960
T1 - Video distribution networks for future aircraft
A1 - Kennett, M. J.
A1 - Perkins, A. E.
Y1 - 1991
N1 - London, UK
N1 - 28-29 Nov. 1990
N2 - This paper outlines the factors behind the increasing requirements for flight instrumentation and mission display data, considering future generation fixed and rotary wing aircraft. The need for high levels of reliability, redundancy and reconfigurability is addressed with respect to advances in modular avionic architectures. Various video distribution schemes are described with consideration of modulation techniques, coding formats, transmission media-in particular fibre optics, network architectures and topologies. Preliminary results of experimental work based on high density wavelength division multiplexing offer the potential for a large number of separate high performance video channels to coexist on a common fibre optic network
KW - aircraft instrumentation
KW - codes
KW - frequency division multiplexing
KW - military equipment
KW - optical links
KW - technological forecasting
KW - video equipment
KW - avionics
KW - future
KW - flight instrumentation
KW - aircraft
KW - video distribution schemes
KW - modulation techniques
KW - coding formats
KW - transmission media
KW - fibre optics
KW - network architectures
KW - topologies
KW - wavelength division multiplexing
JA - Real-Time Data Communications for Military Applications Conference Proceedings (ERA 90-0301)
SP - 7.1/1-11
CY - Leatherhead, UK
PB - ERA Technol
SN - 0700804099

AD - Westland Helicopters Ltd, Yeovil, UK

TY - CONF
ID - 4045846
T1 - Prediction of helicopter simulator sickness
A1 - Horn, R. D.
A1 - Birdwell, J. D.
A1 - Allgood, G. O.
Y1 - 1990
N1 - Honolulu, HI, USA
N1 - 5-7 Dec. 1990
N2 - Machine learning methods from artificial intelligence are used to identify information in sampled accelerometer signals and associative behavioral patterns which correlate pilot simulator sickness with helicopter simulator dynamics. In this work, accelerometers were installed in the simulator cab, enabling a complete record of the flight dynamics and the pilot's control response as a function of time. When given the results of performance measures administered to detect simulator sickness symptoms, the problem was to find functions of the recorded data which could be used to help predict the simulator sickness level and susceptibility. Methods based upon inductive inference were used, which yield decision trees whose leaves indicate the degree of simulator-induced sickness. The long-term goal is to develop a 'gauge' which can provide an online prediction of simulator sickness level when given a pilot's associative behavioral patterns (learned expectations). This will allow informed decisions to be made on when to terminate a hop and provide an effective basis for determining the training and flight restrictions to be placed upon the pilot after simulator use
KW - aerospace computing
KW - aerospace simulation
KW - helicopters
KW - human factors
KW - inference mechanisms
KW - learning systems
KW - machine learning
KW - human factors
KW - aerospace computing
KW - helicopter simulator sickness
KW - artificial intelligence
KW - associative behavioral patterns
KW - pilot simulator sickness
KW - inductive inference
KW - decision trees
JA - Proceedings of the 29th IEEE Conference on Decision and Control (Cat. No.90CH2917-3)
SP - 2380-5 vol.4
CY - New York, NY, USA
PB - IEEE
AD - Dept. of Electr. & Comput. Eng., Tennessee Univ., Knoxville, TN, USA

TY - CONF
ID - 4011485
T1 - Aircraft control in a downburst on takeoff and landing
A1 - Zhao, Y.
A1 - Bryson, A. E.
Y1 - 1990
N1 - Honolulu, HI, USA
N1 - 5-7 Dec. 1990
N2 - Dynamic optimization and feedback control system design techniques are used to determine proper guidance laws for aircraft in the presence of downbursts, and insensitivity to downburst structures is emphasized. Avoidance is the best policy. If an inadvertent encounter occurs when the aircraft is already close to or even in the downburst, the pilot should concentrate on vertical flight, unless he is sure which direction to turn for winds of less intensity. If such an encounter happens on takeoff, maximum thrust should be aggressively and a lower climb rate or even descending flight is recommended. Similar strategy is applicable for abort landing. If an encounter happens on landing and encounter height is low, landing should proceed. It is recommended that the nominal horizontal and vertical velocities w.r.t. the ground should be maintained, subject to a minimum airspeed constraint. A landing control logic is designed to accomplish this
KW - aircraft control
KW - attitude control
KW - control system synthesis
KW - feedback
KW - optimisation
KW - dynamic optimisation
KW - aircraft control
KW - downburst
KW - takeoff

KW - landing
KW - feedback
KW - thrust
KW - climb rate
JA - Proceedings of the 29th IEEE Conference on Decision and Control (Cat. No.90CH2917-3)
SP - 753-7 vol.2
CY - New York, NY, USA
PB - IEEE
AD - Minnesota Univ., Minneapolis, MN, USA

TY - CONF
ID - 4010785
T1 - Design for trainability: assessment of operational complexity in man-machine systems
A1 - Yufik, Y. M.
A1 - Hartzell, E. J.
A1 - Salvendy, G.
A1 - Smith, M. J.
Y1 - 1989
N1 - Boston, MA, USA
N1 - 18-22 Sept. 1989
N2 - The paper reports progress in the development of a computer-aided engineering system for the design of helicopter crewstations. The system will apply computational human factors methods to predict pilot training requirements early in the conceptual phase of design. The authors focus on operational complexity as one of the training predictors, and introduce methods for deriving complexity measures from design characteristics and pilot mental models. They argue that dependency graphs can be used to represent evolution of pilot models in the course of training, and propose complexity measures reflecting uncertainty resolved in graphs manipulation. They indicate motivations of this work, then describe pilot models, followed by key concepts of complexity assessment
KW - CAD
KW - human factors
KW - man-machine systems
KW - training
KW - design for trainability
KW - cognitive engineering
KW - operational complexity
KW - man-machine systems
KW - computer-aided engineering system
KW - helicopter crewstations
KW - computational human factors methods
KW - pilot training requirements
KW - conceptual phase
KW - training predictors
KW - complexity measures
KW - design characteristics
KW - pilot mental models
KW - dependency graphs
KW - graphs manipulation
KW - complexity assessment
JA - Designing and Using Human-Computer Interfaces and Knowledge Based Systems. Proceedings of the Third International Conference on Human Computer Interaction. Vol.II
SP - 160-7
CY - Amsterdam, Netherlands
PB - Elsevier
SN - 044488078X
AD - Yan Yufik & Associates, Philadelphia, PA, USA

TY - CONF
ID - 4000008
T1 - Recent research results in stereo 3-D pictorial displays at Langley Research Center
A1 - Parrish, R. V.
A1 - Busquets, A. M.
A1 - Williams, S. P.
Y1 - 1990
N1 - Virginia Beach, VA, USA
N1 - 15-18 Oct. 1990
N2 - Results from a NASA Langley Research Center program which addressed stereo 3-D pictorial displays from a comprehensive standpoint are reviewed. The program dealt with human factors issues and display technology aspects, as well as flight display applications. The human factors findings include addressing a fundamental issue challenging the application of stereoscopic displays in head-down flight applications, with the determination that stereoacuity is unaffected by the short-term use of stereo 3-D displays. While stereoacuity has been a traditional measurement of depth perception abilities, it is a measure of relative depth, rather than actual depth (absolute depth). Therefore, depth perception effects based on size and distance

judgments and long-term stereo exposure remain issues to be investigated. The applications of stereo 3-D to pictorial flight displays within the program have repeatedly demonstrated increases in pilot situational awareness and task performance improvements. These improvements have been obtained within the constraints of the limited viewing volume available with conventional stereo displays. A number of stereo 3-D pictorial display applications are described, including recovery from flight-path offset, helicopter hover, and emulated helmet-mounted display
KW - aircraft instrumentation
KW - display instrumentation
KW - helicopters
KW - human factors
KW - visual perception
KW - head down display
KW - stereo 3-D pictorial displays
KW - Langley Research Center
KW - NASA
KW - flight display
KW - human factors
KW - addressing
KW - stereoscopic displays
KW - stereoacuity
KW - depth perception
KW - relative depth
KW - recovery
KW - flight-path offset
KW - helicopter hover
KW - emulated helmet-mounted display
JA - Proceedings. IEEE/AIAA/NASA 9th Digital Avionics Systems Conference (Cat. No.90CH2929-8)
SP - 529-39
CY - New York, NY, USA
PB - IEEE
AD - NASA Langley Res. Center, Hampton, VA, USA

TY - JOUR
ID - 3917891
T1 - Drag-law effects in the Goddard problem
A1 - Tsiotras, P.
A1 - Kelley, H. J.
Y1 - 1991
N2 - Studies the problem of maximizing the altitude of a rocket in vertical flight in a resisting medium, when the amount of propellant is specified, known as the Goddard problem. The case is studied in which the drag coefficient is a function of the Mach number, witnessing a sharp increase in the transonic region. Analysis shows the possibility of a more complex switching structure than the classical full-singular-coast sequence, with the appearance of a second full-thrust subarc in the transition from the subsonic to the supersonic region. Necessary conditions such as the Legendre-Clebsch condition for singular subarcs and the McDanell-Powers condition for joining singular and non-singular subarcs were checked, and were found to be satisfied. It is shown that the results obtained depend heavily on the assumed form of the drag law, and on the magnitude of the upper bound on the thrust
KW - aerospace control
KW - bang-bang control
KW - drag
KW - optimal control
KW - rockets
KW - aerospace control
KW - bang bang control
KW - optimal control
KW - Goddard problem
KW - drag coefficient
KW - Mach number
KW - transonic region
KW - Legendre-Clebsch condition
KW - singular subarcs
KW - McDanell-Powers condition
JF - Automatica
JA - Automatica (UK)
VL - 27
IS - 3
SP - 481-90
SN - 0005-1098
AD - Dept. of Aerosp. & Ocean Eng., Virginia Polytech. Inst. & State Univ., Blacksburg, VA, USA

TY - CONF
ID - 3875180
T1 - Part-task simulation as a tool to investigate the effects of types of lag on positioning performance

A1 - Jensen, S. E.
A1 - Life, M. A.
A1 - Narborough-Hall, C. S.
A1 - Hamilton, W. I.
Y1 - 1990
N1 - Brighton, UK
N1 - 18-19 May 1989
N2 - The author describes the simulation of the input phase of a sonar operator's task in military helicopters and fixed wing aircraft engaged in anti-submarine warfare. In real systems the information is displayed in the form of a lofargram (a specific visual display representing returns from acoustic sensors floating in the sea). The task requires the recognition of significant patterns embedded in the background noise, and their subsequent interpretation. The relevant parts of this task were simulated to investigate the effects of constant and variable input lag on operator's performance, as was vibration; an important aspect of the environment
KW - aerospace simulation
KW - helicopters
KW - military systems
KW - sonar
KW - user interfaces
KW - part-task simulation
KW - sonar operator
KW - positioning performance
KW - military helicopters
KW - fixed wing aircraft
KW - anti-submarine warfare
KW - lofargram
KW - acoustic sensors
KW - background noise
KW - vibration
JA - Simulation and the User Interface
SP - 227-37
CY - London, UK
PB - Taylor & Francis
SN - 0850668034
AD - Human Factor Div., R. Aerosp. Establ., Farnborough, UK

TY - JOUR
ID - 3870668
T1 - Pilot night vision: human factor problems
A1 - Robinson, A.
Y1 - Jan. 1991
N2 - Night vision goggles have the advantages of being simple and reliable and offering a natural view of the outside world, albeit one which differs from daylight vision in significant ways. Experienced operators agree that a high level of training and a thorough understanding of the limitations of NVGs are essential qualifications. The difficulties for fast-jet pilots are much the same as for helicopter pilots. The prevailing view is that NVG pilots should be selected carefully taking into account their experience, psychological make-up, willingness to take on the commitment of extended night operations, and physical condition (excellent night vision being a pre-eminent requirement). Among the shortcomings of current NVGs are a restricted field-of-view and comparatively poor resolution. The kind of terrain flown over also affects NVG performance
KW - aircraft instrumentation
KW - human factors
KW - image intensifiers
KW - optical resolving power
KW - psychology
KW - night vision goggles
KW - human factors
KW - training
KW - fast-jet pilots
KW - helicopter pilots
KW - experience
KW - psychological make-up
KW - extended night operations
KW - physical condition
KW - field-of-view
KW - resolution
KW - terrain
KW - performance
JF - International Defense Review
JA - Int. Def. Rev. (Switzerland)
VL - 24
IS - 1
SP - 65-7
SN - 0020-6512

TY - CONF
ID - 3853755

T1 - Quantitative method for relating helicopter crew task performance and mission success
A1 - Askren, W. B.
A1 - Boyett, J. E.
Y1 - 1990
N1 - Dayton, OH, USA
N1 - 21-25 May 1990
N2 - A quantitative method that relates aviator performance at the cockpit task level to system performance at the mission level is described. A series of hierarchical, probabilistic conceptual models were developed that link helicopter crew task performance to mission combat success. The models were fashioned so that predictions can be made from crew task performance, through system function performance, through flight segment performance to mission success. The models allow prediction of the relative contribution of each task, function, and segment to mission success. The models link crew task performance to four mission scores: probability of target kill, probability of surviving an enemy threat, probability of surviving ground hazards, and probability of hitting a navigation window. A proof-of-concept of the models was accomplished using subject matter expert (SME) data that were collected for AH-64 helicopter combat operations. This resulted in the production of a total of 236 equations that predict from task performance to mission success, and from mission success to task performance
KW - helicopters
KW - human factors
KW - military systems
KW - probability
KW - human factors
KW - crew task performance
KW - mission success
KW - aviator performance
KW - cockpit
KW - conceptual models
KW - predictions
KW - flight segment performance
KW - probability
KW - target kill
KW - surviving
KW - enemy threat
KW - ground hazards
KW - navigation window
KW - subject matter expert
KW - AH-64 helicopter
JA - Proceedings of the IEEE 1990 National Aerospace and Electronics Conference. NAECON 1990 (Cat. No.90CH2881-1)
SP - 825-30 vol.2
CY - New York, NY, USA
PB - IEEE
AD - Universal Energy Systems Inc., Dayton, OH, USA

TY - CONF
ID - 3823397
T1 - Fundamental monocular/binocular HMD human factors
A1 - Lippert, T. M. , Ph. D.
Y1 - 1990
N1 - Helmet-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 19-20 April 1990
N2 - Five laboratory studies were conducted in order to establish image alignment tolerances for wide field of view monocular/biocular/binocular helmet mounted displays (HMD). Apache helicopter type production HMD oculars were used by night vision trained pilots in the studies, the results of which underscore the operational advantage of maintaining one dark adapted eye, and quantify the pilots' perceptual sensitivities to display system sources of binocular misalignment
KW - aircraft instrumentation
KW - display instrumentation
KW - human factors
KW - visual perception
KW - wide field of view display
KW - biocular display
KW - pilots
KW - visual perception
KW - monocular/binocular HMD
KW - human factors
KW - image alignment tolerances
KW - helmet mounted displays
KW - Apache helicopter
KW - night vision
KW - perceptual sensitivities
KW - binocular misalignment
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)

VL - 1290
SP - 185-91
SN - 0277-786X
AD - Target Acquisition Syst., Honeywell Inc., Minneapolis, MN, USA

TY - CONF
ID - 3823395
T1 - Visual processing: implications for helmet mounted displays
A1 - Caldwell, J. L.
A1 - Cornum, R. L. S.
A1 - Stephens, R. L.
A1 - Rash, C. E.
Y1 - 1990
N1 - Helmet-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 19-20 April 1990
N2 - A study was conducted to compare the performance of AH-64 (Apache) pilots to other Army pilots on visual tasks. Each pilot was given a task presented monocularly to the right eye, a task presented monocularly to the left eye, and a task presented to both eyes simultaneously in a dichoptic task. Results indicated no performance difference between the groups of pilots on the dichoptic task, but indicated better performance on the left monocular task for the AH-64 pilots. These results indicate that AH-64 pilots who are required to switch their attention from their left eyes to their right eyes in order to obtain needed information are capable of processing information efficiently and effectively using only one eye. The implications of these results for the Integrated Helmet and Display Sighting System (IHADSS) are discussed
KW - aircraft instrumentation
KW - display instrumentation
KW - helicopters
KW - human factors
KW - military systems
KW - right monocular task
KW - integrated helmet display
KW - visual processing
KW - helicopter
KW - helmet mounted displays
KW - AH-64
KW - Apache
KW - Army pilots
KW - dichoptic task
KW - left monocular task
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1290
SP - 165-72
SN - 0277-786X
AD - US Army Aeromedical Res. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 3823394
T1 - Human factors and safety considerations of night vision systems flight using thermal imaging systems
A1 - Rash, C. E.
A1 - Verona, R. W.
A1 - Crowley, J. S.
Y1 - 1990
N1 - Helmet-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 19-20 April 1990
N2 - Military aviation night vision systems enhance the aviator's capability to operate effectively during periods of low illumination, adverse weather, and in the presence of obscurants. Current fielded systems allow aviators to conduct terrain flight during conditions which would be extremely dangerous, if not impossible, using only unaided vision. In night vision systems, trade-offs are made that enhance some visual parameters and compromise others. The mounting of the visual displays onto the aviator's helmet provokes concern regarding fatigue and crash safety, due to increased head-supported weight and shifts in center-of-gravity. Human factors and safety issues related to the use of thermal night vision systems are identified and discussed. The accumulated accident experience with U.S. Army AH-64 helicopters equipped with the thermal Pilot's Night Vision System and the Integrated Helmet and Display Sighting System is briefly reviewed
KW - aircraft instrumentation
KW - display instrumentation
KW - human factors
KW - infrared detectors
KW - infrared imaging
KW - military equipment

KW - safety
KW - military aviation
KW - human factors
KW - safety
KW - night vision systems flight
KW - thermal imaging
KW - fatigue
KW - crash safety
KW - head-supported weight
KW - center-of-gravity
KW - AH-64 helicopters
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1290
SP - 142-64
SN - 0277-786X
AD - US Army Aeromedical Res. Lab., Fort Rucker, AL, USA

TY - CONF
ID - 3823390
T1 - Requirements of an HMS/D for a night-flying helicopter
A1 - Bohm, H. -D. V.
A1 - Schranner, R.
Y1 - 1990
N1 - Helmet-Mounted Displays II
N1 - Orlando, FL, USA
N1 - 19-20 April 1990
N2 - Helicopter pilots prefer for the night-flying tasks a combination of electro-optical sensors with different physical principles in the infra-red (IR) and in the near IR spectrum: thermal imager (TI or FLIR), night vision goggles (NVG) or low light level television (LLLTV). The limits of these three sensors are in extreme darkness with less than 1 mLux illumination or in heavy rain, fog or snow with temperature differences below 0.1 K or with cross-over effects, respectively. The authors describe operational requirements, human engineering aspects and the requirements of an integrated light-weight helmet with two NVG-tubes and two CRTs to display superimposed NVG and TI images with flight symbologies
KW - aircraft instrumentation
KW - cathode-ray tube displays
KW - helicopters
KW - human factors
KW - image intensifiers
KW - infrared detectors
KW - military equipment
KW - helmet mounted display
KW - ergonomics
KW - mission requirements
KW - military aircraft
KW - human factors
KW - visual perception
KW - pilot
KW - night-flying helicopter
KW - thermal imager
KW - FLIR
KW - night vision goggles
KW - low light level television
KW - integrated light-weight helmet
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1290
SP - 93-107
SN - 0277-786X
AD - Helicopter Div., Messerschmitt-Bolkow-Blohm GmbH, Munchen, West Germany

TY - JOUR
ID - 3744434
T1 - Analog/hybrid computer simulation of hovering experiments in human factors research. 1. Generalized mathematical modelling
A1 - Karayanakis, N. M.
Y1 - July-Sept. 1990
N2 - Vertical takeoff and landing (VTOL) aircraft provide a fascinating research facet in aeronautical and human factors engineering. The many different VTOL configurations include rotary wing, deflected slipstream, fan-in-wing, and jet lift, and each configuration shows many variants. Although different VTOL vehicles show widely different physical and operating characteristics, they have a powerful common denominator: handling a VTOL under full manual control is a difficult if not impossible task. Of interest is the hovering maneuver, where the aircraft maintains a fixed position with respect to a ground reference for some period of time. Hovering is a unique feature

of VTOL aircraft where the vehicle is controlled through its powered lift system. Without the benefit of forward velocity, a hovering VTOL aircraft has no restoring aerodynamic forces or moments. This is to say that the hovering VTOL machine lacks both attitude and path stability. Many aircraft of this type even possess negative attitude stability. The purpose of the article is to acquaint the reader with the hovering maneuver, some of the research questions of VTOL man-machine systems and the analog/hybrid setup of hovering experiments

KW - aerospace computer control
KW - aerospace simulation
KW - ergonomics
KW - human factors
KW - vertical takeoff/landing
KW - computer simulation
KW - human factors research
KW - mathematical modelling
KW - human factors engineering
KW - VTOL configurations
KW - rotary wing
KW - deflected slipstream
KW - fan-in-wing
KW - jet lift
KW - hovering maneuver
KW - fixed position
KW - ground reference
KW - VTOL aircraft
KW - powered lift system
KW - aerodynamic forces
KW - attitude stability
KW - VTOL man-machine systems
KW - analog/hybrid setup
KW - hovering experiments
JF - CoED
JA - CoED (USA)
VL - 10
IS - 3
SP - 9-12
SN - 0736-8607
AD - North Florida Univ., Jacksonville, FL, USA

TY - CONF
ID - 3602578

T1 - Task-operator study for the primary flight control center of Tarawa class (LHA) ships
A1 - Permenter, K. E.
A1 - Baker, C. C.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - This report presents the findings of a task-operator study for the primary flight control (Pri-Fly) major operating stations aboard Tarawa class (LHA) ships. The LHA carries a variety of attack and cargo helicopters, plus AV-8A Sea Harrier jet aircraft. Pri-Fly is the area of the ship which controls the landing and recovery of aircraft, as well as flight control when aircraft are in the immediate vicinity of the ship. Two main positions were examined by this study, the Air Administrator (Air-Boss) and the Assistant Air Administrator (Mini-Boss). The purposes of this study were to perform a task-operator study of Pri-Fly personnel task requirements, to identify human-equipment interface design problems given the existing configuration of Pri-Fly within LHAs, and to provide general design recommendations based on the findings of the study. Seven tasks were undertaken to meet the objectives of the project. Overall, the review identified numerous human engineering design problems in Pri-Fly, many of which severely limit the performance of Pri-Fly personnel. Based on this review, it is asserted that significant improvement can be realized, in terms of air operations safety and efficiency, by instituting a Pri-Fly improvement program

KW - air-traffic control
KW - helicopters
KW - human factors
KW - military computing
KW - military systems
KW - ships
KW - Tarawa-class ships
KW - LHA ships
KW - attack helicopters
KW - primary flight control center
KW - task-operator study
KW - Pri-Fly
KW - major operating stations
KW - cargo helicopters
KW - AV-8A Sea Harrier jet aircraft
KW - Air-Boss

KW - Assistant Air Administrator
KW - Mini-Boss
KW - human engineering design problems
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 1119-23 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Carlow Associates Inc., Fairfax, VA, USA

TY - JOUR
ID - 3592470
T1 - Simulation investigation of the effects of helicopter hovering dynamics on pilot performance
A1 - Aponso, B. L.
A1 - Mitchell, D. G.
A1 - Hoh, R. H.
Y1 - Jan.-Feb. 1990
N2 - A fixed-based simulation has been performed to investigate the handling-qualities requirements for the midterm pitch response of a helicopter at hover and in low-speed flight. Pilot rating results from this simulation, using an attitude-tracking task, were compared with those from previous experiments to develop handling-qualities limits on the frequency and damping of the oscillatory mode in the hovering cubic. Pilot performance data obtained during the experiment were used to confirm the pilot-rating results. These data show the pilot performance closely matches that predicted by the theory of piloted control. A means of predicting pilot ratings from the open-loop aircraft dynamics is presented
KW - aerospace computing
KW - aerospace simulation
KW - aircraft control
KW - attitude control
KW - helicopters
KW - human factors
KW - aerospace simulation
KW - aircraft control
KW - human factors
KW - helicopter
KW - hovering dynamics
KW - pilot performance
KW - attitude-tracking task
KW - oscillatory mode
KW - pilot-rating
JF - Journal of Guidance, Control, and Dynamics
JA - J. Guid. Control Dyn. (USA)
VL - 13
IS - 1
SP - 8-15
SN - 0731-5090
AD - Syst. Technol. Inc., Hawthorne, CA, USA

TY - CONF
ID - 3590215
T1 - Incorporating dynamic field of view information to design the next-generation Black Hawk helicopter cockpit
A1 - Simon, R.
A1 - Dunn, D.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - Changing flight tactics and increased use of night vision goggles has focused attention on the limited field of view (FOV) of the Army UH-60A Black Hawk helicopter. To improve the FOV in the next generation Black Hawk, the US Army asked an independent contractor to investigate the problem and propose alternatives. The study involved a comprehensive review of army requirement documents, existing FOV studies, and accident data. Close attention was given to dynamic flight characteristics that affect FOV. Also, the study team collected technical data related to military rotary wing design, administered a survey to pilots, and interviewed users and other technical experts. The study revealed the current UH-60A design meets the requirements of MIL-STD-850B under static conditions. The only exception is the obstructed view that the door and windshield vertical structures create. However, under dynamic conditions the UH-60A cockpit design and normal flight characteristics substantially reduce the FOV in critical areas. The study produced eleven options that can improve and/or enhance the next generation Black Hawk's FOV if incorporated into the new design. Each option is presented and discussed
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - military equipment

KW - dynamic field of view information
KW - flight tactics
KW - night vision goggles
KW - Army UH-60A Black Hawk helicopter
KW - US Army
KW - military rotary wing design
KW - MIL-STD-850B
KW - obstructed view
KW - UH-60A cockpit design
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 1124-8 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Dynamics Res. Corp., Wilmington, MA, USA

TY - CONF
ID - 3590212
T1 - Helmet mounted display systems for helicopter simulation
A1 - Haworth, L. A.
A1 - Bucher, N.
A1 - Runnings, D.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - Detailed and appropriate visual information is especially critical for Nap-of-the-Earth (NOE) helicopter flight simulation where the pilot maintains an 'eyes-out' orientation to avoid obstructions and terrain. The paper elaborates on the visually-coupled wide field of view helmet mounted display (WFOVHMD) system technology as a viable visual display system for helicopter simulation. In addition the paper discusses research conducted on the NASA-Ames Vertical Motion Simulator that examined one critical research issue for helmet mounted displays
KW - aerospace computing
KW - aerospace simulation
KW - aircraft instrumentation
KW - helicopters
KW - map of the earth flight simulation
KW - helmet mounted visual display system
KW - aircraft instrumentation
KW - helicopter simulation
KW - NASA-Ames Vertical Motion Simulator
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 86-90 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Ames Res. Center, Moffett Field, CA, USA

TY - CONF
ID - 3590210
T1 - Touch panel sampling strategies and keypad performance comparisons
A1 - Beringer, D. B.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - A study was conducted to improve accuracy of touch input devices to be used in helicopter environments through serial sampling and minima selection algorithms. Several types of mechanical keypads were compared with the two types of touch-input devices. Results obtained with this menu-selection task suggested no practical degradation in performance when substituting the touch input devices for bezel-mounted hardware keys. This was true of both error rate (in a qualified sense) and response time. It was concluded that the touch-input devices could provide flexibility for high-resolution input using maps and other spatial forms of data while allowing effective use of previously developed menus and menu-selection routines without the need for auxiliary bezel-mounted mechanical keys
KW - aerospace computer control
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - user interfaces
KW - touch panel sampling
KW - human factors
KW - keypad performance
KW - touch input devices
KW - helicopter
KW - serial sampling
KW - minima selection algorithms
KW - menu-selection task
KW - bezel-mounted hardware keys
KW - error rate

KW - response time
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 71-5 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Human Factors Res. Lab., New Mexico State Univ., Las Cruces, NM, USA

TY - CONF
ID - 3590203
T1 - Instrument scanning and subjective workload with the peripheral vision horizon display
A1 - Hameluck, D.
A1 - Stager, P.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - The peripheral vision horizon display (PVHD) is an expanded artificial horizon line that is intended to provide the pilot with orientation information through peripheral vision. The potential advantage is a reduction in the requirement to constantly refer to the attitude indicator (AI) in order to maintain awareness of orientation during instrument meteorological conditions (IMC). Four helicopter pilots flew two types of instrument approaches to determine whether the degree to which pilots rely on the AI would be altered when the PVHD was in operation. The general trend in the data indicated an increase in subjective workload with the PVHD
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - man-machine systems
KW - visual perception
KW - orientation awareness
KW - human factors
KW - aircraft instrument scanning
KW - man machine systems
KW - subjective workload
KW - peripheral vision horizon display
KW - attitude indicator
KW - instrument meteorological conditions
KW - helicopter
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 18-22 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - York Univ., Toronto, Ont., Canada

TY - CONF
ID - 3578890
T1 - Cognitive perspectives on map displays for helicopter flight
A1 - Harwood, K.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - Computer generated map displays in the present study were configured according to previous research on maps, navigational problem solving, and spatial cognition in large scale environments. Interest centered on the representation of different spatial relationships that would best support helicopter navigational problem solving. One map display emphasized the global relationships between objects in the environment. The other map showed the pilot's relationship to objects as he travelled through the environment. Twenty skilled pilots used the maps to complete several navigational tasks that occurred within a realistic simulation program tailored for helicopter navigation. Findings indicate that the type of task and mode of flight (low level or Nap of the Earth (NOE)) are important determinants of map display effectiveness
KW - aerospace computing
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - navigation
KW - visual perception
KW - flight navigation
KW - human factors
KW - man machine systems
KW - map displays
KW - helicopter
KW - spatial cognition
KW - simulation program
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives

SP - 13-17 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Inst. of Aviation, Illinois Univ., Urbana-Champaign, IL, USA

TY - RPRT
ID - 3576890
T1 - Human factors relating to escape and survival from helicopters ditching in water
A1 - Brooks, C. J.
Y1 - Aug. 1989
N1 - AGARD-AG-305(E)
N2 - The AGARDograph describes the worldwide incidence of military and civilian over-water helicopter accidents and the problems related to survival. It reviews the typical accident scenario from the moment the occupant steps on board the helicopter and the pre-flight briefing through to the accident itself, the difficulties with escape (commonly from underwater and in darkness), to the rescue and return safe and sound to dry land. It also proposes improvements to crashworthiness and life support equipment in current in-service and future helicopters and a syllabus for underwater escape training
KW - accidents
KW - helicopters
KW - human factors
KW - safety
KW - survival problems
KW - human factors
KW - AGARDograph
KW - over-water helicopter accidents
KW - crashworthiness
KW - life support equipment
KW - underwater escape training
KW - AGARD, Neuilly sur Seine, France

TY - CONF
ID - 3558400
T1 - The macroergonomical challenge of industrial teaming arrangements organizational structure
A1 - Getty, R. L.
Y1 - 1989
N1 - Denver, CO, USA
N1 - 16-20 Oct. 1989
N2 - Industrial teaming arrangements that are formed by industry to take advantage of pooled resources have problems of coordination and communication in their operations. The central contention of this study is that the organizational structure is the precipitating cause of the resulting inefficiencies. The location of the majority of structural difficulties are in the interstitial, boundary spanning roles between teamed companies. A mailed questionnaire was developed. The data from this industrial survey was analyzed by principal component, multiple regression and path analytic procedures. Studies in individual teaming arrangements are suggested to identify and solve structural issues that detract from their operations
KW - behavioural sciences
KW - human factors
KW - management science
KW - management science
KW - industrial teaming arrangements
KW - human factors
KW - organizational structure
KW - boundary spanning roles
KW - principal component
KW - multiple regression
KW - path analytic procedures
JA - Proceedings of the Human Factors Society 33rd Annual Meeting. Perspectives
SP - 836-40 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Society
AD - Bell Helicopter Textron Inc., Fort Worth, TX, USA

TY - CONF
ID - 3526285
T1 - Helmet-mounted displays for helicopter pilotage: design configuration tradeoffs, analyses, and test
A1 - Lohmann, R. A.
A1 - Weisz, A. Z.
Y1 - 1989
N1 - Helmet-Mounted Displays
N1 - Orlando, FL, USA
N1 - 28-29 March 1989
N2 - Human engineering criteria applicable to the design of helmet mounted displays for use with night vision sensors, such as

forward looking infra-red (FLIR) or low light level television (LLTV), are stated and reviewed. Systems requirements are presented which call for pilot operation at night that is as equivalent as practicable to flight under normal daytime visual rules. Requirements are developed that utilize head motion coupled to sensor movement to achieve the semblance of daytime pilotage while conducting operations at night under the cover of deep darkness. At the outset, salient factors are identified and prioritized which are applied to further design tradeoffs leading to helmet mounted visor displays. The prime design objectives being operational suitability, acceptability by the pilot community, reduced crew training requirements and minimal logistics support. Alternate design configurations, computer analyses, operating experience, and pilot reaction are cited
KW - aerospace computing
KW - aircraft instrumentation
KW - display instrumentation
KW - helicopters
KW - human factors
KW - military equipment
KW - FLIR
KW - aircraft instrumentation
KW - helicopter
KW - design configuration
KW - helmet mounted displays
KW - night vision sensors
KW - low light level television
KW - pilot
KW - helmet mounted visor displays
KW - operational suitability
KW - acceptability
KW - crew training requirements
KW - minimal logistics support
KW - computer analyses
KW - pilot reaction
JF - Proceedings of the SPIE - The International Society for Optical Engineering
JA - Proc. SPIE - Int. Soc. Opt. Eng. (USA)
VL - 1116
SP - 27-32
SN - 0277-786X
AD - Hughes Aircraft Co., Display Syst. Lab., Los Angeles, CA, USA

TY - JOUR
ID - 3298977
T1 - Preview control pilot model for near-Earth maneuvering helicopter flight
A1 - Hess, R. A.
A1 - Chan, K. K.
Y1 - March-April 1988
N2 - A preview control model of the human pilot maneuvering a helicopter in near-Earth flight is developed. The model is simple in form and extends a description of pursuit tracking behavior in which preview is used to compensate for inherent time delays in the pilot/vehicle system. Data from manned simulation and flight test are used to support the modeling approach. Although attention is focused primarily on lateral-directional flight tasks, an example of vertical flight path preview control is also included
KW - aerospace control
KW - aerospace simulation
KW - helicopters
KW - man-machine systems
KW - position control
KW - near Earth flight maneuvering
KW - aerospace control
KW - aerospace simulation
KW - helicopter
KW - preview control model
KW - human pilot maneuvering
KW - tracking
KW - time delays
KW - simulation
KW - lateral-directional flight tasks
KW - vertical flight path preview control
JF - Journal of Guidance, Control, and Dynamics
JA - J. Guid. Control Dyn. (USA)
VL - 11
IS - 2
SP - 146-52
SN - 0731-5090
AD - California Univ., Davis, CA, USA

TY - CONF
ID - 3297274
T1 - Man-Machine Interface in Tactical Aircraft Design and Combat

Automation (AGARD-CP-425)
Y1 - July 1988
N1 - Stuttgart, West Germany
N1 - 28 Sept.-1 Oct. 1987
N2 - The following topics were dealt with: man-machine interfaces; human factors; tactical mission planning; military aircraft instrumentation; pilot workload assessment; cockpit design; display systems; virtual panoramic display helmet systems; advanced flight control systems; side stick controllers; EAP experience; and helicopter cockpit and control. Abstracts of individual papers can be found under the relevant classification codes in this or other issues
KW - aerospace control
KW - aircraft instrumentation
KW - human factors
KW - man-machine systems
KW - military equipment
KW - fighter aircraft
KW - man-machine interfaces
KW - human factors
KW - tactical mission planning
KW - military aircraft instrumentation
KW - pilot workload assessment
KW - cockpit design
KW - display systems
KW - virtual panoramic display helmet systems
KW - advanced flight control systems
KW - side stick controllers
KW - EAP experience
KW - helicopter
CY - Neuilly sur Seine, France
PB - AGARD
SN - 9283504712

TY - CONF
ID - 3288364
T1 - Considerations concerning the assessment of pilot workload for complex task conditions
A1 - van de Graaff, R. C.
Y1 - July 1988
N1 - Stuttgart, West Germany
N1 - 28 Sept.-1 Oct. 1987
N2 - Discusses a number of considerations concerning the problem of being able to draw conclusions from a variety (i.e. a matrix) of experimental measures in a complex task situation. Several implications are pointed out, such as the problem of dealing with contradictory outcomes, the designating of artefacts, and the problem of formulating final conclusions without the (a-priori) availability of a superior method for evaluating other methods. These considerations are examined in detail in an in-flight study concerning the assessment of pilot workload under various instrument approach conditions for a fixed-wing (civil) transport aircraft. The experimental findings have been compared with the results of a former in-flight experiment dealing with pilot workload and performance during helicopter (instrument-flying) tasks. A discussion is given of the results consisting of subjective ratings, physiological measures, and task performance measures. A strategy is discussed, dealing with the formulation of final conclusions based on the outcomes of a matrix of measures
KW - aircraft
KW - human factors
KW - man-machine systems
KW - pilot workload assessment
KW - human factors
KW - man machine systems
KW - complex task conditions
KW - in-flight study
KW - transport aircraft
KW - subjective ratings
KW - physiological measures
KW - task performance measures
JA - Man-Machine Interface in Tactical Aircraft Design and Combat Automation (AGARD-CP-425)
SP - 9/1-15
CY - Neuilly sur Seine, France
PB - AGARD
SN - 9283504712
AD - Nat. Aerosp. Lab., Amsterdam, Netherlands

TY - CONF
ID - 3286719
T1 - The Goddard problem with constrained time-of-flight
A1 - Tsiotras, P.
A1 - Kelley, H. J.
Y1 - 1988

N1 - Atlanta, GA, USA
N1 - 15-17 June 1988
N2 - The problem of the vertical flight of a rocket in a resisting medium, with a constraint of isoperimetric type, is considered. Only the case of maximum range for given flight-time is analyzed, but the methodology applies to other types of constraints as well, e.g. the minimum-time problem, due to Mayer reciprocity. Analysis shows that one-parameter family of singular extremals is generated according to the value of time-of-flight. Three cases of switching structures have been found, varying with the specified duration of flight, with the most interesting case featuring appearance of a second full-thrust subarc at the departure from the singular subarc owing to a low value of the upper bound on the thrust
KW - aerospace control
KW - optimal control
KW - rockets
KW - space vehicles
KW - viscosity
KW - Goddard problem
KW - constrained time-of-flight
KW - vertical flight
KW - rocket
KW - resisting medium
KW - isoperimetric type
KW - maximum range
KW - minimum-time problem
KW - Mayer reciprocity
KW - singular extremals
KW - switching structures
KW - second full-thrust subarc
JA - Proceedings of the 1988 American Control Conference
SP - 1412-21 vol.2
CY - Green Valley, AZ, USA
PB - American Autom. Control Council
AD - Dept. of Aerosp. & Ocean Eng., Virginia Polytech. & State Univ., Blacksburg, VA, USA
AD - IEEE, Piscataway, NJ, USA

TY - CONF
ID - 3248283
T1 - Terrain following/terrain avoidance path optimization using the method of steepest descent
A1 - Asseo, S. J.
Y1 - 1988
N1 - Dayton, OH, USA
N1 - 23-27 May 1988
N2 - A path-optimization algorithm for terrain following/terrain avoidance and threat avoidance is presented. The algorithm uses the gradient method for generating the optimal ground track that minimizes a quadratic cost function of the aircraft's altitude above sea level to maximize terrain masking while penalizing large deviations from a prescribed initial ground track. The vertical flight path for each ground track is obtained by using parabolic flight segments that satisfy vertical path constraints. Confining the optimization process to the horizontal plane improves the convergence properties of the algorithm, reduces the storage requirements, and allows the algorithm to be used on fine-grain terrain data. Simulation results are presented which validate the algorithm
KW - aircraft
KW - military computing
KW - simulation
KW - terrain following
KW - terrain avoidance
KW - steepest descent method
KW - dynamic programming
KW - path-optimization algorithm
KW - gradient method
KW - optimal ground track
KW - quadratic cost function
KW - aircraft's altitude
KW - terrain masking
KW - vertical flight path
KW - parabolic flight segments
KW - vertical path constraints
KW - optimization process
KW - convergence properties
KW - fine-grain terrain data
JA - Proceedings of the IEEE 1988 National Aerospace and Electronics Conference: NAECON 1988 (Cat. No.88CH2596-5)
SP - 1128-36 vol.3
CY - New York, NY, USA
PB - IEEE
AD - Northrop Corp., Hawthorne, CA, USA

TY - CONF
ID - 3239881
T1 - Cockpit automation concept development for the NUH-60 (STAR) aircraft
A1 - Riley, D. D.
A1 - Stringer, P. G.
Y1 - 1988
N1 - Dayton, OH, USA
N1 - 23-27 May 1988
N2 - Results of a study performed to derive an automation and avionics integration design concept for the NUH-60 systems testbed for avionics research (STAR) aircraft are presented. The STAR aircraft is being developed by the US Army avionics research and development activity to provide a flight demonstrator and research vehicle for state-of-the-art cockpit technology. A goal was to determine cockpit design preferences associated with single-pilot performance of the US Army scout and utility missions. Emphasis was placed on high-workload phases of the missions during which eyes-out-of-the-cockpit and hands-on-controls performance capabilities would be most crucial. Cockpit design alternatives in the areas of communication, navigation, aircraft survivability equipment (ASE) operations, subsystem status monitoring, and aircraft performance computation and prediction were systematically derived
KW - aerospace control
KW - aircraft instrumentation
KW - helicopters
KW - military systems
KW - navigation
KW - cockpit automation concept
KW - helicopter
KW - avionics
KW - NUH-60 systems testbed
KW - STAR aircraft
KW - flight demonstrator
KW - research vehicle
KW - state-of-the-art cockpit technology
KW - single-pilot performance
KW - communication
KW - navigation
KW - aircraft survivability equipment
KW - subsystem status monitoring
KW - aircraft performance computation
JA - Proceedings of the IEEE 1988 National Aerospace and Electronics Conference: NAECON 1988 (Cat. No.88CH2596-5)
SP - 910-14 vol.3
CY - New York, NY, USA
PB - IEEE
AD - Essex Corp., Warminster, PA, USA

TY - CONF
ID - 3239866
T1 - Computational human factors in human-machine engineering-the Army-NASA aircrew/aircraft integration (A/sup 3/I) program
A1 - Hartzell, E. J.
A1 - Lakowske, S.
Y1 - 1988
N1 - Dayton, OH, USA
N1 - 23-27 May 1988
N2 - The A/sup 3/I program is joint US Army-NASA exploratory program to develop a rational predictive methodology for helicopter cockpit system design, including mission requirements and training-system implications, that integrates human factors engineering with other vehicle system design disciplines at an early stage in the development process. The program will produce a prototype human factors/computer-aided engineering (HF/CAE) workstation suite for use by design professionals. This interactive environment will include computational and expert systems for the analysis and estimation of the impact of cockpit design and mission specification on system performance by considering the performance consequences from the human component of the system, especially as an integral part of the overall system operation, and from the very beginning of the design process. The central issues of pilot workload, performance, and training needs, and appropriate uses of automation are interrelated to effect all integrated design considerations in future man-machine systems. The goal is to aid designers in understanding these complex interactions and in optimally matching human capabilities with advanced cockpit systems
KW - aerospace computing
KW - CAD/CAM
KW - human factors
KW - man-machine systems
KW - military computing
KW - HF-CAE workstation
KW - computational human factors
KW - Army-NASA aircrew/aircraft integration program

KW - computer-aided engineering
KW - human-machine engineering
KW - A/sup 3/I program
KW - rational predictive methodology
KW - helicopter cockpit system design
KW - training-system implications
KW - vehicle system design
KW - interactive environment
KW - expert systems
KW - mission specification
KW - pilot workload
JA - Proceedings of the IEEE 1988 National Aerospace and Electronics Conference: NAECON 1988 (Cat. No.88CH2596-5)
SP - 819-22 vol.3
CY - New York, NY, USA
PB - IEEE
AD - US Army Aeroflightdynamics Directorate, Moffett Field, CA, USA

TY - CONF
ID - 3219794
T1 - Development and testing of a predictive methodology for optimization of man-machine interface in future avionics systems
A1 - Parks, R. E.
Y1 - Dec. 1987
N1 - Las Vegas, NV, USA
N1 - 27 April-1 May 1987
N2 - While new technologies offer the avionics designer opportunities in terms of providing systems with expanded capabilities, those opportunities are accompanied by new kinds of challenges and constraints which warrant a revision of traditional design life cycle strategies. The trend of increasing complexity and cost in emerging avionics systems, driven by requirements for increased functional capability, has created a need for a predictive analytical methodology which: accurately forecasts system performance early in the design process: and treats the human operator and the equipment as a fully integrated man-machine system. A methodology which meets these needs has been developed and validated at Bell Helicopter Textron. The process is being used to provide early, accurate avionics system characterization, thereby reducing design costs
KW - aerospace computing
KW - aircraft instrumentation
KW - CAD
KW - economics
KW - man-machine systems
KW - military systems
KW - optimisation
KW - technological forecasting
KW - aircraft instrumentation
KW - technological forecasting
KW - CAD
KW - optimization
KW - man-machine interface
KW - avionics systems
KW - complexity
KW - cost
KW - predictive analytical methodology
KW - human operator
KW - Bell Helicopter Textron
JA - Design, Development and Testing of Complex Avionics Systems (AGARD-CP-417)
SP - 14/1-9
CY - Neuilly sur Seine, France
PB - AGARD
SN - 9283504372
AD - Adv. Human Factors Syst. Design, Bell Helicopter Textron Inc., Fort Worth, TX, USA

TY - CONF
ID - 3119210
T1 - Cockpit automation concept development for the NUH-60 (STAR) aircraft
A1 - Riley, D. D.
A1 - Stringer, P. G.
Y1 - 1987
N1 - New York, NY, USA
N1 - 19-23 Oct. 1987
N2 - A study was performed to derive an automation and avionics integration design concept for the NUH-60 Systems Testbed for Avionics Research (STAR) aircraft. The STAR, a one-of-a-kind reconfiguration of the UH-60 Black Hawk helicopter, is being developed by the US Army Avionics Research and Development Activity to provide a flight demonstrator and research vehicle for state-of-the-art cockpit technology. The work was directed toward determining cockpit design preferences associated with single-pilot performance of the Army scout and utility missions.

Emphasis was placed on high workload phases of the missions during which eyes-out-of-the-cockpit and hands-on-controls performance capabilities would be most crucial. A number of cockpit-based design alternatives in the areas of communication, navigation, aircraft survivability equipment (ASE) operations, subsystem status monitoring, and aircraft performance computation and prediction were systematically derived and proposed
KW - aerospace simulation
KW - aircraft instrumentation
KW - helicopters
KW - human factors
KW - NUH-60 Systems Testbed for Avionics Research
KW - UH-60 Black Hawk helicopter
KW - flight demonstrator
KW - research vehicle
KW - state-of-the-art cockpit technology
KW - cockpit design preferences
KW - single-pilot performance
KW - Army scout
KW - high workload phases
KW - communication
KW - aircraft survivability equipment
KW - subsystem status monitoring
KW - aircraft performance computation
JA - Proceedings of the Human Factors Society 31st Annual Meeting: Rising to New Heights with Technology
SP - 1383-7 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Essex Corp., Warminster, PA, USA

TY - CONF
ID - 3119178
T1 - Simulator design features for helicopter shipboard landings
A1 - Sheppard, D. J.
A1 - Madden, J.
A1 - Jones, S. A.
Y1 - 1987
N1 - New York, NY, USA
N1 - 19-23 Oct. 1987
N2 - The Vertical Takeoff and Landing Simulator at the Naval Training Systems Center's Visual Technology Research Simulator (VTRS) was used to study the effects of simulator design features on pilot performance in helicopter shipboard landings. The research was designed to evaluate the effects of current design features on the SH-60B Operational Flight Trainer (OFT) used to train helicopter shipboard landing and four proposed simulator design modifications. These were: (1) scene detail (SH-60B OFT scene versus an upgraded VTRS scene), (2) field-of-view (VTRS wide versus a smaller SH-60B OFT field-of-view), (3) dynamic seat cueing (on versus off), and (4) dynamic inflow (standard rotor model available in existing trainers versus an updated rotor model). These factors were tested across two levels of seastate. On the basis of the factors studied in the experiment, the wide field-of-view, the more detailed scene and the updated rotor model are recommended for use. The dynamic seat cueing evaluated in this study is not recommended at this time
KW - aerospace simulation
KW - design engineering
KW - helicopters
KW - human factors
KW - ships
KW - training
KW - helicopter shipboard landings
KW - Vertical Takeoff and Landing Simulator
KW - Naval Training Systems Center
KW - Visual Technology Research Simulator
KW - simulator design features
KW - pilot performance
KW - SH-60B Operational Flight Trainer
KW - scene detail
KW - field-of-view
KW - dynamic seat cueing
KW - dynamic inflow
KW - rotor model
KW - seastate
JA - Proceedings of the Human Factors Society 31st Annual Meeting: Rising to New Heights with Technology
SP - 233-7 vol.1
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Essex Corp., Orlando, FL, USA

TY - JOUR
ID - 2982106
T1 - Too much, too soon: information overload (systems design, human

factors)
Y1 - June 1987
N2 - The importance of taking human factors into account early in the design process is discussed and illustrated by examples in which they were not considered. The history of human factors as a subject of study is related, and various issues that must be addressed, e.g. the impact of computers or the characteristics of the operator, are examined. The role of simulation in human-factors-based design is discussed. Attempts to include more human-factors considerations into military equipment development are discussed, and the Light Experimental Helicopter (LHX) is presented as a model for incorporating human-factors engineering
KW - human factors
KW - man-machine systems
KW - systems design
KW - human factors
KW - computers
KW - simulation
KW - military equipment development
KW - Light Experimental Helicopter
JF - IEEE Spectrum
JA - IEEE Spectr. (USA)
VL - 24
IS - 6
SP - 51-5
SN - 0018-9235

TY - CONF
ID - 2933247
T1 - Proceedings of the IEEE/AIAA 7th Digital Avionics Systems Conference (Cat. No.86CH2359-8)
Y1 - 1986
N1 - Fort Worth, TX, USA
N1 - 13-16 Oct. 1986
N2 - The following topics are dealt with: software management; standard modular avionics; communication, navigation and identification; space systems technology; helicopter avionics; software development and evaluation tools; databases; digital map techniques; commercial aircraft collision avoidance systems, crew systems and human factors; software verification and quality assurance; sensor signals and data processing; fiber optics; design for testability; Ada software; fault tolerance and reconfigurability; digital flight controls; data link system applications; artificial intelligence and expert systems; integrated circuit technology; design and testability; integrated flight-propulsion control; and general aviation electronics. 111 papers were presented, all of which are published in full in the present proceedings. Abstracts of individual papers can be found under the relevant classification codes in this or other issues
KW - Ada
KW - aerospace computing
KW - aerospace control
KW - aerospace propulsion
KW - aircraft instrumentation
KW - artificial intelligence
KW - digital control
KW - digital instrumentation
KW - expert systems
KW - fibre optics
KW - human factors
KW - integrated circuit technology
KW - software engineering
KW - software evaluation
KW - aerospace computing
KW - software management
KW - standard modular avionics
KW - space systems
KW - helicopter avionics
KW - software development
KW - databases
KW - digital map
KW - collision avoidance
KW - software verification
KW - quality assurance
KW - sensor
KW - data processing
KW - fiber optics
KW - Ada
KW - fault tolerance
KW - reconfigurability
KW - digital flight controls
KW - artificial intelligence
KW - expert systems
KW - integrated circuit technology
KW - design and testability
KW - integrated flight-propulsion control
KW - aviation electronics

CY - New York, NY, USA
PB - IEEE

TY - JOUR
ID - 2890390
T1 - A qualitative model of human interaction with complex dynamic systems
A1 - Hess, R. A.
Y1 - Jan.-Feb. 1987
N2 - A qualitative model describing human interaction with complex dynamic systems is developed. The model is hierarchical in nature and consists of three parts: a behavior generator, and internal model, and a sensory information processor. The behavior generator is responsible for action decomposition, turning higher level goals or missions into physical action at the human-machine interface. The internal model is an internal representation of the environment which the human is assumed to possess and is divided into four submodel categories. The sensory information processor is responsible for sensory composition. All three parts of the model act in consort to allow anticipatory behavior on the part of the human in goal-directed interaction with dynamic systems. Human workload and error are interpreted in this framework, and the familiar example of an automobile commute is used to illustrate the nature of the activity in the three model elements. With the quantitative model as a guide, verbal protocols from a manned simulation study of a helicopter instrument landing tasks are analyzed
KW - human factors
KW - man-machine systems
KW - physiological models
KW - man machine systems
KW - qualitative model
KW - human interaction with complex dynamic systems
KW - behavior generator
KW - human-machine interface
KW - sensory information processor
KW - helicopter instrument landing tasks
JF - IEEE Transactions on Systems, Man and Cybernetics
JA - IEEE Trans. Syst. Man Cybern. (USA)
IS - 1
SP - 33-51
SN - 0018-9472
AD - Dept. of Mech. Eng., California Univ., Davis, CA, USA

TY - CONF
ID - 2823384
T1 - A practical helicopter cabin noise simulator
A1 - Chillery, J. A.
A1 - Collister, J. B.
Y1 - 1986
N1 - Coventry, UK
N1 - 7-11 Sept. 1986
N2 - It is of increasing importance that designers of helicopters and associated equipment have access to data which allow the nature of the interface between each system and the human operator and between combinations of systems and operators to be defined and optimised. The authors describe the hardware, software and performance characteristics of a facility which simulates in all essential details the noise fields in helicopter cabins. The simulation facility has been used successfully on a number of occasions. Extensive trials have been performed using the simulator in the final stage of development of a programme aimed at the prediction of masked auditory thresholds in helicopters and in initial examination of the performance of an Adaptive Noise Cancellation system allowing definition of the software parameters of the microprocessor used in the ANC equipment
KW - acoustic noise
KW - aerospace simulation
KW - helicopters
KW - human factors
KW - adaptive noise cancellation
KW - aerospace simulation
KW - acoustic noise
KW - helicopter cabin noise simulator
KW - interface
KW - human operator
KW - simulation facility
KW - prediction
KW - masked auditory thresholds
KW - Adaptive Noise Cancellation system
KW - microprocessor
JA - Second International Conference on Simulators (Conf. Publ. No.267)
SP - 31-7
CY - London, UK
PB - IEE

SN - 0852963351
AD - R. Aircraft Establ., Farnborough, UK

TY - CONF
ID - 2774555
T1 - Development of computer-generated imagery for a low-cost real-time terrain imaging system
A1 - Fox, T. A.
A1 - Clark, P. D.
Y1 - 1986
N1 - Dayton, OH, USA
N1 - 19-23 May 1986
N2 - The US Army Human Engineering Laboratory has acquired, as part of its Human Factors Research Simulator (HFRS), a computer-generated, real-time terrain imaging system. This system, known as HELICON, produces images of terrain features as they would be seen from the front window of a helicopter. It provides a source of constant visual stimuli while collecting pilot performance data related to the research and development for new helicopter systems. An important feature of this system is its low cost, which is due to the fact that it uses only off-the-shelf hardware: a VAX 11/780 and an ADAGE 3000 graphics processor. The procedure involved in creating the terrain features is described. The capabilities and limitations of the terrain imaging system are discussed, as well as areas in which it is currently being used and possible future applications
KW - aerospace computing
KW - aircraft instrumentation
KW - computer graphics
KW - computerised picture processing
KW - display instrumentation
KW - computerised picture processing
KW - aerospace computing
KW - aircraft instrumentation
KW - display instrumentation
KW - computer-generated imagery
KW - real-time terrain imaging system
KW - US Army
KW - HELICON
KW - helicopter
KW - cost
KW - VAX 11/780
KW - ADAGE 3000 graphics processor

JA - Proceedings of the IEEE 1986 National Aerospace and Electronics Conference, NAECON 1986 (Cat. No.86CH2307-7)
SP - 986-91 vol.3
CY - New York, NY, USA
PB - IEEE
AD - US Army Lab. Command, Aberdeen Proving Ground, MD, USA

TY - CONF
ID - 2615743
T1 - Proceedings of the AIAA/IEEE 6th Digital Avionics Systems Conference (Cat. No. 84CH-2132-9)
Y1 - 1985
N1 - Baltimore, MD, USA
N1 - 3-6 Dec. 1984
N2 - The following topics were dealt with: aerospace computing software development; commercial transport avionics; advanced avionic sensor systems; human factors and artificial intelligence; digital flight controls; fault tolerant avionics; signal processing; advanced control/display technology; software verification and testing; rotorcraft avionics; databus concepts and practices; communication, navigation and identification terminals; onboard monitoring and testing; VLSI design and testing; data link systems; digital map techniques; all electric aircraft; standardised modular avionics and digital propulsion control. Abstracts of individual papers can be found under the relevant classification codes in this or other issues
KW - aerospace computer control
KW - aerospace computing
KW - aerospace instrumentation
KW - aircraft instrumentation
KW - computerised instrumentation
KW - digital instrumentation
KW - aerospace computing
KW - aerospace computer control
KW - computerised instrumentation
KW - software development
KW - commercial transport avionics
KW - avionic sensor
KW - human factors
KW - artificial intelligence
KW - digital flight controls
KW - fault tolerant avionics
KW - signal processing

KW - display technology
KW - verification
KW - testing
KW - rotorcraft
KW - databus
KW - onboard monitoring
KW - VLSI
KW - data link
KW - digital map
KW - electric aircraft
KW - standardised modular avionics
KW - digital propulsion control
CY - New York, NY, USA
PB - AIAA

TY - CONF
ID - 2596740
T1 - Army 21-aviation
A1 - Fry, C. A.
Y1 - 1985
N1 - Dayton, OH, USA
N1 - 20-24 May 1985
N2 - An army perspective is presented on the 'ideal' Army helicopter cockpit of the future. A summary of the tactical necessities which drive cockpit design is presented. A short summary is also given of present-day helicopter cockpit research. Finally, extensive projections are made summarizing the characteristics of the 'dream' Army helicopter cockpit of the year 2010. This cockpit of the future is seen as being heavily dependent on the continued development of artificial intelligence
KW - aerospace control
KW - aircraft instrumentation
KW - artificial intelligence
KW - helicopters
KW - human factors
KW - technological forecasting
KW - aviation
KW - Army helicopter cockpit
KW - tactical necessities
KW - cockpit design
KW - artificial intelligence
JA - Proceedings of the IEEE 1985 National Aerospace and Electronics Conference NAECON 1985 (Cat. No. 85CH2189-9)
SP - 1046-9 vol.2
CY - New York, NY, USA
PB - IEEE
AD - US Army Human Eng. Lab., Aberdeen Proving Ground, MD, USA

TY - CONF
ID - 2375833
T1 - Alerting prefixes for speech warning messages
A1 - Bucher, N. M.
A1 - Karl, R. L.
A1 - Voorhees, J. W.
A1 - Werner, E.
Y1 - 1984
N1 - Dayton, OH, USA
N1 - 21-25 May 1984
N2 - Following the successful implementation of voice output for information display in the cockpit of helicopters, an important direction in research is the investigation of an integrated voice information display/warning system. One question is whether an alerting prefix should precede the voice warning messages, and if so, what characteristics that cue should have. The study examines pilot response time and response accuracy to messages preceded by neutral cues or cognitively appropriate semantic cues. The verbal cues and messages were spoken in direct phoneme synthesized speech. Results are discussed in terms of the importance of human factors research in cockpit information display design
KW - aircraft instrumentation
KW - alarm systems
KW - helicopters
KW - human factors
KW - integrated display warning systems
KW - warning systems
KW - aircraft instrumentation
KW - speech warning messages
KW - voice output
KW - information display
KW - cockpit
KW - helicopters
KW - alerting prefix
KW - voice warning messages
KW - pilot response time
KW - response accuracy
KW - neutral cues

KW - cognitively appropriate semantic cues
KW - verbal cues
KW - direct phoneme synthesized speech
KW - human factors research
KW - cockpit information display design
JA - Proceedings of the IEEE 1984 National Aerospace and Electronics Conference. NAECON 1984 (IEEE Cat. No. 84CH2029-7)
SP - 924-31 vol.2
CY - New York, NY, USA
PB - IEEE
AD - NASA Ames Res. Center, Moffett Field, CA, USA

TY - JOUR
ID - 2343445
T1 - The role of human factors in VTOL aircraft display technology
A1 - Roscoe, S. N.
A1 - Tatro, J. S.
A1 - Trujillo, E. J.
Y1 - July 1984
N2 - Advances in avionics have made possible the implementation of several display and control design principles that were once impractical with conventional electromechanical display and control technology. A system approach is applied to the design and evaluation of integrated forward-looking and downward-looking electronic pictorial displays for VTOL aircraft including helicopters. Effects of critical display and control design variables in horizontal displays for vertical and translational flight are determined experimentally
KW - aircraft instrumentation
KW - display instrumentation
KW - human factors
KW - ergonomics
KW - forward looking display
KW - vertical takeoff and landing aircraft
KW - human factors
KW - VTOL aircraft
KW - display technology
KW - avionics
KW - system approach
KW - design
KW - downward-looking electronic pictorial displays
KW - helicopters
JF - Displays, Technology and Applications
JA - Disp. Technol. Appl. (UK)
VL - 5
IS - 3
SP - 149-53
SN - 0141-9382
AD - Behavioural Engng. Lab., New Mexico State Univ., La Cruces, NM, USA

TY - CONF
ID - 2286355
T1 - Evaluation of speech technology for automatic target recognition
A1 - Mountford, S. J.
A1 - Schwartz, J.
A1 - Graffunder, K.
A1 - Pope, A. T.
A1 - Haugh, L. D.
Y1 - 1983
N1 - Norfolk, VA, USA
N1 - 10-14 Oct. 1983
N2 - Describe an experiment which integrated a speech-interaction system with a prototype automatic target recognizer. The scenario simulated was that of an attack helicopter pop-up maneuver searching for several target types. The sequence of tasks during operational control of the target screener involved pilot entry of navigation coordinates, targeting mode, target type, target selection and weapon preparation. This task sequence is experimentally evaluated using three different modalities of interaction: a speech recognition and speech generation dialogue, speech recognition with visual prompting, and conventional visual-manual transactions. The results indicate significantly better flight control performance during simultaneous speech-interaction for the targeting tasks. Speech technology results indicate selective performance benefits for the entire sequence of targeting tasks, which are not apparent at the individual switch-closure level. Overall avionics system activities are well supported by the current data
KW - aerospace computer control
KW - speech recognition
KW - speech technology
KW - automatic target recognition
KW - speech-interaction system
KW - operational control
KW - navigation coordinates

KW - targeting mode
KW - weapon preparation
KW - speech recognition
KW - flight control performance
JA - Proceedings of the Human Factors Society 27th Annual Meeting
SP - 965-9 vol.2
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Honeywell Systems & Res. Center, Minneapolis, MN, USA

TY - JOUR
ID - 2286240
T1 - Westland's 'alternative automation'
A1 - Dodd, R.
Y1 - April 1984
N2 - The recently re-equipped factory of Westland Helicopters at Milton Keynes represents a carefully conceived 'alternative automation' approach, which uses the latest advanced machine tools and computers to enhance productivity, but has managed to retain the inherent flexibility and skills of human operators
KW - helicopters
KW - manufacturing computer control
KW - manufacturing industries
KW - production control
KW - productivity enhancement
KW - Milton Keynes plant
KW - conversational programming
KW - aircraft manufacture
KW - human factor
KW - Westland Helicopters
KW - alternative automation
KW - advanced machine tools
KW - computers
KW - flexibility
JF - Chartered Mechanical Engineer
JA - Chart. Mech. Eng. (UK)
VL - 31
IS - 4
SP - 24-6
SN - 0306-9532

TY - CONF
ID - 2202196
T1 - Generation and evaluation of near-optimum vertical flight profiles
A1 - Sorensen, J. A.
Y1 - Sept. 1983
N1 - San Francisco, CA, USA
N1 - 22-24 June 1983
N2 - The objectives of this research have been to develop and evaluate algorithms and flight management concepts for minimization of fuel or direct operating costs. These concepts are to be used for flight planning or for on-board computation and steering of turbojet transport aircraft in the vertical path. A computer program called OPTIM has been developed to use these algorithms to generate near-optimum vertical reference profiles. OPTIM contains control options to examine effects of various flight constraints on cost performance. A companion program called TRAGEN was developed to simulate an aircraft flying along a given vertical reference profile. TRAGEN is used to verify OPTIM's output, to examine the effects of parameter value uncertainty (such as prevailing wind), and to compare cost performance of profiles generated by different techniques. This paper describes OPTIM and TRAGEN and presents examples of the programs' utility
KW - aerospace computer control
KW - aerospace computing
KW - aircraft
KW - aerospace computer control
KW - aerospace computing
KW - near-optimum vertical flight profiles
KW - flight management concepts
KW - fuel
KW - operating costs
KW - flight planning
KW - onboard computation
KW - steering
KW - turbojet transport aircraft
KW - OPTIM
KW - TRAGEN
JA - Proceedings of the 1983 American Control Conference
SP - 513-18 vol.2
CY - New York, NY, USA
PB - IEEE
AD - Analytical Mechanics Associates Inc., Mountain View, CA, USA

TY - CONF
ID - 2112021
T1 - Airspeed measurements
A1 - Golberstein, M.
A1 - DeLuca, G. M.
Y1 - 1983
N1 - Dayton, OH, USA
N1 - 17-19 May 1983
N2 - Reliable, accurate and cost effective pressure sensing instrumentation that provides airspeed measurements for operating ranges of 0-40 KTS is essential for air data and fire control systems of vertical flight aircraft. Rosemount's capacitive pressure sensing transducers provide air data system measurements of free and local stream airspeed up to three axes from a single sensor. The airspeed transducer senses differential pressures proportional to relative airflow in each of the longitudinal, lateral and vertical directions. The differential pressures are transmitted to air data modules containing pressure sensors and electronics, producing bidirectional outputs proportional to airspeed. For the sake of simplicity an orthogonal airspeed system is described
KW - aircraft instrumentation
KW - pressure transducers
KW - velocity measurement
KW - pressure sensing instrumentation
KW - airspeed measurements
KW - air data
KW - fire control systems
KW - vertical flight aircraft
KW - capacitive pressure sensing transducers
KW - air data system
KW - pressure sensors
KW - electronics
KW - orthogonal airspeed system
JA - Proceedings of the IEEE 1983 National Aerospace and Electronics Conference. NAECON 1983
SP - 284-9 vol.1
CY - New York, NY, USA
PB - IEEE
AD - Rosemount Inc., Eden Prairie, MN, USA

TY - JOUR
ID - 2018212
T1 - Helicopter speech command systems: recent noise tests are encouraging
A1 - Coler, C. R.
Y1 - Sept.-Oct. 1982
N2 - Describes the noise tests used to evaluate the performance of automatic speech recognition (ASR) systems used in helicopters. The noise immunity of the VOTAN V5000 was evaluated for its suitability for research on the human factors involved in ASR. The subjects were tested in a sound attenuating chamber. They wore helmets and earplugs to protect their hearing from helicopter noise generated by a digital audio tape
KW - acoustic noise measurement
KW - helicopters
KW - speech recognition
KW - speech command systems
KW - noise tests
KW - automatic speech recognition
KW - helicopters
KW - noise immunity
KW - VOTAN V5000
KW - human factors
KW - ASR
KW - sound attenuating chamber
KW - digital audio tape
JF - Speech Technology
JA - Speech Technol. (USA)
VL - 1
IS - 3
SP - 76-7, 81
SN - 0744-1355
AD - Helicopter/VTOL Human Factors Office, NASA, Ames Res. Center, Moffett Field, CA, USA

TY - JOUR
ID - 1863288
T1 - CAD in the sky
A1 - Tolila, P.
Y1 - Oct. 1981
N2 - Explains the role of computer-aided design in the successful transformation of work in the SNIAS Helicopter Division based at the Marignane factory in the south of France. The progress of data processing since 1963 is outlined, and the interest in CAD which originated in 1972 is attributed to a preoccupation with

the speed of response to the demands of users. The hardware and software are likened to military weapons and intelligence deployed in the battle to reduce production delays and costs. The Cadam graphics system purchased from IBM to a Lockheed design and the Systrid 1 interactive programming system for design of complex shapes are described. Human factors, transformation of attitudes and customary practices, and the trend towards a totally integrated informatics system are discussed
KW - aerospace computing
KW - CAD
KW - human factors
KW - aerospace computing
KW - sky
KW - computer-aided design
KW - SNIAS Helicopter Division
KW - data processing
KW - military weapons
KW - Cadam graphics system
KW - IBM
KW - Lockheed design
KW - Systrid 1 interactive programming system
JF - Informatique et Gestion
JA - Inform. Gest. (France)
IS - 127
SP - 61-4
SN - 0020-062X

TY - CONF
ID - 1861701
T1 - How to get a grip on TADS/PNVS
A1 - Trabold, F. W. , Jr.
A1 - Housman, M. T.
Y1 - 1981
N1 - Rochester, NY, USA
N1 - 12-16 Oct. 1981
N2 - Describes the methodology, trade studies, subjective evaluation, and applied experimental techniques employed in the design of multi-function handgrip controls. These handgrips, used in acquiring and tracking ground targets from a helicopter, were developed as part of the Target Acquisition Detection System (TADS) and Pilot's Night Vision System (PNVS). Although the studies were directed toward designing a specific set of handgrips, the basic criteria and techniques can serve as guidelines for future handgrip designs
KW - aerospace control
KW - ergonomics
KW - helicopters
KW - human factors
KW - multi-function handgrip controls
KW - helicopter
KW - TADS
KW - PNVS
JA - Proceedings of the Human Factors Society 25th Annual Meeting
SP - 250-3
CY - Santa Monica, CA, USA
PB - Human Factors Soc
AD - Martin Marietta Aerospace, Orlando, FL, USA

TY - CONF
ID - 1816475
T1 - 'Pilot guidance and display considerations for energy efficient flight profiles'
A1 - Samms, K. H.
A1 - Morello, S. A.
Y1 - 1981
N1 - Charlottesville, VA, USA
N1 - 17-19 June 1981
N2 - Discusses the application of two computer programs to energy efficient flight operation in order to minimize aircraft operating cost. One is a computerized algorithm which generates optimum vertical flight trajectories calculated to minimize aircraft direct operating cost, including time and fuel cost. The second program simulates an aircraft steered to follow a specified vertical flight trajectory. These trajectories may be optimum trajectories or standard Mach/airspeed schedules currently in use in commercial aviation
KW - aerospace computing
KW - energy efficient flight operation in
KW - aircraft operating cost
KW - optimum vertical flight trajectories
KW - vertical flight trajectory
KW - optimum trajectories
KW - Mach/airspeed schedules
KW - commercial aviation
JA - Proceedings of the 1981 Joint Automatic Control Conference
SP - WA-1C/1-7 vol.1

CY - New York, NY, USA
PB - IEEE
AD - NASA Langley Res. Center, Hampton, VA, USA

TY - CONF
ID - 1800966
T1 - 'Modeling human performance in a tracer-directed fire anti-aircraft artillery system with interrupted observations'
A1 - Kuang-Chung Wei
A1 - Chen-Fu Yu
A1 - Whitmeyer, J.
A1 - Vikmanis, M.
Y1 - 1981
N1 - Charlottesville, VA, USA
N1 - 17-19 June 1981
N2 - Discusses the modeling of human's performance in a complex AAA tracking and firing task with periodic measurement blanking (interruption). The human gunner is modeled as a state reconstructor, a linear feedback controller, plus a remnant noise element. The gunner's performance is parameterized by the controller and estimator gains, in addition to the covariance coefficient of the remnant. The effect of blanking is modeled by degrading these gains and coefficients as a function of blanking duration. A direct search method is used to identify model parameters systematically while minimizing the least-squares error between the model output and the empirical data. Computer simulation of the proposed gunner model show that the model predictions are in good agreement with empirical data for various blanking patterns using a typical helicopter trajectory. These results demonstrate that the model can adequately describe the gunner's tracking and firing characteristics in an AAA weapon system subject to observation blanking
KW - aerospace simulation
KW - human factors
KW - parameter estimation
KW - model parameter identification
KW - computer simulation
KW - human performance
KW - tracer-directed fire anti-aircraft artillery system
KW - AAA tracking and firing task
KW - gunner
KW - state reconstructor
KW - linear feedback controller
KW - remnant noise element
KW - blanking
KW - search method
KW - least-squares error
JA - Proceedings of the 1981 Joint Automatic Control Conference
SP - TP-4E/1-4 vol.2
CY - New York, NY, USA
PB - IEEE
AD - Systems Res. Labs. Inc., Dayton, OH, USA

TY - JOUR
ID - 1753048
T1 - Sperry digitizes helicopter autopilot
A1 - Lambert, M.
Y1 - April 1981
N2 - Describes the digital DFC-500 autopilot system developed by the Sperry Flight Systems. Both channels of the dual DFC-500 systems, that is, two four-axis flight control computers, two flight director computers and two trim computers are housed in one box together with their digital-analog and analog-digital converter stages. As a four-axis system, DFC-500 controls pitch, roll, yaw and collective (vertical flight). It offers pedal-controlled heading selection, automatic deceleration at the end of an approach, and automatic hover coupled to radio height. Another new mode is altitude preselect, by which the pilot simply dials a new height and the autopilot initiates the climb or descent and levels off automatically when the new height is reached
KW - air traffic computer control
KW - aircraft instrumentation
KW - computerised instrumentation
KW - helicopters
KW - helicopter
KW - DFC-500 autopilot system
KW - Sperry Flight Systems
KW - flight control computers
KW - flight director computers
KW - four-axis system
KW - pitch
KW - roll
KW - yaw
KW - vertical flight
KW - pedal-controlled heading selection
KW - automatic deceleration

KW - altitude preselect
KW - air traffic computer control
JF - Interavia (English Edition)
JA - Interavia (Engl. Ed.) (Switzerland)
VL - 36
IS - 4
SP - 319
SN - 0020-5168

TY - JOUR
ID - 1736971
T1 - Effect of reduced visibility on VTOL handling quality and display requirements
A1 - Hoh, R. H.
A1 - Ashkenas, I. L.
Y1 - March-April 1981
N2 - Available data have been used to quantify the intuitive idea that acceptable levels of pilot workload (Cooper-Harper ratings and commentary) for the low-speed and hover task are dependent on outside visibility level, augmentation, and cockpit displays. An outside visual cue scale is developed to quantify the environmental conditions for the intended mission in a more fine-grained manner than simply specifying visual meteorological conditions or instrument meteorological conditions. A tentative handling quality criterion for low speed and hover is developed in terms of augmentation, outside visual cue level, and cockpit display sophistication. In general, the criterion indicates that rate augmentation is acceptable only in good visibility. Low speed and hover in degraded levels of visibility require attitude augmentation which must be upgraded to a translational rate command system in zero visibility. Finally, there is evidence that the most critical flight phase may be final deceleration to hover as opposed to steady hovering
KW - aerospace control
KW - aircraft
KW - display instrumentation
KW - human factors
KW - man-machine systems
KW - VTOL handling quality
KW - pilot workload
KW - cockpit displays
KW - outside visual cue scale
KW - environmental conditions
KW - handling quality criterion
KW - low speed
KW - hover
KW - augmentation
JF - Journal of Guidance and Control
JA - J. Guid. Control (USA)
VL - 4
IS - 2
SP - 171-6
SN - 0162-3192
AD - Systems Technol. Inc., Hawthorne, CA, USA

TY - CONF
ID - 1668359
T1 - Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
A1 - Demko, P. S.
Y1 - 1980
N1 - Atlantic City, NJ, USA
N1 - 8-11 Dec. 1980
N2 - In practice, lack of adequate guidance and flight instrumentation systems usually limit the helicopter to performing confined area operations only to periods when the pilot can clearly see his point of intended landing from slant ranges in excess of 1/2 mile. Darkness, weather and other visibility reducing phenomena usually force curtailment of confined area operations. This limitation no longer needs to be tolerated. Small, portable microwave landing guidance systems, used in conjunction with 4-cue decelerated steep approach and landing (DSAL) flight director systems, tailored specifically to unique helicopter requirements, can now overcome the visibility barriers and provide a true all-visibility DSAL capability
KW - aircraft instrumentation
KW - helicopters
KW - radionavigation
KW - instrument meteorological conditions
KW - guidance
KW - flight instrumentation
KW - helicopter
KW - confined area operations
KW - portable microwave landing guidance systems
KW - 4-cue decelerated steep approach and landing
KW - flight director systems

KW - DSAL
JA - IEEE PLANS 80. Position Location and Navigation Symposium
SP - 381-8
CY - New York, NY, USA
PB - IEEE
AD - US Army Avionic Res. & Dev. Activity, Air Traffic Management Systems Div., Fort Monmouth, NJ, USA

TY - JOUR
ID - 1657946
T1 - Type A V/STOL propulsion system development
A1 - Glasgow, E. R.
A1 - Skarshaug, R. E.
Y1 - Oct. 1980
N2 - Design and performance considerations associated with the development of a unique type A V/STOL four-turbofan propulsion system concept are described. This propulsion system uses fixed horizontal nacelles with thrust vectoring nozzles installed for achieving lift, a coaxial fan flow reaction control system for pitch control and trim, and a reaction control system for roll and yaw control and engine-out roll trim. The turbofan engine is specially designed to provide continuous compressor bleed flow for the reaction control system during vertical flight while achieving low specific fuel consumption during conventional flight modes. Critical propulsion system sizing conditions are identified, and the sensitivity of aircraft takeoff gross weight to changes in control criteria requirements, engine cycle parameters, and engine rating schemes are discussed. In addition to having competitive performance characteristics, the propulsion system concept has zero single-point failures, low development cost and risk, and good reliability/maintainability
KW - aerospace control
KW - aerospace propulsion
KW - aircraft
KW - horizontal nacelles
KW - thrust vectoring nozzles
KW - lift
KW - coaxial fan flow reaction control system
KW - pitch control
KW - yaw control
KW - turbofan engine
KW - continuous compressor bleed flow
KW - vertical flight
KW - sizing
KW - aircraft takeoff
KW - type A V/STOL population system
KW - roll control
KW - engine out roll trim
JF - Journal of Aircraft
JA - J. Aircr. (USA)
VL - 17
IS - 10
SP - 741-7
SN - 0021-8669
AD - Lockheed-California Co., Burbank, CA, USA

TY - CONF
ID - 1643079
T1 - Colloquium on Control and Application of Remote Piloted Vechicles
Y1 - 1980
N1 - London, UK
N1 - 23 Oct. 1980
N2 - The following topics were dealt with: the control of remotely piloted helicopters, a simulator to study the human factors of a remote piloted vehicle, the control of underwater RPVs, computer control of industrial plant carriers, and the capabilities of underwater RPVs. Abstracts of individual papers can be found under the relevant classification codes in this or future issues
KW - telecontrol
KW - vehicles
KW - remotely piloted helicopters
KW - simulator
KW - underwater RPVs
KW - computer control
KW - industrial plant carriers
CY - London, UK
PB - IEE

TY - CONF
ID - 1628317
T1 - Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
A1 - Sorensen, J. A.
A1 - Waters, M. H.
Y1 - 1980

N1 - I
N1 - San Francisco, CA, USA
N1 - 13-15 Aug. 1980
N2 - A practical scheme is presented for generating fixed range, minimum fuel vertical flight profiles that also satisfy time-of-arrival constraints. The resulting algorithm is suitable for incorporation into an on-board flight management system. Example results show that such a capability can save up to 6% of fuel burned in flights subject to delays because of terminal area congestion
KW - aerospace control
KW - aircraft
KW - optimal control
KW - aircraft
KW - trajectory optimization
KW - flight management system
KW - minimum fuel problem
JA - 1980 Joint Automatic Control Conference
SP - WA10-D/3 pp.
CY - New York, NY, USA
PB - IEEE
AD - Analytical Mech. Associates Inc., Mountain View, CA, USA

TY - CONF
ID - 1536318
T1 - Helicopter pilot performance and workload as a function of night vision symbologies
A1 - Hartzell, E. J.
Y1 - 1979
N1 - II
N1 - Fort Lauderdale, FL, USA
N1 - 12-14 Dec. 1979
N2 - A study was undertaken to investigate several human factors questions of man-machine integration mediated through infrared video displays and symbologies. A full six-degree-of-freedom motion simulation of an advanced US Army helicopter flying a night NOE scenario was conducted. The dynamic visual scene was obtained from a video picture of a terrain board and three-candidate computer generated flight control symbologies were video-mixed with the scene. Six experienced helicopter pilots were employed as subjects and trained to fly a scenario incorporating multiple precision hover maneuvers which varied in difficulty and task loading. The experiment was designed to assess pilot performance, training requirements, and work-load as a function of the three symbologies
KW - aerospace simulation
KW - helicopters
KW - human factors
KW - man-machine systems
KW - workload
KW - night vision symbologies
KW - human factors
KW - simulation
KW - helicopter pilot performance
KW - man machine systems
JA - Proceedings of the 18th IEEE Conference on Decision and Control Including the Symposium on Adaptive Processes
SP - 995-6
CY - New York, NY, USA
PB - IEEE
AD - US Army Aeromech. Lab., Moffett Field, CA, USA

TY - CONF
ID - 1394529
T1 - AGARD Conference Proceedings No.255. Operational Helicopter Aviation Medicine
A1 - Knapp, S. C.
Y1 - 1978
N1 - Fort Rucher, AL, USA
N1 - 1-5 May 1978
N2 - The following topics were dealt with: medical aspects of medical evacuation and search/rescue operations; environmental aspects of helicopter operations; helicopter operations crew fatigue panel; human factors of helicopter design and operations; visual and acoustic aspects of helicopter operations; safety aspects of helicopter design and operations. 67 papers were presented, all of which are published in full in the present proceedings
KW - helicopters
KW - medicine
KW - medical evacuation
KW - environmental aspects
KW - helicopter operations
KW - crew fatigue
KW - human factors
KW - safety
KW - helicopter design

KW - operational helicopter aviation medicine
KW - search rescue operations
CY - Neuilly-sur-Seine, France
PB - AGARD

TY - CONF
ID - 1271964
T1 - Airline pilot scanning behavior during approaches and landing in a Boeing 737 simulator
A1 - Spady, A. A. , Jr.
Y1 - 1978
N1 - Dayton, OH, USA
N1 - 17-20 Oct. 1977
N2 - A series of approaches using airline-rated Boeing 737 pilots in an FAA qualified simulator has been conducted. The test matrices include both manual and coupled approaches for VFR, Category I and Category II conditions. A nonintrusive oculometer system was used to track the pilot's eye-point-of-regard throughout the approach. The results indicate that, in general, the pilots use a different scan technique for the manual and coupled (auto-pilot with manual throttle) conditions. For the manual approach 73 percent of the time was spent on the flight director and 13 percent on airspeed as opposed to 50 percent on flight director and 23 percent on airspeed for the coupled approaches
KW - aerospace simulation
KW - aircraft
KW - human factors
KW - landing
KW - Boeing 737 simulator
KW - approaches
KW - nonintrusive oculometer system
KW - airline pilot scanning behaviour
JA - AGARD Conference Proceedings, No.240. Guidance and control design considerations for low-altitude and terminal-area flight
SP - 17/1-5
CY - Neuilly-sur-Seine, France
PB - AGARD
AD - Langley Res. Center, NASA, Hampton, VA, USA

TY - CONF
ID - 1271959
T1 - Flight performance and pilot workload in helicopter flight under simulated IMC employing a forward looking sensor
A1 - Beyer, R.
Y1 - 1978
N1 - Dayton, OH, USA
N1 - 17-20 Oct. 1977
N2 - The low altitude and terminal area flight of helicopters under IMC is a much desired goal in both civil and military fields. Electro-optical sensors and associated displays may be a part of a future helicopter avionics system to achieve this goal. In order to study some related problems a study was made giving particular emphasis to flight performance and pilot workload in flights under simulated IMC employing a forward looking sensor as well as to the layout of the display and the sensor system. The experiments were flown in a Bell UH-1D helicopter and the paper presents the technical approach which was chosen and some of the results which were obtained
KW - aerospace control
KW - aerospace simulation
KW - helicopters
KW - human factors
KW - pilot workload
KW - helicopter flight
KW - forward looking sensor
KW - flight performance
JA - AGARD Conference Proceedings, No.240. Guidance and control design considerations for low-altitude and terminal-area flight
SP - 6/1-9
CY - Neuilly-sur-Seine, France
PB - AGARD
AD - Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Inst. fur Flugfuhrung, Braunschweig-Flughafen, West Germany

TY - JOUR
ID - 1197583
T1 - Prediction of pilot opinion ratings using an optimal pilot model
A1 - Hess, R. A.
Y1 - Oct. 1977
N2 - A brief review of some of the more pertinent applications of analytical pilot models to the prediction of aircraft handling qualities is undertaken. The relative ease with which multiloop piloting tasks can be modeled via the optimal control formulation makes the use of optimal pilot models particularly attractive for handling qualities research. A rating hypothesis is introduced

which relates the numerical pilot opinion rating assigned to a particular vehicle and task to the numerical value of the index of performance resulting from an optimal pilot modeling procedure as applied to that vehicle and task. This hypothesis is tested using data from piloted simulations and is shown to be reasonable. An example concerning a helicopter landing approach is introduced to outline the predictive capability of the rating hypothesis in multiaxis piloting tasks
KW - aerospace control
KW - helicopters
KW - human factors
KW - modelling
KW - optimal control
KW - analytical pilot models
KW - prediction
KW - aircraft handling qualities
KW - optimal control
KW - optimal pilot models
KW - rating hypothesis
KW - pilot opinion rating
KW - helicopter landing
KW - multiaxis piloting tasks
KW - human factors
KW - aircraft control
JF - Human Factors
JA - Hum. Factors (USA)
VL - 19
IS - 5
SP - 459-76
SN - 0018-7208
AD - Ames Res. Center, NASA, Moffett Field, CA, USA

TY - JOUR
ID - 1197581
T1 - A design procedure for control/display systems
A1 - Curry, R. E.
A1 - Kleinman, D. L.
A1 - Hoffman, W. C.
Y1 - Oct. 1977
N2 - Proposes a design procedure for control and display systems in which levels of automation vary over a significant range. The elements of the primary analysis tool (the optimal control model of the human operator) are briefly reviewed, and the use of the model at three levels of specification (information level, display-element level, and display-format level) is discussed. Based on observation and pilot commentary, it is assumed that the pilot allocates his attention to control the aircraft to the desired level of performance, and then, with remaining capacity, to monitor displays. The facet of behavior is incorporated into the design procedure so that regardless of the level of control automation, all systems are compared at the same level of control performance. The design procedure is applied to the longitudinal control, of a CH-47 helicopter. The procedure points out the need for performance-workload relations for control, which are fairly well understood, and performance-workload relations for monitoring, about which little is known
KW - aerospace control
KW - aircraft instrumentation
KW - display instrumentation
KW - human factors
KW - man-machine systems
KW - optimal control
KW - design procedure
KW - display systems
KW - longitudinal control
KW - helicopter
KW - human operator performance
KW - man machine system
KW - pilot performance
KW - display instrumentation
KW - control system
KW - aircraft instrumentation
KW - optimal control
JF - Human Factors
JA - Hum. Factors (USA)
VL - 19
IS - 5
SP - 421-36
SN - 0018-7208
AD - Ames Res. Center, NASA, Moffet Field, CA, USA

TY - JOUR
ID - 1197032
T1 - The effects of cockpit environment on long-term pilot performance
A1 - Stave, A. M.
Y1 - Oct. 1977

N2 - A fixed-base helicopter simulator was used to examine pilot performance as influenced by noise, vibration, and fatigue. SUbjects flew the simulator for periods ranging between three and eight hours while exposed to vibrations (at 17 Hz) ranging from 0.1 to 0.3 g, and noise stimuli varying between 74 (ambient) and 100 dB. Despite reports of extreme fatigue on these long flights, subject performance did not degrade. Within the limits of this study, performance tended to improve as environmental stress increased. However, subjects did suffer from lapses resulting in abnormally poor performance. These lapses are probably of short duration (seconds) and occur at unpredictable times. If such lapses occur in actual flight, they could provide an explanation for many so-called 'pilot error' accidents
KW - aerospace simulation
KW - helicopters
KW - human factors
KW - helicopter
KW - pilot performance
KW - noise
KW - vibration
KW - fatigue
KW - simulator
KW - pilot error
KW - cockpit environment
KW - long term pilot performance
KW - human factors
JF - Human Factors
JA - Hum. Factors (USA)
VL - 19
IS - 5
SP - 503-14
SN - 0018-7208

TY - CONF
ID - 845044
T1 - Flight symbology augmentation of sensor displays
A1 - DeBellis, W. B.
A1 - Fry, C. A.
Y1 - 1975
N1 - Stuttgart, West Germany
N1 - 14-16 May 1974
N2 - A study is presented in which scales were designed to provide altitude, airspeed, and heading information, and were combined into six candidate flight display formats. Both moving and fixed scales were considered. A repeated measure factorial experiment was designed to use response time and control error as dependent variables, and display format and scale indication as independent variables. Twelve US Army aviators flew each format under static base simulation condition by providing a cyclic control stick response to various scale value changes. It was hypothesized that display formats with markedly differing scale types would strongly affect the pilot's response times and errors. However, multivariate and univariate analysis of variances did not verify this hypothesis. There were pronounced differences, but only between individual scale indications. Significant differences in pilot performance between display formats apparently arose from differences in scale factor rather than from the types of scales
KW - aircraft instrumentation
KW - display systems
KW - sensor displays
KW - heading information
KW - flight display formats
KW - measure factorial experiment
KW - response time
KW - control error
KW - scale indication
KW - static base simulation
KW - cyclic control stick response
KW - univariate analysis
KW - pilot performance
KW - flight symbology
KW - altitude information
KW - airspeed information
KW - multivariate analysis
JA - AGARD Conference Proceedings No. 148 on Guidance and Control of V/Stol Aircraft and Helicopters at Night in Poor Visibility
SP - R-111/1-8
CY - Neuilly sur Seine, France
PB - AGARD
AD - US Army Human Engng. Lab., Aberdeen Proving Ground, MA, USA

TY - CONF
ID - 845043
T1 - Research on displays for V/STOL low-level and IMC operations
A1 - Strother, D. D.
A1 - Upton, H. W.

Y1 - 1975
N1 - Stuttgart, West Germany
N1 - 14-16 May 1974
N2 - A review is given of the result of several research studies covering cockpit displays and their effect on the performance of helicopter pilots. Conducted at Bell Helicopter Company, these studies evaluated displays used for the guidance and control of helicopters at night and in restricted visibility, especially for operations at extremely low altitudes
KW - aircraft instrumentation
KW - display systems
KW - helicopters
KW - research studies
KW - cockpit displays
KW - helicopter pilots
KW - displays
KW - guidance
KW - control
KW - restricted visibility
KW - low altitudes
KW - V/STOL low level operations
KW - IMC operations
KW - Bell Helicopter Company
JA - AGARD Conference Proceedings No. 148 on Guidance and Control of V/Stol Aircraft and Helicopters at Night in Poor Visibility
SP - 18/1-11
CY - Neuilly sur Seine, France
PB - AGARD
AD - Human Factors Engng., Bell Helicopter Co., Fort Worth, TX, USA

TY - JOUR
ID - 797094
T1 - Optimal motion of spacecraft in vicinity of Kepler ellipse of arbitrary eccentricity
A1 - Lashkin, V. I.
Y1 - May-June 1974
N2 - Studies the set of equations describing planar perturbed optimal motion of a spacecraft in the gravitational field of a single center of attraction. No limitations are imposed on time and angular range. The motion commences from some fixed point of a Kepler ellipse of arbitrary eccentricity and is effected by the action of a constant-power motor. Minimum fuel consumption is taken to be the optimality criterion. An exact particular solution, corresponding to vertical flight of the spacecraft, is found to the extremal set of equations. The case when the motor thrust is small and the parameters of the osculating trajectories differ insignificantly from those of the initial elliptical orbit is then analyzed in detail and brought to a first-approximation final solution
KW - aerospace control
KW - celestial mechanics
KW - optimisation
KW - space vehicles
KW - constant power motor
KW - spacecraft
KW - Kepler ellipse
KW - arbitrary eccentricity
KW - planar perturbed optimal motion
KW - minimum fuel consumption
KW - vertical flight
KW - osculating trajectories
JF - Kosmicheske Issledovaniya
JA - Kosm. Issled. (USSR)
VL - 12
IS - 3
SP - 353-9
SN - 0023-4206

TY - JOUR
ID - 238796
T1 - A hierarchical model of a helicopter pilot
A1 - Benjamin, P.
Y1 - Aug. 1970
N2 - A hierarchical model of a helicopter pilot is developed and mechanized by means of computer simulation. The basic element of the pilot model is a decision hierarchy which determines the multiloop closure and tracking characteristics of the man-vehicle system. Pilot model input is quantized and used by the hierarchy to determine the specific loop to be closed and the particular transfer function to apply to that loop. The pilot model and vehicle dynamics are implemented on a digital computer. Model validation is provided by comparison of tracking records obtained from this simulation of the vehicle with a human operator. Although developed for a vehicle with only the two lateral degrees of freedom, the pilot model is sufficiently general in form to allow its extension to six degrees of freedom. As a

fourth-order system, it is applicable to the control of not only the helicopter, but all VTOL vehicles. The reduction of higher-order inputs to zero permits applicability to vehicles with lower- order dynamics. Its form is independent of the input function
KW - aerospace applications of computers
KW - human factors
KW - man-machine systems
KW - modelling
KW - simulation
JF - Human Factors
JA - Hum. Factors (USA)
VL - 12
IS - 4
SP - 361-74
SN - 0018-7208
AD - Northwestern Univ., Evanston, IL, USA

TY - CONF
ID - 197583
T1 - Evaluation of an automatic navigation system for use in helicopters
A1 - Lewis, R. E. F.
Y1 - 1969
N1 - 2
N1 - Cambridge, UK
N1 - 8-12 Sept. 1969
N2 - On occasion, helicopter aircrews are required to navigate very accurately over unfamiliar terrain while flying close to ground throughout sorties as long as one hundred miles. The paper concerns the most recent of a series of field trials, conducted to resolve the navigational and human factors problems posed by this king of flying, which dealt with the evaluation of an automatic navigation system that promised a performance better than that of man. The automatic navigation system consisted of a cockpit mounted projected moving map display, doppler radar and an accurate stable platform heading reference. Nearly one hundred hours were flown in a medium transport helicopter by six aircrews in a systematic trial, in which navigation by conventional techniques was compared to that achieved by the various modes of the automatic system
KW - aerospace control
KW - man-machine systems
KW - navigation
JA - Proceedings of the international symposium on man-machine systems
SP - 13 pp.
CY - New York, NY, USA
PB - IEEE
AD - Defence Res. Establ. Toronto, Ont., Canada

TY - JOUR
ID - 11786
T1 - An analysis of pilot adaptation in a simulated multiloop VTOL hovering task
A1 - Vinje, E. W.
Y1 - Dec. 1968
N2 - Human pilot adaptation in a simulated multiloop VTOL hovering task was investigated with a series-loop-closure model. Using the model equations, the pilot-model adaptable parameters were computed from rms hovering performance data measured in flight simulator experiments for a variety of VTOL aircraft configurations. Variations in the aircraft configurations affected both the aircraft's dynamic characteristics and its response to simulated turbulence. The results show no specific low-frequency attitude gain requirements that must be satisfied by the pilot for the attitude disturbance and dynamic characteristics considered. Results also show that the pilot preferred to adjust pitch-loop gain by changing control-stick sensitivity (aircraft gain) rather than by changing his internal gain
KW - human factors
KW - man-machine systems
JF - IEEE Transactions on Man-Machine Systems
JA - IEEE Trans. Man-Mach. Syst. (USA)
IS - 4
SP - 110-20
SN - 0536-1540
ER -

NTIS/TRIS/Aerospace Database

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File 108:AEROSPACE DATABASE_1962-2001/JUN

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AN- 00864491
DT- DA
TI- SAFETY CIRCLES: IMMOVABLE HUMAN-FACTORS OBSTACLES ARE A MAJOR CONCE RN
IN HELICOPTER SAFETY.
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES
PD- 960000
AU- LEARMOUNT, DAVID.
PY- 9600
LA- ENGLISH
SF- TLIB L
JN- FLIGHT INTERNATIONAL.
SO- P. 40-42: COL. ILL.; FLIGHT INTERNATIONAL. VOL. 150, NO. 4545 (OCT. 16-22, 1996)
AB- No abstract provided.
DE- AIRCRAFT ACCIDENTS. HELICOPTERS

AN- 00858020
DT- DA
TI- CREW FACTORS IN FLIGHT OPERATIONS.
FT- PSYCHOPHYSIOLOGICAL RESPONSES TO HELICOPTER OPERATIONS
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES
PD- 19940000
AU- PHILIPPA H. GANDER... ET AL. GANDER, PHILIPPA H.
PY- 1994
LA- ENGLISH
SF- TLIB L
IS- 108838 N95-10861
CS- NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, AMES RESEARCH CENTER,
MOFFETT FIELD, CALIF.: NASA TECHNICAL MEMORANDUM;
AV- NATIONAL TECHNICAL INFORMATION SERVICE, NASA MICROFICHE. 1 MICROFICHE:
NEGATIVE; 11 X 15 CM. SPRINGFIELD, VA.:
SO- VII, 36, A-3 P.: ILL.; INCLUDES BIBLIOGRAPHICAL REFERENCES (P. 34-36).
UNITED STATES. AMES RESEARCH CENTER. "JULY 1994." TECHNICAL MEMORANDUM.

AB- No abstract provided.
DE- HELICOPTER PILOTS HELICOPTERS HELICOPTERS PSYCHOLOGY. PHYSIOLOGICAL
EFFECT. HUMAN FACTORS.

AN- 00837099
DT- DA
TI- ASSESSMENT OF PILOT PERFORMANCE AND MENTAL WORKLOAD IN ROTARY WING
AIRCRAFT.
DA- NORTHWESTERN UNIVERSITY TRANSPORTATION LIBRARY
PD- 19930000
AU- ERIK J. SIREVAAG (UNIVERSITY OF ILLINOIS AT URBANA)... ET AL..
SIREVAAG, ERIK J.
PY- 1993
LA- ENGLISH
SF- TLIB L
JN- ERGONOMICS,
CS- SIREVAAG, ERIK J.
SO- ERGONOMICS, V. 36, NO. 9 (SEPT. 1993), P. 1121-1140.
AB- No abstract provided.
DE- HELICOPTER PILOTS.

AN- 00808925
DT- DA
TI- VERTICAL NAVIGATION DISPLAYS: PILOT PERFORMANCE AND WORKLOAD DURING
SIMULATED CONSTANT ANGLE OF DESCENT GPS APPROACHES
PD- 20010000
AU- Oman, CM Kendra, AJ Hayashi, M Stearns, MJ Burki-Cohen, J
PY- 2001
LA- English
SF- ATRIS A
PG- pp 15-31
FG- 4 Fig.
TB- 3 Tab.
PH- 1 Phot.
RF- Refs.
AD- 1 App.
JV- 11
IS- 1
JN- International Journal of Aviation Psychology
SN- 10508414

CS- Lawrence Erlbaum Associates, Incorporated 10 Industrial Avenue Mahwah NJ 07430-2262
AV- Lawrence Erlbaum Associates, Incorporated Journal Subscription Department, 10 Industrial Avenue Mahwah NJ 07430-2262 N/A
AB- This study compared the effect of alternative graphic or numeric vertical navigation aircraft cockpit displays on horizontal and vertical flight technical error, workload, and subjective preference. Displays included: 1) a moving map with altitude range arc; 2) the same format, supplemented with a push-to-see profile view, including a vector flight-path predictor; 3) an equivalent numeric display; and 4) a numeric nonvertical navigation display. 16 pilots each flew 4 different approaches with each format in a Frasca 242 simulator. The vertical navigation displays of the authors reduced vertical flight technical error by as much as a factor of 2 without increasing workload. Relative advantages of the graphics formats are also discussed.
SH- A12 GENERAL AVIATION
DE- Information display systems Instrument displays Air transportation General aviation Air pilots Flight simulators Cockpits Vertical navigation displays (Cockpit)

AN- 00801950
DT- DA
TI- EKRANOPLANES. CONTROLLED FLIGHT CLOSE TO THE SEA
PD- 20000000
AU- Nebylov, A Wilson, PA
PY- 2000
LA- English
SF- ATRIS A
PG- 250p
SN- N/A
BN- 1853128317
CS- WIT Press Ashurst Lodge, Ashurst Southampton SO40 7AA United Kingdom
AV- Computational Mechanics Incorporated 25 Bridge Street Billerica MA 01821- N/A
AB- This book has been translated from Russian and is dedicated to the problem of flight control at low altitudes over the sea. Specifically concerned with Ekranoplanes, a new aircraft which uses low resistance of ground effect flight, the book will also be of interest to researchers and designers of hovercraft, hydrofoils, helicopters, special purpose aircraft, search and rescue craft and other types of craft designed for working close to the sea. Included with the book is a video on CD-ROM showing versions of the Ekranoplane in flight and general operations.
SH- A01 AIRCRAFT
DE- Aircraft Flight control systems Flight dynamics Ground effect Search and rescue operations Instrumentation Flight tests Ekranoplane Special purpose aircraft Low altitude flight

AN- 00794587
DT- DA
TI- THE DEVELOPMENT OF SPECIFICATIONS FOR AN AUTOMATED MONITORING SYSTEM
INTERFACE ASSOCIATED WITH AIRCRAFT CONDITION
PD- 19990000
AU- Deaton, JE Glenn, FA
PY- 1999
LA- English
SF- ATRIS A
PG- pp 175-187
FG- 1 Fig.
TB- 1 Tab.
RF- Refs.
JV- 9
IS- 2
JN- International Journal of Aviation Psychology
SN- 10508414
CS- Lawrence Erlbaum Associates, Incorporated 10 Industrial Avenue Mahwah NJ 07430-2262
AV- Lawrence Erlbaum Associates, Incorporated Journal Subscription Department, 10 Industrial Avenue Mahwah NJ 07430-2262 N/A
AB- Due to the complexity and interconnectedness of aircraft subsystems, considerable intrepretation is necessary to determine the implications of conventional system warnings and to decide on an appropriate course of action to ameliorate a fault condition. This paper focuses on mechanical fault conditions in rotorcraft. Until recently, only a few simple sensors were provided to signal mechanical problems. However, a variety of new sensors and analyzers have recently become available, under the general rubric of health and usage monitoring systems, which purport to provide more sensitive identifications of faults along with the expectation of future extensions to fault diagnosis and prognosis as well. A motion-based simulator was used to gather performance data associated with air crew responses to a variety of mechanical faults using current cockpit instrumentation. Participants were then interviewed as to their information requirements for using new diagnostic systems to mitigate in-flight mechanical system emergencies.

Results gave initial support for a taxonomy of air crew cognitive activities. This classification scheme is being used in ongoing work to design and evaluate information aids for rotorcraft air crews.
SH- A12 GENERAL AVIATION A19 SAFETY
DE- Aviation safety Air transportation Rotary wing aircraft Indicators (Instruments) General aviation Flight crews Mechanical failure Flight simulators Cockpits Aircraft design

AN- 00766473
DT- DA
TI- HELICOPTER HUMAN FACTORS. IN: HANDBOOK OF AVIATION HUMAN FACTORS
PD- 19990000
AU- Hamilton, BE
PY- 1999
ED- Garland, DJ Wise, JA Hopkin, VD
LA- English
SF- ATRIS A
PG- pp 405-428
FG- 4 Fig.
TB- 1 Tab.
RF- Refs.
SN- N/A
BN- 0805816801
CS- Lawrence Erlbaum Associates, Incorporated 10 Industrial Avenue Mahwah NJ 07430-2262
AV- Lawrence Erlbaum Associates, Incorporated 10 Maple Street Norwood NJ 07648- N/A
AB- Helicopters present many of the same issues to the human factors engineers as do fixed-wing aircraft. This paper examines some of the unique challenges that helicopters have, issues that are related mostly to how helicopters generate and control lift, and to what is done with their unique flight capabilities. The different phases in helicopter design that have an affect on the role of human factors include: requirements definition phase; preliminary design phase; detailed design phase; assembly phase, and the flight test phase. Additional vital areas of concern are workload and operational effectiveness. The paper reviews the sources of helicopter workload and engineering solutions to the workload.
SH- A01 AIRCRAFT
DE- HELICOPTERS HUMAN FACTORS DESIGN ENGINEERING COCKPITS HUMAN FACTORS
ENGINEERING USER BENEFITS WORKLOAD

AN- 00760057
DT- DA
TI- IMPROVING THE CONTINUED AIRWORTHINESS OF CIVIL AIRCRAFT
PD- 19980000
PY- 1998
LA- English
SF- ATRIS A
PG- 74p
FG- Figs.
TB- Tabs.
RF- Refs.
SN- N/A
CS- National Academy Press 2101 Constitution Avenue, NW Washington DC 20418
AV- National Academy Press 2101 Constitution Avenue, NW Washington DC 20418 N/A
SO- Authored by Committee on Aircraft Certification Safety Management, Aeronautics and Space Engineering Board, Commission on Engineering and Technical Systems, and National Research Council.
AB- This report focuses on the committee's primary task: defining the key elements of an improved aircraft certification safety management process for large transport airplanes and recommending how potential barriers to implementing the recommended process could be overcome. Chapter 2 provides background information on the role of AIR (Aircraft Certification Service), on how that role has evolved, and on specific regulatory actions that are part of the current safety management process. Chapter 3 provides background information on the causes of incidents and accidents. Chapter 4 describes the recommended safety management process, which includes a mechanism for monitoring its own effectiveness. Chapter 5 describes the relationships between human factors, environmental factors, and aircraft systems in accidents and incidents, followed by comments on several current initiatives to reduce accidents and incidents associated with human error. Chapter 6 recommends approaches for overcoming five key barriers to the implementation of the recommended safety management plan. Chapter 7 describes special characteristics of the small aircraft and rotorcraft communities and the special concerns that these characteristics raise with respect to the recommended safety management plan.
SH- A01 AIRCRAFT
DE- AIRWORTHINESS AIRCRAFT ACCIDENTS AVIATION SAFETY AIRLINES CERTIFICATION

TRANSPORT AIRCRAFT HUMAN FACTORS IN ACCIDENTS SMALL AIRCRAFT

AN- 00744589
DT- DA
TI- GENERAL AVIATION ACCIDENTS, 1983-1994: IDENTIFICATION OF FACTORS RELATED TO CONTROLLED-FLIGHT-INTO-TERRAIN (CFIT) ACCIDENTS
PD- 19970600
AU- Bud, MJ Mengert, P Ransom, S Stearns, MD
PY- 1997
LA- English
SF- ATRIS A
RN- DOT-VNTSC-FAA-97-8, DOT/F AA/AAR-100-97-2
PG- 26p
SN- N/A
CS- Volpe National Transportation Systems Center Kendall Square Cambridge MA 02142 Federal Aviation Administration 800 Independence Avenue, SW Washington DC 20591
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 PB97-203426WTS
AB- A controlled-flight-into-terrain accident (CFIT) is any collision with terrain (or water) in which the pilot was in control of the aircraft but was not aware of the airplane's altitude, the terrain elevation, or the airplane's position in terms of latitude or longitude. This report describes the characteristics of general aviation (GA) accidents and identifies factors related to the occurrence of CFIT accidents in GA. This study used the National Transportation Safety Board (NTSB) database of 31,790 aviation accidents that occurred between 1983 and 1994, inclusive. In the NTSB aviation accident databases, 86% of these accidents were GA accidents. This study analyzed the subset of accidents involving GA airplanes and helicopters.
SH- A19 SAFETY
DE- GENERAL AVIATION ACCIDENTS COLLISIONS ACCIDENT CAUSES TERRAIN AVOIDANCE
HELICOPTERS PILOT PERFORMANCE

AN- 00741838
DT- DA
TI- AMERICAN HELICOPTER SOCIETY. 53RD ANNUAL FORUM PROCEEDINGS
PD- 19970000
PY- 1997
LA- English
SF- ATRIS A
PG- 1993p
FG- Figs.
TB- Tabs.
RF- Refs.
SN- N/A
CS- American Helicopter Society 217 N Washington Street Alexandria VA 22314-2538
AV- American Helicopter Society 217 N Washington Street Alexandria VA 22314-2538 N/A
AB- The theme for this conference is "Affordable Vertical Lift" and is examined in detail by special sessions dealing with affordability and rotorcraft economics. Topics covered include: acoustics, crew stations and human factors, military operations, aerodynamics, flight simulation, aircraft design, structures and materials, avionics and systems, crash safety, integrated manufacturing process and control, rotorcraft economics and VTOL/STOL aircraft.
CT- American Helicopter Society. 53rd Annual Forum Proceedings. 3 Volumes
CL- Virginia Beach, VA
CD- 19970429
SP- American Helicopter Society
SH- A01 AIRCRAFT
DE- HELICOPTERS ACOUSTICS CREW REQUIREMENTS CREW SAFETY CREWS AERODYNAMICS
ROTOR AERODYNAMICS ECONOMICS DESIGN SAFETY MANUFACTURING VSTOL/STOL
AIRCRAFT AVIONICS

AN- 00741345
DT- DA
TI- EVALUATION OF DRIVER CHARACTERISTICS ON EXPRESSWAYS
PD- 19960000
AU- Nakayama, H Fujimoto, S Miura, N Matsumoto, K Sakamoto, K
PY- 1996
LA- English
SF- HRIS H
PG- pp 50-51
SN- N/A
CS- ITS America 400 Virginia Avenue, SW, Suite 800 Washington DC 20024-2730
AV- ITS America 400 Virginia Avenue, SW, Suite 800 Washington DC 20024-2730 N/A
SO- Full conference proceedings available only on CD.
AB- This paper describes evaluation and classification methods for driver

characteristics on expressways. The investigations have been carried out in four stages. First a questionnaire of 149 drivers was conducted to confirm the initial classification method of drivers' characteristics. The drivers included males and females from 18 to 61 years old. Four types of drivers were classified by the questionnaires. Those were: aggressive (A type), keep speed (B type), following (C type), and safety (D type). Second, a driving test was used to confirm those driver types with four drivers selected from each type, for a total of 16 drivers. Third, 11 drivers were selected as a sample of the motoring population to carry out an investigation on the Keiyo expressway in Japan, using a test vehicle. The test vehicle was installed with accelerator, brakes, engine speed and vehicle speed sensors. Galvanic skin response (GSR) and drivers' view point devices were also installed to collect the psychological data of the driver. The surrounding of the vehicle was monitored by a video camera on a helicopter which was chasing the vehicle. The fourth stage was evaluation of these data using a hyperbolic function. The findings are based upon the results of investigations that driver characteristics could be estimated by the desired speed and the desired spacing using parameters of the hyperbolic function. It is concluded that driver type can be estimated by questionnaire and can be applied to traffic flow simulation.

CT- Intelligent Transportation: Realizing the Future. Abstracts of the Third World Congress on Intelligent Transport Systems
CL- Orlando, Florida
CD- 19961014
SP- ITS America
SH- H52 HUMAN FACTORS I83 ACCIDENTS AND THE HUMAN FACTOR
DE- EVALUATION (ASSESSMENT) DRIVER CHARACTERISTICS EXPRESSWAYS QUESTIONNAIRES GALVANIC SKIN RESPONSE PSYCHOLOGICAL EXAMINATION TRAFFIC FLOW SIMULATION

AN- 00725013
DT- DA
TI- 52ND ANNUAL FORUM PROCEEDINGS OF THE AMERICAN HELICOPTER SOCIETY, WASHINGTON, D.C., JUNE 4-6, 1996. VOLUMES 1 AND 2 AND VOLUME 3 ADDENDUM
PD- 19960000
PY- 1996
LA- English
SF- ATRIS A
PG- 1966p
FG- Figs.
TB- Tabs.
PH- Phots.
RF- Refs.
SN- N/A
CS- American Helicopter Society 217 N Washington Street Alexandria VA 22314-
AV- American Helicopter Society 217 N Washington Street Alexandria VA 22314- N/A
AB- The technical program of the American Helicopter Society's 52nd Annual Forum and Technology Display, FORUM 52, covers the latest in vertical flight technology. These proceedings contain the papers presented during two and one-half days of intense discussion. The technical sessions are organized along the lines of the Technical Council of the American Helicopter Society. Twenty-five sessions, grouped into five parallel technical areas (aeromechanics, system integration, vehicle design, vehicle integrity, operations and product support) are supported by 157 speakers and alternates. The papers presented were selected by members of the Society's Technical Committees from abstracts offered in response to a call for papers in August 1995. The American Helicopter Society Forum brings together vertical flight specialists from an international cross section of academia, industry and government. FORUM 52 is more than technical presentations as it includes exhibits from a broad spectrum of the vertical flight community and special events. An opening general session titled "Technology Without Borders" covers the goals and objectives of the international vertical lift community. A second seminar on "JAST '96: Developing the Future Joint Air Strike Fighter" reported the latest program plans for this international development. A VTOL/STOVL special session focused on JAST technology. Two special sessions on "System Health and Usage Monitoring" highlighted the latest technical accomplishments in this new discipline that offers substantial increases in safety and reliability with the potential for lower overall costs. The papers in Volume 1 are organized according to the following topics: Acoustics; Dynamics I; Avionics and Systems; Aircraft Design I; Structures and Materials I; Product Support Panel; Aerodynamics I; Flight Simulation; Integrated Manufacturing Process and Control Technology I; Military Operations; Dynamics II; and Handling Qualities I. The papers in Volume 2 are arranged by the following topics: Structures and Materials II; Test and Evaluation; Aeroacoustics; Crew Stations and Human Factors; Aircraft Design II; VTOL/STOVL Aircraft; Crash Safety; System Health and Usage Monitoring I; Aerodynamics II; Handling Qualities II; Propulsion; Integrated

Manufacturing Process and Control Technology II; and System Health and Usage Monitoring II. Appendix 3 Addendum contains papers not available at the time that Volumes 1 and 2 were printed.
SH- A01 AIRCRAFT
DE- CONFERENCES HELICOPTERS VERTICAL FLIGHT TECHNOLOGY ACOUSTICS DYNAMICS
AVIONICS AIRCRAFT DESIGN AIRCRAFT STRUCTURES AIRCRAFT MATERIALS DIAGNOSTICS AERODYNAMICS FLIGHT SIMULATION MANUFACTURING MILITARY
OPERATIONS HANDLING TEST AND EVALUATION AEROACOUSTICS CREW STATIONS
HUMAN FACTORS VTOL/STOVL AIRCRAFT CRASHWORTHINESS PROPULSION SYSTEMS

AN- 00678008
DT- DA
TI- ASSESSMENT OF NIGHT VISION GOGGLE WORKLOAD: FLIGHT TEST ENGINEER'S
GUIDE
PD- 19940700
AU- Green, DL
PY- 1994
LA- English
SF- ATRIS A
RN- SCT-91-RR-45 DOT-FAA-RD-94-20
PG- 77p
SN- N/A
CS- Systems Control Technology, Incorporated 1611 North Kent Street, Suite 910 Arlington VA 22209
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A284 012-2-WTS
SO- See also AD-A283 602-1 and AD-A283-594-0.
AB- This document was developed to aid in the evaluation of the use of night vision goggles (NVGs) by civil helicopter pilots. This report was used to prepare pilots to participate in the flight test program. The principal task was to determine if there are any unresolved safety issues that would preclude pilot use of NVGs during helicopter operations under Federal Aviation Regulations Parts 91 or 135. Certainly NVGs can enable a pilot to 'see better' at night and to accomplish certain flight objectives. However, the question is, is safety degraded during any phase of the flight operation if pilots use these devices. Even if the use of NVGs dramatically improves operational effectiveness, current safety margins must be maintained or improved during all phases of flight. This report is one of three documents that were developed for evaluating the use of NVGs by EMS helicopter pilots. The other 2 reports are: 1) FAA/RD-94/18, Civil Use of Night Vision Devices Evaluation Pilot's Guide, Part 1; and 2) FAA/RD-94/19, Civil Use of Night Vision Devices Evaluation Pilot's Guide, Part 2.
SH- A19 SAFETY
DE- PILOT PERFORMANCE NIGHT VISION HELICOPTER PILOTS CIVIL AVIATION PILOT
PERFORMANCE FLIGHT TESTS

AN- 00662985
DT- DA
TI- AMERICAN HELICOPTER SOCIETY 50TH ANNUAL FORUM PROCEEDINGS. FORUM 50
PD- 19940500
PY- 1994
LA- English
SF- ATRIS A
PG- 1459p
FG- Figs.
TB- Tabs.
RF- Refs.
CS- American Helicopter Society 217 North Washington Street Alexandria VA 22314-
AV- American Helicopter Society 217 North Washington Street Alexandria VA 22314- N/A
AB- Volume 1 of this proceedings contains sessions on the following subject areas: Virtual Prototyping & Distributed Interactive Simulation; Acoustics; Crew Stations & Human Factors; Manufacturing & Product Assurance; Product Support; Aircraft Design; Dynamics; Propulsion; Crash Safety; Test & Evaluation; and Helicopter Technologies of Japan. Volume 2 contains sessions on the following subject areas: Avionics and Systems; Flight Simulation; Structures and Materials; Military Operations; Aerodynamics; and Handling Qualities.
CT- American Helicopter Society 50th Annual Forum Proceedings. Forum 50. Volume 1 and Volume 2
CL- Washington, D.C.
CD- 19940511
SP- American Helicopter Society
SH- A01 AIRCRAFT A16 NAVIGATION
DE- HELICOPTERS FLIGHT SIMULATION ACOUSTICS AIRCRAFT DESIGN AVIONICS AERODYNAMICS

AN- 00651553
DT- DA
TI- INVESTIGATION OF SPRINGING RESPONSES ON THE GREAT LAKES ORE CARRIER M/V
STEWART J. CORT
DA- Maritime Technical Information Facility
PD- 19801200
AU- Swanek, RA Kihl, DP
PY- 1980
LA- English
SF- MRIS M
RN- CG-D-17-81
PG- 313p.
RF- Refs.
CS- David W. Taylor Naval Ship Research and Development Center Bethesda MD Coast Guard Washington DC
AV- Available from NTIS N/A AD-A100-293
SO- Report; For related documents, see AN 3079, Record 3921; AN 3094, Record 3923; AN 3074, Record 3920
CN- MIPR-85117-5B
AB- From October through December 1979, DTNSRDC collected wave, stress and pressure measurements from on board the 1000 foot ore carrier, M/V STEWART J. CORT. An attempt was also made to verify the wave measurement system on the CORT via correlation with data from a wave buoy deployed by USCG helicopter. Following the data collection period, DTNSRDC performed a preliminary data analysis and made comparisons between measured and analytical bending moment RAO's (Response Amplitude Operators). The main text of this report includes a complete description of the full scale instrumentation, calibration, data analysis and results.
DE- SPRINGING BENDING MOMENTS STRESSES WAVE MEASUREMENT STRUCTURAL RESPONSE
GREAT LAKES VESSELS ANALYSIS STEWART J. CORT (VESSEL)

AN- 00650273
DT- DA
TI- A PILOT STUDY OF HUMAN FACTORS IN SAR:INTERIM REPORT
DA- Maritime Technical Information Facility
PD- 19820500
AU- Remondini, DI Light, M Everson, ML and others
PY- 1982
LA- English
SF- MRIS M
RN- CG-D-19-82
PG- 70p.
RF- Refs.
CS- National Institute of Health Bethesda MD Coast Guard Research and Development Center Groton CT Coast Guard Research and Development Center Groton CT Coast Guard Washington DC
AV- Available from NTIS N/A AD-A117-917
SO- Report
AB- During three visual detection experiments, the USCG R&D Center collected human factors information. Various human factor parameters thought intuitively to affect the performance of a lookout were measured and analyzed. These included experience level, time on watch, amount of sleep, and lookout position. This report presents the results of this pilot study. Lookout subjects from HH-3F and HH-52A helicopters, 82-ft patrol boats (WPBs), 210-ft medium endurance cutters (WMECs), and 41-ft small utility boats (UTBs) were included. Time on watch was found to have a marked influence on performance of lookouts on surface units.
DE- SEARCH AND RESCUE VISUAL DETECTION HUMAN FACTORS LOOKOUTS FATIGUE
(BIOLOGY) EXPERIMENTAL DATA

AN- 00649371
DT- DA
TI- VISUAL SENSITIVITIES AND DISCRIMINATIONS AND THEIR ROLES IN AVIATION
DA- Maritime Technical Information Facility
PD- 19850617
AU- Regan, D
PY- 1985
LA- English
SF- MRIS M
RN- AFOSR-TR-85-0639
PG- 44p.
RF- Refs.
CS- Dalhousie University Department of Ophthalmology and Medicine Halifax Canada Air Force Office of Scientific Research Bolling AFB DC
AV- Available from NTIS N/A AD-A158-962
SO- Report
CN- AFOSR-84-0030

AB- This report presents 4 studies. (1) An individual's ability to discriminate small differences in orientation about 5% and 0.5 deg respectively contrasts with the coarse size and orientation selectivity of neurons in the visual cortex of the brain. The author reports evidence that these fine discriminations are achieved by means of opponent processing: size discrimination is determined by antagonism between neurons that are coarsely selective for size, and orientation discrimination is mediated by neurons that are coarsely selective for orientation. Opponent processing implies that the neurons that determine detection are not the neurons that determine fine discrimination: that prediction has been experimentally verified. (2) The author has measured motion discrimination in pilots and attempted to predict flying performance in simulators and telemetry-tracked aircraft. Correlations between laboratory tests and flying performance were encouraging, and were much stronger than for simple visual sensitivities such as motion or contrast sensitivity. (3) Some objects are invisible unless they move relative to the background, for example, a grassy hillock viewed against grass in nap of the earth helicopter flight. The author has compared human visual sensitivity to such objects, with sensitivity to conventional objects defined by brightness difference. Spatial summation area, and temporal summation area are much larger for motion-defined objects than for brightness-defined objects. (4) Evidence is reported showing that the Vector Analysis technique of mathematics may be relevant to the physiological study of visual cues in guided self-motion.
DE- VISION AIRCRAFT PILOT PERFORMANCE VISUAL PERCEPTION MOTION PERCEPTION
FLIGHT SIMULATORS ORIENTATION BRAIN

AN- 00648317
DT- DA
TI- HUMAN FACTORS AND SEAKEEPING EVALUATION CONDUCTED ON THE USS BOONE (FFG
28)
DA- Maritime Technical Information Facility
PD- 19850900
AU- Rossignol, GA
PY- 1985
LA- English
SF- MRIS M
RN- DTNSRDC/SPD-0849-02
PG- 47p.
RF- Refs.
CS- David W. Taylor Naval Ship Research and Development Center Bethesda MD
Naval Biodynamics Laboratory New Orleans LA
AV- Available from NTIS N/A AD-B095 729
SO- Report; DTIC distribution restrictions apply
AB- This report presents the results of observations and measurements made during a trans-Atlantic transit on the USS BOONE (FFG 28), a FFG 7 Class guided missile frigate. The observations and measurements were made to assess the human factors effects of ship motions/environmental conditions on the performance of various combat systems related tasks. The attempt was made to identify those tasks/subtasks which are particularly motion sensitive. The operating environment was fairly moderate during the trials, with significant wave heights not exceeding 8 feet (2.4 meters). The only motion sensitive (combat systems related) subtasks conducted were those associated with UNREP and helicopter OPS. The subtasks which seem to be most motion sensitive are the fuel hose transfer (UNREP), flight deck to hangar helicopter movement, and helicopter landings. (Author)
DE- SHIP MOTION EFFECTS (PHYSIOLOGY) HUMAN FACTORS SEAKEEPING BOONE
(VESSEL)

AN- 00639224
DT- DA
TI- ARREST AND CONVICTION OF INJURED INTOXICATED DRIVERS IN EASTERN PENNSYLVANIA
PD- 19931000
AU- Barillo, DJ
PY- 1993
LA- English
SF- HRIS H 9302
PG- pp 635-639
FG- 1 Fig.
TB- 6 Tab.
RF- 12 Ref.
JV- 25
IS- 5
JN- Accident Analysis and Prevention
SN- 00014575
CS- Pergamon Press plc Headington Hill Hall Oxford OX3 0BW England
AV- Pergamon Press, Incorporated Maxwell House, Fairview Park Elmsford NY 10523 N/A
AB- The legal hazards of driving under the influence (DUI) are frequently not appreciated by alcohol users. Physicians who treat such patients

following collisions are often unaware of the judicial disposition following hospital discharge. We examined the courthouse records of 511 intoxicated drivers involved in collisions and admitted to one Level I Trauma Center to determine if DUI arrests and convictions were obtained. The proportion arrested for DUI ranged from 6%-54% (mean 41%) depending on county of crash site and distance from the trauma center. Of those arrested, the proportion of DUI convictions averaged 98% for all jurisdictions. Two hundred and nineteen intoxicated drivers were transported from the crash scene by helicopter. Increased transport distance was associated with a lower arrest proportion (p=0.01). Most injured intoxicated drivers in this study were not arrested for DUI. Of those identified and arrested, conviction was a virtual certainty. Helicopter transport may provide additional protection from prosecution.
SH- H51 SAFETY H52 HUMAN FACTORS
DE- DRIVING UNDER THE INFLUENCE PHYSICIANS AND HIGHWAY SAFETY CONVICTIONS
ARRESTS INJURIES MOTOR VEHICLE ACCIDENTS

AN- 00620565
DT- DA
TI- AIRCRAFT ACCIDENT/INCIDENT SUMMARY REPORT: MIDAIR COLLISION INVOLVING
LYCOMING AIR SERVICES PIPER AEROSTAR PA-60 AND SUN COMPANY AVIATION
DEPARTMENT BELL 412, MERION, PENNSYLVANIA, APRIL 4, 1991
PD- 19910917
PY- 1991
LA- English
SF- ATRIS A
RN- NTSB/AAR-91/01/SUM NOTATION 5489A
PG- 28p
FG- 3 Fig.
CS- National Transportation Safety Board 800 Independence Avenue, SW, Federal Office Building 10A Washington DC 20594
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 PB91-910407
AB- This report explains the midair collision involving a Lycoming Air Services Piper Aerostar PA-60 and a Sun Company Aviation Department Bell 412. The safety issues discussed include pilot judgment, the training and checking of flightcrews, the adequacy of the PA-60 flight manual, and FAA surveillance of the carrier.
SH- H51 SAFETY
DE- AIR TRANSPORTATION MIDAIR COLLISIONS PILOTS (PERSONNEL) FLIGHT CREW
FLIGHT MANUALS FEDERAL AVIATION ADMINISTRATION OVERSIGHT AIR TAXIS HELICOPTERS

AN- 00608405
DT- DA
TI- SEAT DYNAMIC PERFORMANCE STANDARDS FOR A RANGE OF SIZES
DA- National Technical Information Service
PD- 19900800
AU- Soltis, S
PY- 1990
LA- English
SF- ATRIS A
RN- DOT/FAA/CT-TN90/23
PG- 27p
CS- Federal Aviation Administration 800 Independence Avenue, SW Washington DC 20591
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 N91-10028/9/WTS
AB- A summary is presented of the rationale that was used to determine the crash impact characteristics for a range of aircraft sizes and places emphasis on developing seat dynamic performance standards that might be used for commuter category size aircraft. The existing crash dynamics data base which includes twin engine general aviation aircraft, rotorcraft, narrow body and wide body transport aircraft were used in this study. The crash impact characteristic of typical airframe structure will be related to the geometric size of the airframe.
SH- H51 SAFETY I83 ACCIDENTS AND THE HUMAN FACTOR
DE- SEATS ACCIDENT AIRCRAFT COMMUTER SERVICES COMMUTER TRANSPORTATION
IMPACT STUDIES IMPACT

AN- 00603204
DT- DA
TI- EVALUATION OF NIGHT VISION GOGGLES FOR MARITIME SEARCH AND RESCUE
(VOLUME I - TECHNICAL REPORT). INTERIM REPORT
PD- 19900300
AU- Reynolds, WHE Robe, RQ Hover, GL Plourde, JV
PY- 1990
LA- English

SF- MRIS M
RN- CG-D-14-90 R&DC 08/90
PC- 8903-9002
PG- 96p
FG- 32 Fig.
TB- 7 Tab.
PH- 11 Phot.
RF- 13 Ref.
CS- United States Coast Guard Research and Development Center, Avery Point Groton CT 06340-6096 Analysis and Technology, Incorporated 190 Governor Winthrop Boulevard New London CT 06320-6223 United States Coast Guard Office of Engineering, Logistics, and Development Washington DC 20593
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A 229 392
SO- This report is the first in a series that will document the Improvement of Search and Rescue Capabilities (ISARC) Project at the U.S. Coast Guard Research and Development Center and twenty-seventh in a series of Research and Development Center reports dealing with Search and Rescue.

AB- Three experiments were conducted during 1989 by the U.S. Coast Guard Research and Development (R&D) Center to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs were evaluated: the AN/AVS-6 Aviators Night Vision Imaging System (ANVIS) NVG was tested onboard Coast Guard HH-3 and CH-3 helicopters, and the AN/PVS-5C and AN/PVS-7A NVGs were tested onboard 41-foot Coast Guard utility boats (UTBs). Simulated persons in the water (PIWs), 4- and 6-person life rafts, 18- and 21-foot white boats, and white, personal flotation device (PFD) strobe lights were employed as targets during realistically-simulated search missions. A total of 1,490 target detection opportunities were generated during the experiments. These data were analyzed to determine which of 25 search parameters of interest exerted a statistically-significant influence on target detection probability. Lateral range curves and sweep width estimates are developed for each search unit/target type combination. Human factors data are presented and discussed. Recommendations for conducting NVG searches for small targets and for additional data collection and analysis are provided. This report consists of two volumes. Volume I contains the text of the report and Volume II contains the data listing. Requests for Volume II should be sent to the U.S. Coast Guard Research and Development Center.
SH- H51 SAFETY
DE- NIGHT VISION GOGGLES SEARCH AND RESCUE UNITED STATES COAST GUARD
EXPERIMENTS PERFORMANCE EVALUATION NIGHT DETECTION DATA ACQUISITION
DATA ANALYSIS HUMAN FACTOR RECOMMENDATIONS

AN- 00575544
DT- DA
TI- DECISION-HEIGHT WINDOWS FOR DECELERATING APPROACHES IN HELICOPTERS:
PILOT VEHICLE FACTORS AND LIMITATIONS
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES 24185797
PD- 19910400
AU- HOH, RH
PY- 1991
LA- ENGLISH
SF- TLIB L
RN- DOT/FAA/CT-90/14 FINAL REPO
PC- 8901-9105
CS- FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY INTERN,
NJIONAL AIRPORT
SO- ADDL PLACE OF PUBLCATION: SPRINGFIELD, VA ADDL PUBLISHER: AVAILABLE
THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE OTHER PHYS.
DESCRIPTION: VIII ILLUSTRATED COVER TITLE PREPARED BY SYSTEMS CONTROL
TECHNOLOGY, INC. UNDER CONTRACT NO.: DTFA01-87-C-00014 APRIL 1991
INCLUDES BIBLIOGRAPHICAL REFERENCES P. 39 ADDL CORP. AUTHOR INFO:
FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER U.S ADDL CORP. AUTHOR
INFO: SYSTEMS CONTROL TECHNOLOGY, INC
CN- DTFA01-87-C-00014.
AB- No abstract provided.
DE- HELICOPTERS LANDING PILOTING HUMAN FACTOR

AN- 00564220
DT- DA
TI- THE HUMAN FACTORS RELATING TO ESCAPE AND SURVIVAL FROM HELICOPTERS
DITCHING IN WATER
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES 22166104
PD- 19890000
AU- BROOKS, CJ

PY- 1989
LA- ENGLISH
SF- TLIB L
RN- E
PG- 60 PP
IS- N305
JN- AGARDOGRAPH ;
CS- NORTH ATLANTIC TREATY ORGANIZATION ADVISORY GROUP NEUILLY-SUR-SEINE,
FRANCE
AV- NATIONAL TECHNICAL INFORMATION SERVICE SPRINGFIELD, VA, ..AZIP: ZZ N/A

SO- BY C.J. BROOKS DEFENCE & CIVIL INSTITUTE OF ENVIRONMENTAL MEDICINE OTHER PHYS. DESCRIPTION: VI ILLUSTRATED INCLUDES BIBLIOGRAPHICAL REFERENCES P. 56-59 ADDL CORP. AUTHOR INFO: NORTH ATLANTIC TREATY ORGANIZATION. ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
ADDL CORP. AUTHOR INFO: CANADA. DEFENCE AND CIVIL INSTITUTE OF ENVIRONMENTAL MEDICINE NORTH ATLANTIC TREATY ORGANIZATION ADVISORY
GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
AB- No abstract provided.
DE- HELICOPTERS ACCIDENT AERONAUTICS HUMAN FACTOR SURVIVAL (AFTER ACCIDENTS)

FN- DIALOG(R)File 63:Transport Res(TRIS)
CZ- (c) fmt only 2001 Dialog Corp. All rts. reserv.
AN- 00555168
DT- DA
TI- SPECIAL CONSIDERATIONS FOR HELICOPTER SAFETY
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES 20608855
PD- 19890000
AU- ADAMS, RJ
PY- 1989
LA- ENGLISH
SF- TLIB L
PG- PP 210-230
JN- AVIATION PSYCHOLOGY
CS- GOWER TECHNICAL ALDERSHOT, HANTS BROOKFIELD VT
SO- RICHARD J. ADAMS ILLUSTRATED BIBLIOGRAPHY: P. 229-230 NOTE: SOURCE IS
MONOGRAPHIC, NOT A SERIES
AB- No abstract provided.
DE- AIR PILOTS PSYCHOLOGY HELICOPTERS SAFETY MEASURES AERONAUTICS ACCIDENT
HUMAN FACTOR

AN- 00496204
DT- DA
TI- FLIGHT IN ADVERSE ENVIRONMENTAL CONDITIONS
DA- National Technical Information Service
PD- 19890000
PY- 1989
LA- English
SF- ATRIS A
RN- AGARD-CP-470
PG- 368p
CS- Advisory Group for Aerospace Research Development 7 rue Ancelle 92 Neuilly-sur-Seine France
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A217 606/3/WTS
AB- Contents: The Human Element-The Key to Safe Civil Operations in Adverse Weather; Wind Shear Models for Aircraft Hazard Investigations; Analysis of Severe Atmospheric Disturbances From Airline Flight Records; Systems for Airborne Wind and Turbulence Measurement; The United States Air Force Approach to All-Weather Testing; Influence of Wind-Shear Downdraft and Turbulence on Flight Safety; Classification of Wind Shear Severity; How to Fly Windshear Using the Fly-by-Wire Concept; A Pitch Control Law for Compensation of the Phugoid Mode Induced by Windshears; Adverse Weather Operations During Canadian Atlantic Storms Program; Canard Versus AFT-Tail: Ride Qualities Performance and Pilot Command Response; The Interference of Flight mechanical Control Laws with Those of Load Alleviation and Its Influence on Structural Design; Turbulence Effects on Aircraft Flight Dynamics and Control; NASA's program on Icing Research and Technology; Ice Induced Aerodynamic Performance Degradation Rotorcraft - An Overview; Flight and Wind Tunnel Investigation of Aerodynamic Effects of Aircraft Ground Deicing/Anti-Icing Fluids; Effects of Lighting on Operations of Aerospace Vehicles; and Aircraft Testing in the Electromagnetic Environments. Symposia.
SH- H51 SAFETY
DE- HUMAN FACTOR WIND AIR TRANSPORTATION AIRCRAFT PILOTS (PERSONNEL) WIND
VELOCITY TURBULENCE FLIGHT CONTROL FLIGHT PLAN AERODYNAMICS

ELECTROMAGNETIC INTERFERENCE STORMS HAZARD SAFETY SAFETY STANDARDS
PROTECTIVE EQUIPMENT AVIATION WIND TUNNELS LIGHTNING STRUCTURAL DESIGN

AN- 00495235
DT- DA
TI- HELIPORT SURFACE MANEUVERING TEST RESULTS
DA- National Technical Information Service
PD- 19890100
AU- Weiss, RM Wolf, CJ Erlichman, SL Morrow, JG
PY- 1989
LA- English
SF- ATRIS A
RN- DOT/FAA/CT-TN88/30
PG- 81p
CS- Federal Aviation Administration Technical Center Atlantic City International Airport Atlantic City NJ 08405
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD A214 116/6/WTS
AB- During late fall 1987 and early spring 1988 flight tests were conducted at the Federal Aviation Administration (FAA) Technical Center's National Concept Development and Demonstration Heliport. The purpose of these tests was to measure pilot perception of helicopter tip clearances for parking and taxiing maneuvers and to measure pilot performance during these maneuvers. Over 100 parking and taxiing maneuvers were conducted using a UH-1H helicopter. The parking procedures were conducted under head, tail, and crosswind conditions, both with and without an obstacle in place. The taxiing procedures were carried out with a centerline, with only side markings, and with no ground markings. A ground-based laser tracker system was used to track the taxiing procedures. Pilot subjective data in reference to these maneuvers were collected via a post-flight questionnaire. Pilot interviews were conducted at heliports across the country. These interviews gathered pilot views concerning rotor tip clearances for parking and hover taxiing maneuvers, ground markings for parking operations, and hover taxiing heights. This report documents the results of this activity. It described the data collection and analysis methodology and addresses objective as well as subjective issues. It provides statistical and graphical analysis of pilot performance and perception data and pilot subjective data.

AN- 00494359
DT- DA
TI- RISK MANAGEMENT FOR AIR AMBULANCE HELICOPTER OPERATORS
DA- National Technical Information Service
PD- 19890600
AU- Adams, RJ Thompson, JL
PY- 1989
LA- English
SF- ATRIS A
RN- DOT/FAA/DS-88/7
PG- 55p
CS- Systems Control Technology, Incorporated 1611 N. Kent Street Arlington VA 22209
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A212 662/1/WTS
AB- This manual is intended to provide an easy reference for dealing with the op erating pitfalls, the human frailties, and the risks in managing an air ambulance operation. It is not designed to give the operator step-by-step instructions. Rather, the manual describes techniques and tools that can be used to balance the demands of running a business with the need for maintaining safety. It provides pilot selection and training guidelines, as well as a review of a risk assessment technique that have proven successful for Part 135 operators. In addition, the manual recommends a workable format for establishing standard operating procedures to reduce risks. Finally, it highlights the key concerns that should be carefully considered from a risk management viewpoint. This operators manual is one of an integrated set of five Aeronautical Decision Making (ADM) manuals developed by the Federal Aviation Administration in a concerted effort to reduce the number of human factor related helicopter accidents. It can be used as one element of a comprehensive program for improving safety, reducing risk, and, hopefully, the high cost of helicopter hull and liability insurance.
SH- H52 HUMAN FACTORS H51 SAFETY
DE- HELICOPTERS AMBULANCE AIRCRAFT OPERATOR PERFORMANCE HUMAN FACTOR PILOTS
(PERSONNEL) RISK MANAGEMENT MANUALS FEDERAL AVIATION ADMINISTRATION
AVIATION SAFETY TRAINING DECISION MAKING

AN- 00494067
DT- DA
TI- U.S. CIVIL AIRMEN STATISTICS: CALENDAR YEAR 1988
DA- National Technical Information Service

PD- 19890600
AU- Carter, PW
PY- 1989
LA- English
SF- ATRIS A
PG- 35p
CS- Federal Aviation Administration 800 Independence Avenue, SW Washington DC 20591
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A211409/8/WTS
AB- This report furnishes detailed airmen statistics. It contains calendar year statistics on pilots and nonpilots and number of certificates issued. The U.S. Civil Airmen Statistics is an annual study published to meet the demands of FAA, other government agencies, and industry for more detailed airmen statistics than those published in other FAA reports. Statistics pertaining to airmen, both pilot and nonpilot, were obtained from the official airmen certification records maintained at the FAA Aeronautical Center, Oklahome City, Oklahoma. An active Airmen is one who holds both an airmen certificate and a valid medical certificate. Airmen who must have a valid medical to exercise the privileges of their certificate are all airplane pilots. Glider, flight navigators, and lighter-than-air pilots are not required to have a medical examination but the numbers represent only those who had a valid medical certificate. Mechanics, parachute riggers, ground instructors, and dispatchers certificates represent all certificates on record at the Aeronautical Center.
SH- H11 ADMINISTRATION
DE- AIR TRANSPORTATION PILOTS (PERSONNEL) STATISTICS CERTIFICATION CERTIFICATE MEDICAL HELICOPTERS GLIDE PLANE INSTRUMENTATION

AN- 00486698
DT- DA
TI- REPORT OF THE HELICOPTER HUMAN FACTORS WORKING GROUP
DA- National Technical Information Service
PD- 19870000
PY- 1987
LA- English
SF- ATRIS A
RN- CAA/PAPER-87007
PG- 31p
BN- 0-86039-312-7
CS- Civil Aviation Authority, England Space House, 43/59 Kingsway London WC2B 6TE England
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 PB89-131049/WTS
AB- In response to Recommendations of the Helicopter Airworthiness Review Panel a Working Group was formed to evaluate the extent to which incidents and accidents to helicopters were due wholly or in part to human factor causes, and to suggest what steps might be taken, within the limits of current technolgy, to minimize or eliminate those causes. 'Human factor causes' was taken to refer only th the flight crew, and was defined as those causes in which the crew action or failure to act, for whatever reason, contributed to the occurrence or accident.
SH- H52 HUMAN FACTORS H51 SAFETY
DE- HELICOPTERS ACCIDENT CAUSES PILOTS (PERSONNEL) HUMAN FACTOR

AN- 00484749
DT- DA
TI- AERONAUTICAL DECISION MAKING FOR AIR AMBULANCE HELICOPTER PILOTS:
LEARNING FROM PAST MISTAKES
DA- National Technical Information Service
PD- 19880700
AU- Adams, RJ Thompson, JL
PY- 1988
LA- English
SF- ATRIS A
RN- DOT/FAA/DS-88/5
PG- 46p
CS- Systems Control Technology, Incorporated Arlington VA
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 N89-11723/8/WTS
AB- The study is based on actual helicopter air ambulance accidents. The focus is on the importance of decision making and judgement during all phases of flight. Improving safety is a responsibility shared by hospital administrators, health vendors, chief pilots, head nurses, pilots, air medics, dispatchers and physicians. These accident synopses are the first element of a multi-volume set of training materials designed to significantly reduce the helicopter air ambulance accident rate and to keep it under control. The other volumes include the following: Aeronautical decision making for pilots; Aeronautical decision making for the air ambulance helicopter; Pilots: situational awareness exercises; Risk management for air ambulance helicopters operators; and Aeronautical decision making for air ambulance helicopter program administrators.
SH- H51 SAFETY H52 HUMAN FACTORS

DE- HELICOPTERS PILOTS (PERSONNEL) AMBULANCE PERSONNEL TRAINING DECISION
MAKING ACCIDENT PREVENTION ACCIDENT REPORTS ACCIDENT CAUSES CASE
STUDIES

AN- 00484735
DT- DA
TI- AERONAUTICAL DECISION MAKING FOR AIR AMBULANCE HELICOPTER PILOTS:
SITUATIONAL AWARENESS EXERCISES
DA- National Technical Information Service
PD- 19880700
AU- Adams, RJ Thompson, JL
PY- 1988
LA- English
SF- ATRIS A
RN- DOT/FAA/DS-88/6
PG- 45p
CS- Systems Control Technology, Incorporated Arlington VA
AV- National Technical Information Service 5285 Port Royal Road
Springfield VA 22161 N89-10869/0/WTS
AB- The following materials are based upon actual helicopter air ambulance accidents, which cover four broad accident types most recently associated with aeromedical accidents: night flying, weather, obstacle strikes, and mechanical failures. Three tyupes of information are included for each accident type. These are: introductory/background material to provide the historical importance and frequency of each accident type; training knowledge that should be learned in order to avoid mistakes of the past; and decision making exercises.
SH- H51 SAFETY H52 HUMAN FACTORS
DE- HELICOPTERS PILOTS (PERSONNEL) DECISION MAKING ACCIDENT PREVENTION
AMBULANCE

AN- 00482671
DT- DA
TI- AERONAUTICAL DECISION MAKING FOR COMMERCIAL PILOTS
DA- National Technical Information Service
PD- 19880700
AU- Jensen, RS Adrion, J
PY- 1988
LA- English
SF- ATRIS A
RN- DOT/FAA/PM-86/42
PG- 69p
CS- Systems Control Technology, Incorporated Arlington VA
AV- National Technical Information Service 5285 Port Royal Road
Springfield VA 22161 AD-A198772/6/WTS
AB- Aviation accident data indicate that the majority of aircraft mishaps are due to judgement error. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates. The result of such tests were statistically significant and ranged from approximately 10% to 50% fewer mistakes. This manual is designed to explain the risks associated with commercial flying activities, the underlying behavioral causes of typical accidents, and the effects of stress on pilot decision making. It provides a means for the individual pilot to develop an "Attitude Profile" through a self-assessment inventory and provides detailed explanations of pre-flight and in-flight stress management techniques. The assumption is that pilots receiving this training will develop a positive attitude toward safety and the ability to effectively manage stress while recognizing and avoiding unnecessary risk. This manual is one of a series on Aeronautical Decision Making prepared for the following pilot audiences: (1) Student and Private (2) Commercial (3) Instrument (4) Instructor (5) Helicopter (6) Multi-Crew.
SH- H52 HUMAN FACTORS
DE- AIRCRAFT PILOTS (PERSONNEL) DECISION MAKING ERROR ACCIDENT PREVENTION
PERSONNEL TRAINING COMMERCIAL PLANES

AN- 00482670
DT- DA
TI- DISORIENTATION ACCIDENTS AND INCIDENTS IN U.S. ARMY HELICOPTERS, 1 JANUARY 1980 - 30 APRIL 1987
DA- National Technical Information Service
PD- 19880300
AU- Vrnwy-Jones, P
PY- 1988
LA- English
SF- ATRIS A
RN- USAARL-88-3
PG- 65p

CS- Army Aeromedical Research Lab Fort Rucker Ozard AL 36360
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A198720/5/WTS
AB- Accident data was obtained from the U.S. Army Safety Center for all U.S. Army helicopter spatial disorientation accidents which occurred during the period beginning on 1 January 1980 and ending on 30 April 1987. During this time, there were 120 accidents caused by spatial disorientation which were responsible for 37 fatalities and 56 disabling injuries. Major causal factors are analyzed and recommendations made for changes in aircrew training, education and aircraft instrumentation. Also discussed are the effects of operations undertaken in hostile environments.
SH- H51 SAFETY H53 VEHICLE CHARACTERISTICS H52 HUMAN FACTORS
DE- HELICOPTERS PILOTS (PERSONNEL) ACCIDENT CAUSES PERCEPTION ERROR HUMAN FACTOR MILITARY

AN- 00460090
DT- DA
TI- SIMULATOR SICKNESS IN FLIGHT SIMULATORS: A CASE STUDY
PD- 19860000
AU- Lilienthal, MG Merkle, PJ, Jr
PY- 1986
LA- English
SF- HSL S ATRIS A
RN- HS-040 049
PG- pp 81-86
FG- 3 Fig.
TB- 5 Tab.
RF- 8 Ref.
AD- 2 App.
IS- 1059
JN- Transportation Research Record
SN- 03611981
BN- 0-309-04053-1
CS- Transportation Research Board 2101 Constitution Avenue, NW Washington DC 20418
AV- Transportation Research Board Business Office 2101 Constitution Avenue, NW Washington DC 20418
SO- This paper appeared in Transportation Research Record N1059, Vehicular Simulation and User Behavioral Studies.
AB- Simulator sickness is a recently publicized phenomenon in which pilots who use flight simulators experience symptoms characteristic of motion sickness. In this paper is presented a field study performed on a U.S. Navy helicopter simulator (Device 2F120) to identify and correct factors suspected of causing simulator sickness. A survey of 42 U.S. Marine aviators before and after training flights in the simulator revealed a significant incidence of simulator sickness (62 percent). Symptom clusters most often reported included eye strain, general discomfort, headache, nausea, and fullness of the head. Engineering and observational data point to the visual system as a likely culprit in this particular system. Changes in procedures and in the software of the visual system are recommended.
SH- H52 HUMAN FACTORS H53 VEHICLE CHARACTERISTICS
DE- FLIGHT SIMULATORS MOTION SICKNESS CAUSE PREVENTION VISUAL STRESS SOFTWARE

AN- 00451882
DT- DA
TI- THE IMPACT OF AN AIR AMBULANCE SYSTEM ON AN ESTABLISHED TRAUMA CENTER
DA- National Highway Traffic Safety Administration
PD- 19850600
AU- Schwab, CW Peclet, M Zackowski, SW Holmes, EM, III Forrester, JC Hensleigh, CN
PY- 1985
LA- English
SF- HSL S 8601
RN- HS-039 161
PG- pp 580-586
FG- 2 Fig.
TB- 8 Tab.
RF- 17 Ref.
JV- 25
IS- 7
JN- Journal of Trauma
CS- Williams and Wilkins Company 426 East Preston Street Baltimore MD 21202
AV- Rutgers Medical School CW Schwab, Division of Trauma & EMS, 300 Broadway Camden NJ 08103
AB- Hospital competition for air ambulance business has resulted in implementation of a helicopter service before the medical staff can prepare for the increased patient load. We reviewed the effect of an air ambulance on an already established trauma center (TC) by analyzing the impact of the helicopter trauma patient load during the initial

year of operation. The helicopter carried a three-member flight crew consisting of a pilot, paramedic, and critical care nurse. Admission data of all flights from February 1982 through February 1983 were reviewed. Of the 325 air missions launched, 192 (59%) were for the transport of trauma victims. One hundred forty (73.6%) patients were transported from local hospitals, the remaining 52 (26.4%) from the accident scene. Ninety percent of the injuries were due to motor vehicle accidents. Forty-nine percent of the flights occurred on weekends and 68.8% were launched between 7:00 P.M. and 3:00 A.M. The average flight times from hospital and accident scenes were 37 min 30 sec and 13 min 30 sec, respectively. Of all trauma missions flown, 126 (65.8%) were considered new or "captured" by the air ambulance system and brought to the TC. Thirty-seven (19.3%) patients died in flight, were DOA, or died within 1 hour of TC arrival. Eight percent of the deaths were from massive head injuries. The average injury severity score was 35.58 (all patients), 32.9 (survivors), and 45.80 (deaths). Emergency procedures performed during the initial 20 minutes after TC arrival were tabulated: intubation and/or cricothyroidotomy, 30.2%; chest tube insertion, 36.5%; pneumatic antishock garment inflation, 43%; massive fluid resuscitation, 31%; O blood or type-specific administration, 35.5%; and ER thoracotomy, 4.2%. Conclusions: 1) An air ambulance system has a major impact on a TC. 2) Most patients have multisystem blunt injuries. 3) Most trauma flights occur on days of the week and especially times of the day that are considered off hours. 4) Although there is a high "capture" rate of new patients, the overall financial gain to the hospital in not great. 5) The critical status of these patients demands that the helicopter's base-station facility institute an in-house trauma team and readily available surgical support systems before the first flight.
DE- AIR AMBULANCE SYSTEM HELICOPTERS ACCIDENT VICTIMS EMERGENCY SERVICES
HOSPITAL IMPACT

AN- 00420132
DT- DA
TI- HUMAN FACTORS ENGINEERING
DA- NORTHWESTERN UNIVERSITY TRANSPORTATION LIBRARY DAH5733
PD- 19860900
PY- 1986
LA- ENGLISH
SF- TLIB L
PG- PP 124-128
JV- 59
IS- 3
JN- BUSINESS AND COMMERCIAL AVIATION
SO- BY ROBERT L. PARRISH
AB- DEVELOPMENT OF HUMAN FACTORS ENGINEERING IN COCKPIT DESIGN: MILITARY
AND BELL HELICOPTER TEXTRON RESEARCH
DE- AIRPLANES COCKPITS HUMAN ENGINEERING

AN- 00418805
DT- DA
TI- CAUSE FACTOR HUMAN: A TREATISE ON ROTARY WING HUMAN FACTORS (REV.)
DA- UC, BERKELEY, INSTITUTE FOR TRANSPORTATION STUDIES 14690714
PD- 19860000
AU- SKJENNA, OW LEECH, H
PY- 1986
LA- ENGLISH
SF- TLIB L
PG- 248 PP
CS- MINISTER OF NATIONAL HEALTH AND WELFARE MEDICAL OTTAWA?, ..ZIP: ZZ N/A

SO- ISBN: 0660121166 BY OLAF SKJENNA WITH CONTRIBUTIONS BY HUGO LEECH ILL.,
CHARTS COVER TITLE INCLUDES BIBLIOGRAPHICAL REFERENCES ADDL CORP.
AUTHOR INFO: CANADA. MEDICAL SERVICES BRANCH MINISTER OF NATIONAL HEALTH AND WELFARE MEDICAL SERVICES BRANCH
AB- No abstract provided.
DE- HELICOPTERS SAFETY MEASURES HUMAN ENGINEERING AVIATION MEDICINE

AN- 00389763
DT- DA
TI- USER-ORIENTED AND COMPUTERIZED MODEL FOR ESTIMATING VEHICLE RIDE
QUALITY
PD- 19840400
AU- Leatherwood, JD Barker, LM
PY- 1984
LA- English
SF- UMTRIS U 8402 HRIS H 8502

RN- NAS 1.60:2299 L-15745 NASA-TP-2299
PG- 45p
CS- Langley Research Center National Aeronautics and Space Administration Hampton VA 23665
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 N84-22162/1
AB- A simplified empirical model and computer program for estimating passenger ride comfort within air and surface transportation systems are described. The model is based on subjective ratings from more than 3000 persons who were exposed to controlled combinations of noise and vibration in the passenger ride quality apparatus. This model has the capability of transforming individual elements of a vehicle's noise and vibration environment into subjective discomfort units and then combining the subjective units to produce a single discomfort index typifying passenger acceptance of the environment. The computational procedures required to obtain discomfort estimates are discussed, and a user oriented ride comfort computer program is described. Examples illustrating application of the simplified model to helicopter and automobile ride environments are presented.
SH- H53 VEHICLE CHARACTERISTICS I92AHFI VEHICLE COMFORT U13 RAIL VEHICLE TECHNOLOGY
DE- COMPUTER PROGRAMS RIDE QUALITY PASSENGER COMFORT NOISE LEVEL VIBRATION HUMAN FACTOR

AN- 00368321
DT- DA
TI- EFFECTIVENESS AND EFFICIENCIES IN EMERGENCY MEDICAL SERVICES. EVALUATION SUMMARY REPORT
DA- National Highway Traffic Safety Administration
PD- 19820300
AU- Zieziulewicz, T Tarrants, WE
PY- 1982
LA- English
SF- HSL S 8301 HRIS H 8301
RN- HS-806 143
PC- 660000-81
PG- 29p
FG- 4 Fig.
TB- 3 Tab.
RF- 49 Ref.
CS- National Highway Traffic Safety Administration Program & Demonstration Evaluation Off, 400 7th Street, SW Washington DC 20590
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161
AB- Approximately 13 percent of the 51,000 annual highway deaths can be prevented and the amount and duration of medical costs and care of hospitalization and residual morbidity can be decreased as much as 20 percent, by prompt and appropriate prehospital emergency medical care and transportation through the use of emergency medical services (EMS). EMS is available to less than 32 percent of all motor vehicle accident injury victims. Presently the 32 percent of accident victims receiving EMS response represents less than ten percent of the overall demand for such services. The EMS system has grown and will continue to operate and develop nationally largely on the basis of State and local incentives and funding support. The combined EMS system consists of three subsystems: emergency detection and notification, emergency response and treatment and emergency command and control. Potentially effective additional support systems include use of helicopters and training of police officers as first responders. Potentially effective programs include improved data collection, a public information program, and a program whereby Emergency Medical Technicians would assume a greater role in the alcohol testing of accident victims. A summary of the documented evidence of effectiveness of the EMS system and its subsystems is provided in the report.
SH- H51 SAFETY I83AHFD ACCIDENTS AND THE HUMAN FACTOR
DE- EMERGENCY SERVICES EFFECTIVENESS EFFICIENCY MOTOR VEHICLE ACCIDENTS DEMAND HELICOPTERS POLICE EMERGENCY MEDICAL TECHNICIANS BLOOD TESTS ACCIDENT VICTIMS

AN- 00365726
DT- DA
TI- INSTRUMENT APPROACH AIDS FOR HELICOPTERS
FT- FINAL REPT. JAN 81-JAN 82
DA- National Technical Information Service
PD- 19820700
AU- McConkey, ED Ace, RE
PY- 1982
LA- English
SF- NTIS N
SC- u8304
RN- DOT/FAA/RD-82/6
PG- 94p

CS- Systems Control Technology, Inc., West Palm Beach, FL.*Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A120678/8
FD- Contract
CN- DTFA01-80-C-10080
AB- This report identifies the various instrument approach procedures that are available to the helicopter operator. Emphasis is placed on the recently approved Helicopter Only procedures, the criteria for which are contained in Chapter 11 of the Terminal Instrument Procedures Handbook. The objective of this study was to examine currently available solutions to helicopter approach needs. The study also covers new and innovative solutions to helicopter approach requirements. This was accomplished by: Identifying the various navigation aids now being used which may have general application to U.S. helicopter operations. Describing typical locations of use, typical approach procedures, and minimums for each of these aids. Providing estimated equipment costs for both the ground and airborne portions of these systems. Discussing the rationale used to support the use of a particular aid at a particular location or in a specific operational environment. Results of this investigation are presented in the form of a series of helicopter instrument approach options for the user. (Author)
DE- *HELICOPTERS *INSTRUMENT LANDINGS *NAVIGATIONAL AIDS APPROACH COST
ESTIMATES AVIONICS GROUND SUPPORT EQUIPMENT HUMAN FACTORS ENGINEERING

AN- 00365710
DT- DA
TI- 3D LORAN-C NAVIGATOR DOCUMENTATION
FT- FINAL REPT. MAY 81-JAN 82
DA- National Technical Information Service
PD- 19820100
AU- Bolz, EH King, LD
PY- 1982
LA- English
SF- NTIS N
SC- u8303
RN- DOT/FAA/RD-82/16
PG- 62p
CS- Systems Control Technology, Inc., West Palm Beach, FL.*Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A120106/0
FD- Contract
CN- DTFA01-80-C-10080
AB- The purpose of this task was to develop a 3D Loran-C Navigator by configuring an interface unit between an airborne Loran-C navigator (Teledyne TDL-711) and an Altitude Alerter/VNAV Guidance system (Intercontinental Dynamics model 541). The digital computer-based interface unit was designed to allow the flight crew to specify the approach slope (3.0 to 9.9 degrees). This report documents the hardware and software in the interface unit, and interconnection with the other involved systems. The availability of accurate, three-dimensional approach guidance information at airports where no ILS is available provides significant operational advantages, to helicopter operators in particular. The 3D Loran-C navigator system was bench tested and flight demonstrated. Smooth, accurate (within the limitations of Loran-C) descent guidance information was obtained. (Author)
DE- *LORAN *COMPUTER PROGRAM DOCUMENTATION NAVIGATORS ALGORITHMS DIGITAL
SYSTEMS THREE DIMENSIONAL INSTRUMENT LANDING COMPUTER APPLICATIONS
TRACKING APPROACH GLIDE SLOPE HELICOPTERS

AN- 00342109
DT- DA
TI- LASER SYSTEM FOR VISUAL SIMULATION
PD- 19810000
AU- McLanaghan, R
PY- 1981
LA- English
SF- HRIS H 8201
PG- pp 46-52
FG- 10 Fig.
IS- 803
JN- Transportation Research Record
CS- Transportation Research Board 2101 Constitution Avenue, NW Washington DC 20418
AV- Transportation Research Board Business Office 2101 Constitution Avenue, NW Washington DC 20418
SO- This paper appeared in Transportation Research Record No. 803, Air Service, Airport Access, and Future Technology.
AB- The most challenging aspect of flight simulation is representation of

the visual scene as it appears through the aircraft windshield. A review is made of the techniques that have been used and a discussion is included of film systems, television cameras and models, and the latest fully digital systems. Helicopter flying at low altitude necessitates the generation of a large amount of visual detail over a very large field of view. Currently in development is a system that uses a scanning laser beam over a detailed model of the terrain over which the simulator is flying and producing a video signal by using a bank of sensitive photodetectors. For display, a direct-writing laser projector is used to cover a field-of-view of 180 deg x 70 deg in full color. Prototypes of both the image generator and the projector have been built. (Author)
SH- H52 HUMAN FACTORS I83 ACCIDENT STATISTICS
DE- SIMULATION LASER APPLICATIONS SIMULATORS PILOTS (PERSONNEL) AIRCRAFT
TRAINING AIDS STATE OF THE ART STUDIES

AN- 00324573
DT- DA
TI- USE OF DRUGS IN AIR AND GROUND RESCUE SYSTEMS
FT- MEDIKAMENTENEINSATZ IN LUFT- UND LANDGEBUNDENEN RETTUNGSSYSTEMEN
DA- Transport and Road Research Laboratory Federal Institute of Road Research, West Germany
PD- 19790000
AU- Tryba, M Jacobitz, K Wellhoener, HH Gahl, K Helms, U
PY- 1979
LA- German
SF- HRIS H IRRD I
SC- IRRD 311617
PG- pp 285-290
TB- 1 Tab.
RF- 9 Ref.
JV- 82
IS- 7
JN- Unfallheilkunde/Tranmatology
CS- Sprige-Verlag 175 Fifth Avenue New York NY 10010
AB- Experience with the use of the ambulance and rescue helicopter in Hanover and interdisciplinary corperation between the clinics and institutes of the Medical University of Hanover have resulted in a limit of drugs which can be used at the site of the emergency; this provides quick and accurate information on indication, dosage, effects and side effects. It is emphasized that new drugs and therapies should be continually checked for their possible application at the scene of the emergency. (TRRL)
RN- IRRD 311617
SH- H52 HUMAN FACTORS H51 SAFETY 3T84 PERSONAL INJURIES
DE- FIRST AID DRUG EMERGENCY VEHICLE HELICOPTERS EMERGENCY SERVICES FIRST
AID ACCIDENT DRUG INFORMATION DOCUMENTATION

AN- 00264323
DT- DA
TI- CRASH-RESISTANT FUEL TANKS FOR HELICOPTERS AND GENERAL AVAIATION
AIRCRAFT
PD- 19740400
AU- Smith, HD
PY- 1974
LA- English
SF- HRIS H 7501
RN- SAE Paper No. 740358
PG- 17 pp
SN- SASI 74752
CS- Society of Automotive Engineers 2 Pennsylvania Plaza New York NY 10001

AV- Society of Automotive Engineers, Incorporated 400 Commonwealth Drive Warrendale PA 15096
AB- Crashworthy fuel tanks have been developed for U.S. Army helicopters which have demonstrated excellent performance in over three years of service. Although design guidelines evolving from this work have a direct bearing on the application of crashworthy fuel cells for general aviation aircraft, additional development work is required to provide tanks with minimum cost and weight penalties.
SH- H52 HUMAN FACTORS
DE- FUEL TANK FUEL CELLS HELICOPTERS CRASHWORTHINESS DESIGN STANDARDS
AIRCRAFT

AN- 00262475
DT- DA
TI- DEVELOPMENT OF NEW INTERSECTION TECHNIQUES USING PHOTOGRAPHIC INSTRUMENTATION
DA- Highway Safety Research Institute
PD- 19720000

AU- Treiterer, J
PY- 1972
LA- English
SF- HRIS H 7501
SC- HSRI-28004
PG- pp 67-74
FG- Figs.
PH- Phots.
RF- 4 Ref.
JV- 30
JN- Society of Photo-Optical Instrumentation Engr Proc
CS- Society of Photo-Optical Instrumentation Engineers 119 Palos Verdes Boulevard Re dondo Beach CA 90277
SO- Presented at Sominar on Photographic Instrumentation--A Tool for Solving Highway and Traffic Engineering Problems, North Hollywood, California, November 1971.
AB- After developing and testing different photographic systems ranging from a 16 mm movie camera and 35 mm recording cameras to rather sophisticated aerial camera systems of 70 mm and 5 inch film format, it was concluded that photographic systems are a powerful and easy to handle tool for the practicing transportation engineer. Some basic training, is necessary before such systems can be applied. Sophisticated systems are required for the study of progressive traffic systems and the 5 inch aerial camera, mounted in a helicopter, appears to be the most useful tool for this task. Data reduction has long been the bottleneck in applying photographic techniques. New data reduction systems have been developed and the time required for reading photographs has been reduced considerably. Though data processing systems have been improved, it is hoped that a fully automatic system will be developed in the near future. This would really make photographic systems a most useful tool for transportation engineers in practice and in research.
SH- H21 FACILITIES DESIGN
DE- PHOTOGRAPHIC SURVEYS PHOTOGRAPHIC METHODS PHOTOGRAPHIC EQUIPMENT
PHOTOGRAMMETRY CAMERAS AERIAL PHOTOGRAPHY DATA PROCESSING INTERSECTION
TRAFFIC FLOW TRAFFIC SURVEY

AN- 00261177
DT- DA
TI- FIELD MEASUREMENT OF INFRASONIC NOISE
DA- American Inst of Aero & Astro Tech Info Service
PD- 19710700
AU- Hood, RA Leventhall, HG
PY- 1971
LA- English
SF- RRIS R 7301 HRIS H
SC- A72-10157
PG- pp10-13
JV- 25
JN- Acustica
AV- American Inst of Aero & Astro Tech Info Service 750 Third Avenue New York NY 10017 A72-10157
SO- Research supported by the Medical Research Council.
AB- Portable equipment for the detection and recording of noise in the frequency range from 2 to 500 Hz is described, together with typical results obtained in an automobile, blast furnace, railroad car, engine room, and helicopters. Factors responsible for peaks appearing at various frequencies are identified, and research on the subjective effects of infrasonic noise is indicated.
SH- R10 H52 HUMAN FACTORS
DE- NOISE NOISE SOURCES LOW FREQUENCY NOISE NOISE DETECTION EQUIPMENT NOISE
RECORDING EQUIPMENT FIELD MEASUREMENTS NOISE (SOUND) LOW FREQUENCY
MEASURING INSTRUMENTS

AN- 00261167
DT- DA
TI- KENTUCKY HOUSE BILL NO. 223
PD- 19720112
PY- 1972
LA- English
SF- HRIS H
PG- 10pp
CS- Kentucky Legislature Frankfort KY 40601
AV- State Capitol Frankfort KY 40601
AB- This bill requires the use of decibel meters in radar traffic patrol cars for measuring noise emissions from motor vehicles, boats, aircraft or any mechanical equipment. Excessively noisy mufflers will be cause for withholding issuance of a safety inspection sticker. The sale of new or used motor vehicles is prohibited if their noise emissions exceed maximum limits. The sale or lease of powered equipment or powered hand tool is also subject to noise emission limitations. Operation of motorboats, recreational or off-road vehicles, including

dune buggies, snowmobiles, all-terrain vehicles, go-carts and minibikes
is similarly prohibited. Noise limits for light fixed or rotary wing
aircraft are specified at a distance of 200 feet from run-way, taxi,
takeoff and landing operations.
SH- N08 LEGISLATION/LEGAL ASPECTS H70 LAW H52 HUMAN FACTORS
DE- MOTOR VEHICLE NOISE/KENTUCKY LEGISLATION RECREATION VEHICLE
NOISE/KENTUCKY LEGISLATION BOAT NOISE/KENTUCKY LEGISLATION SNOWMOBILE
NOISE/KENTUCKY LEGISLATION KENTUCKY LEGISLATION/MOTOR VEHICLE NOISE
KENTUCKY LEGISLATION/RECREATION VEHICLE NOISE KENTUCKY
LEGISLATION/SMOWMOBILE NOISE KENTUCKY LEGISLATION/BOAT NOISE NOISE
LEVEL NOISE POLLUTION LAW POLICE CARS EMISSION MOTOR VEHICLE AIRPLANE
NOISE MOTORBOATS TOOLS NOISE CONTROL NOISE METERS

AN- 00242166
DT- DA
TI- SKYLOUNGE AIR VEHICLE STUDY - FINAL REPORT
DA- Urban Mass Transportation Administration HELP
PD- 19000000
LA- English
SF- HRIS H
CS- Sikorsky Aircraft
SO- PROJ NO CAL-MTD-8
AB- THE REPORT DELINEATES DESIGN REQUIREMENTS AND SPECIFICATIONS FOR
COMPONENT SUB-SYSTEMS IN THE PROPOSED SKYLOUNGE TRANSPORTATION CONCEPT.
THIS UNIQUE DESIGN EMPLOYS MODIFIED SIKORSKY S-64A AIRCRAFT TO
FACILITATE AIRPORT ACCESS FOR BOTH PASSENGERS AND CARGO; THE HELICOPTER
IS USED TO TRANSPORT MOBILE PODS FROM URBAN LOADING CENTERS DIRECTLY TO
AIRPORT BOARDING AREAS. THE PURPOSE WAS TO SUMMARIZE BASIC REQUIREMENTS
AND DESIGN CRITERIA FOR THE AIRCRAFT AND SUPPORT FACILITIES. BASIC
ENGINEERING CONSIDERATIONS ARE OUTLINED IN DETAIL WITH REFERENCE TO
MONTH-BY-MONTH DEVELOPMENT SCHEDULES, TOTAL SYSTEM COSTS, MODIFICATIONS
IN THE AIRCRAFT DESIGN, FULFILLMENT OF REQUIREMENTS PRESCRIBED BY
FEDERAL REGULATORY AGENCIES, LOAD CAPABILITIES, AERODYNAMIC CRITERIA,
CONSTRUCTION MATERIALS, INSTRUMENTATION, AND OTHER SUBSYSTEMS. THE
REPORT SPECIFIES PRECISION STANDARDS FOR ALL BASIC COMPONENTS OF THE
AIRCRAFT. COMMUNICATIONS AND NAVIGATION EQUIPMENT TO BE USED BY THE
SKYLOUNGE SYSTEM ARE PRESENTED IN DETAIL. REQUIREMENTS FOR MAINTENANCE
AND SPARE PARTS ARE DISCUSSED ALONG WITH SPECIFICATIONS FOR SERVICE
FACILITIES AND SITE SELECTION. AN OPERATIONAL PARAMETER REPORT IS
PROVIDED WHICH ESTIMATES PERFORMANCE OF THE AIRCRAFT UNDER A WIDE
VARIETY OF CONDITIONS, BROKEN DOWN BY AMBIENT TEMPERATURE, ALTITUDE,
VELOCITY, CLIMBING AND DECENT, RANGE, AND LOAD FACTORS. A RECOMMENDED
TESTING PLAN IS EXAMINED BRIEFLY ALONG WITH PROPOSED REQUIREMENTS FOR
PERSONNEL AND TRAINING. BECAUSE SKYLOUNGE INVOLVES UNIQUE OPERATIONAL
AND ENGINEERING CONSIDERATIONS, THE MANPOWER PROGRAM IS GIVEN
PARTICULAR ATTENTION. OVERALL, THE AUTHORS CONCLUDE THAT THE SYSTEM
FEASIBILITY HAS BEEN DEMONSTRATED IN ALL DESIGN AND ENGINEERING
ASPECTS. IN ADDITION, THE CONCEPT MAY BE PARTICULARLY ADAPTABLE FOR
FREIGHT MOVEMENT OPERATIONS IN WHICH PRE-CONTAINERIZED CARGO WOULD BE
MOVED FROM SHIPPERS DIRECTLY TO THE AIRPORT LOADING PLATFORMS. /UMTA/
SH- H12 PLANNING
DE- SKY-CAR TRANSIVATOR SYSTEMS DESIGN CRITERIA COMPONENTS COSTS
CONSTRUCTION MATERIALS EQUIPMENT EQUIPMENT MAINTENANCE PERSONNEL

AN- 00224359
DT- DA
TI- APPLICATION OF TWO-PHASE DC CHOPPER MOTOR DRIVE
PD- 19730600
AU- Reimers, E

PY- 1973
LA- English
SF- HRIS H
PG- pp 285-93
JV- ia-9
IS- n3
CS- Ieee Trans Industry & Gen Applications
AB- THE EXPERIMENTAL SOLID-STATE CONTROLLER DEVELOPED BY THE U.S. ARMY
MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER IS DISCUSSED. WHEN
OPERATING FROM A BATTERY ENERGY STORAGE CELL, THIS EXPERIMENTAL
TWO-PHASE, PHASE SEQUENTIALLY-SWITCHED DC CHOPPER IS ABLE TO OPERATE
TWO DC SERIES FIELD MOTORS WITH A SINGLE CONTROL MECHANISM FROM ZERO TO
FULL SPEED. THIS RESULTS IN A PEAK POWER PROPULSION PROFILE HERETOFORE
NOT CONSIDERED FEASIBLE IN TERMS OF THE INDIVIDUAL COMPONENT AND
SUBSYSTEM POWER RATING. A POWER PROCESSOR FOR SHUNT FIELD MOTORS IS
ALSO DESCRIBED WHICH CAN PROVIDE IDENTICAL PROPULSION CHARACTERISTICS
THROUGH STORAGE OF KINETIC ENERGY IN A HIGH-SPEED FLYWHEEL. /DOT/
SH- H52 HUMAN FACTORS
DE- SOLID STATE CONTROLLERS BATTERIES DIRECT CURRENT MOTORS PROPULSION
SYSTEMS SHUNT WOUND MOTORS FLYWHEEL HELICOPTERS

AN- 00224129
DT- DA
TI- MODELING OF V/STOL NOISE IN CITY STREETS
DA- National Technical Information Service
PD- 19711115
AU- Lyon, RH Pande, L Kinney, WA
PY- 1971
LA- English
SF- ATRIS A 77S1 HRIS H
RN- Tech Rept
PG- 55 pp
CS- Massachusetts Institute of Technology Department of Mechanical
Engineering Cambridge MA 02139
AV- National Technical Information Service 5285 Port Royal Road
Springfield VA 22161 PB-211953
FD- Contract
CN- DOT-TSC-93
AB- THE GOALS OF THIS WORK WERE TWO-FOLD. FIRST, TO DEVELOP MODELING
TECHNIQUES THAT WILL BE HELPFUL IN STUDYING A VARIETY OF NOISE
PROPAGATION PROBLEMS. THESE INVOLVE NOT ONLY AIRCRAFT SOURCES, BUT ALSO
SURFACE TRAFFIC (AUTOMOBILES, TRUCKS, AND RAIL VEHICLES) AS WELL. THE
SECOND AND MORE NARROW GOAL IS THE APPLICATION OF THESE MODELING
TECHNIQUES TO A SPECIFIC PROBLEM, THE PROPAGATION OF V/STOL AIRCRAFT
NOISE INTO AN URBAN AREA. /AUTHOR/
FR- NTIS PB 211 953
SH- A07 ENVIRONMENT A03 H52 HUMAN FACTORS
DE- ENVIRONMENT MODEL VTOL AIRCRAFT STOL AIRCRAFT NOISE PROPAGATION
AIRCRAFT NOISE URBAN AREAS HELICOPTERS AIRCRAFT CITY STREETS NOISE
(SOUND) CITIES TRAFFIC NOISES MODEL RAIL TRANSPORTATION V/STOL

AN- 00223724
DT- DA
TI- TRIPLES GET MIXED REACTIONS FROM OFFICIALS AFTER 8-DAY TEST ON
CALIFORNIA ROADS
PD- 19720200
AU- Carroll, W
PY- 1972
LA- English
SF- HRIS H
CS- Commercial Car Journal
SO- pp 11-12, 2 PHOT
AB- THE TEST RIG CONSISTED OF THREE TRAILERS LOADED TO 90,000 POUNDS GROSS.
THE EIGHT-DAY PROJECT WAS AIMED AT DETERMINING THE ABILITY OF TRIPLES
TO MERGE INTO AND MATCH CALIFORNIA'S HIGH-SPEED TRAFFIC FLOW AND TO SEE
HOW THEY FIT CITY STREET GEOMETRY. PAID FOR BY THE CALIFORNIA TRUCKING

ASSOCIATION, THE TEST WAS OBSERVED BY STATE HIGHWAY PATROL HELICOPTERS,
HIGHWAY ENGINEERS, REPRESENTATIVES OF MAJOR AUTOMOBILE CLUBS AND
TRUCKING COMPANY OFFICIALS.
SH- H52 HUMAN FACTORS
DE- TRACTOR TRAILERS TRUCK EFFECT ON HIGHWAY CAPACITY TRUCKS TRIPLE TRAILER
TRUCKS TRUCK LAWS & REGULATIONS

AN- 00223130
DT- DA
TI- PROJECT CARE-SOM COORDINATED ACCIDENT RESCUE ENDEAVOR STATE OF
MISSISSIPPI
PD- 19690900
PY- 1969
LA- English
SF- HRIS H
CS- Mississippi State University
SO- Quart Prog RPT, 71 PP, 7 TAB, 8 FIG, 11 APP
AB- A STUDY OF EMERGENCY MEDICAL SERVICE SYSTEMS WAS CONDUCTED WITH THE
OBJECT OF DEVELOPING AND EVALUATING A COMPREHENSIVE AND INTEGRATED
SYSTEM WHICH CONSISTS OF TRANSPORTATION, TREATMENT, AND COMMUNICATIONS,
AND WHICH CAN PROVIDE THESE SERVICES ON A UNIFORM, PROMPT STATE-WIDE
BASIS. THE PROJECT, TERMED 'CARE-SOM', IS PRESENTLY DIVIDED INTO FOUR
TASKS, AND THIS INTERIM REPORT COVERS THE LAST 2 MONTHS OF THE PLANNING
PHASE AND THE FIRST MONTH OF OPERATIONS. THE TASKS DISCUSSED CONSIST OF
THE FOLLOWING: (1) GENERAL-INCLUDES TRAINING COURSES IN EMERGENCY
TREATMENT OF 224 PARTICIPANTS (AMBULANCE ATTENDANTS, FIREMEN,
POLICEMEN, AND OTHER NONMEDICAL RESCUE PERSONNEL), AND ADMINISTRATION
OF THE HELICOPTER SYSTEM BY ZONE MANAGERS; (2) DATA ANALYSIS-INVOLVES
THE METHODOLOGY OF DATA FORMS, DATA COLLECTION, AND EVALUATION, AND THE
DATA ITSELF, (RESPONSE-TIME, STAND-BY TIME, INJURIES PER ACCIDENT,
DISPATCHING PROCEDURES, AND SIMULATION AND ACCIDENT PARAMETER
ANALYSIS); (3) HELICOPTER MALFUNCTIONS, MISSION SUMMARIES, AND FUEL
PROBLEM; AND (4) COMMUNICATIONS-BOTH RADIO AND TELEPHONE. THE 11
APPENDICES LIST THE DETAILS AND DATA PERTAINING TO WORK ON EACH OF THE
FOUR MAJOR TASKS.
SH- H52 HUMAN FACTORS H51 SAFETY
DE- EMERGENCY SERVICES EMERGENCY VEHICLE HELICOPTERS MEDICAL SERVICE FIRST
AID EDUCATION DATA ANALYSIS DATA ACQUISITION RESPONSE TIME ACCIDENT
INJURIES COMMUNICATION RADIO COMMUNICATION SYSTEMS TELEPHONE ZONE
ADMINISTRATION

AN- 00222857
DT- DA
TI- LONDON NOISE SURVEY
PD- 19680000
AU- Parkin, PH Purkis, HJ Stephenson, RJ Schlaffenberg, B
PY- 1968
LA- English
SF- HRIS H
RN- 60 pp
CS- Building Research Station /UK/
AB- A SURVEY WAS CONDUCTED BY THE LONDON COUNTY COUNCIL TO SET NOISE FROM
HELICOPTERS IN LEVEL FLIGHT AT 1000 FEET IN PERSPECTIVE WITH OTHER
FACTORS AND TO ASCERTAIN THE RELATIVE EFFECTS ON DAILY LIVING OF INDOOR
AND OUTDOOR NOISE. INTERVIEWS WERE CARRIED OUT WITH A REPRESENTATIVE
SAMPLE OF 1377 ADULTS RESIDING WITHIN AN AREA OF ABOUT 35 TO 40 SQUARE
MILES IN CENTRAL LONDON AROUND CHARING CROSS. IT WAS DETERMINED THAT
ROAD TRAFFIC IS UNQUESTIONABLY THE MOST IMPORTANT INDIVIDUAL SOUND
HEARD BY, AND BOTHERING PEOPLE WHEN AT HOME AND OUTDOORS. NEVERTHELESS
ROAD TRAFFIC IS NOT INTRINSICALLY THE MOST BOTHERSOME SOUND. THIS IS

SHOWN BY THE FACT THAT THE PERCENTAGE OF THOSE WHO HEAR ROAD TRAFFIC IN
THEIR HOMES ARE BOTHERED LESS BY IT THAN BY SOME OTHER SOUNDS. /AUTHOR/

SH- H52 HUMAN FACTORS
DE- SURVEYS INTERVIEWS TRAFFIC NOISES HELICOPTERS SAMPLING RESIDENT NOISE
(SOUND)

AN- 00199075
DT- DA
TI- WORKLOAD AND THE CERTIFICATION OF HELICOPTERS FOR IFR OPERATION
DA- National Technical Information Service
PD- 19790600
AU- DeLucien, AG Green, DL Jordan, SW Traybar, JJ
PY- 1979
LA- English
SF- ATRIS A 8001 NTIS N
SC- u7925
RN- PAR-508-78-3 Final Rpt. FAA-RD-79-64
PC- 780700-7906
PG- 129 p.
CS- PACER Systems, Incorporated 1755 South Jefferson Davis Highway Arlington VA Federal Aviation Administration Systems R&D Service, 800 Independence Avenue, SW Washington DC 20591
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A072758/6ST
FD- Contract
CN- DOT-FA77WA-3966
AB- A review was made of the Interim Criteria. Federal Aviation Regulations, Advisory Circulars and other pertinent Documents associated with certification of Helicopters for instrument flight. A review of publications pertaining to workload definitions and evaluation, applicable to IFR helicopter operations was accomplished. The report identifies the role of aircrew workload in the IFR certification process and develops a rationale to allow determination of that portion of a pilot's attention and effort available for aircraft control. Performance objectives for required maneuvers are delineated and the interdependence of performance and workload is identified. Workload/performance implications for single and dual pilot IFR operations are reviewed. A series of flight maneuver patterns for use as IFR certification assessment tools is developed. A flying qualities workload evaluation scheme is offered for use in the FAA certification process for IFR approval of helicopters. (Author)
SH- A18 PERSONNEL
DE- *HELICOPTERS *AIRWORTHINESS INSTRUMENT FLIGHT REGULATION AVIATION
SAFETY PERFORMANCE HUMAN WORK MEASUREMENT STANDARDS HELICOPTERS
CERTIFICATION INSTRUMENT FLIGHT RULES WORKLOAD PILOTS HUMAN FACTOR

AN- 00198375
DT- DA
TI- HELICOPTER ICING SYMPOSIUM, 6-7 NOVEMBER 1978, LONDON
DA- National Technical Information Service
PD- 19781100
AU- Don, TC
PY- 1978
LA- English
SF- ATRIS A 8001
SC- u7918
RN- Proceeding
PG- 313 p.
CS- Ministry of Defence, England Main Building, Whitehall London SW1 England
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A067981/1ST
AB- This document is a collection of papers presented at the Helicopter Icing Symposium, held in London, England, 6-7 November 1978. The emphasis of the symposium was on helicopter rotor blade icing. Papers covered methods of rotor blade ice protection (electrothermal, ice phobic coatings, microwave, vibratory and mechanical-pneumatic concepts); design and test criteria; ice protection system capabilities and testing and certification methods. Also included are papers on meteorological data; instrumentation; icing tunnel tests and correlations of results to mathematical accretion model; and simulated and natural icing flight tests. (Author)
SH- A01 AIRCRAFT
DE- *DEICING SYSTEMS *DEICING MATERIALS *ROTOR BLADES ROTARY WINGS ICE
PREVENTION METEOROLOGICAL DATA FLIGHT TESTING COATING PNEUMATIC DEVICES
MECHANICAL COMPONENTS VIBRATION MICROWAVE EQUIPMENT ELECTRICAL

EQUIPMENT THERMAL PROPERTIES SYMPOSIA HELICOPTERS ICING CONFERENCES
ROTOR BLADES ICE PREVENTION ANTI-ICING ELECTRICAL EQUIPMENT MICROWAVE
EQUIPMENT MECHANICAL EQUIPMENT COATING FLIGHT TESTS METEOROLOGICAL DATA

AN- 00195474
DT- DA
TI- THE EFFECTIVENESS OF SOME TRAFFIC SURVEILLANCE METHODS
FT- TRAFIKOEVERVAKNING OCH REGELEFTERLEVNAD 1
DA- Transport and Road Research Laboratory National Swedish Road & Traffic Research Institute
PD- 19780000
PY- 1978
LA- Swedish
SF- HRIS H 7904 IRRD I
SC- IRRD 238995
RN- TFD 1978:8 Monograph
PG- 80 p.
FG- 13 Fig.
TB- Tabs.
RF- Refs.
SN- 9185562-12-2
CS- Transportforskningsdelegationen Sveavaegen 166 Stockholm Sweden
AB- The purpose of the project described in this report was to study how drivers' observance of speed limits is influenced by different traffic surveillance methods. The hypothesis that was tested was, that a driver who has observed some traffic surveillance activity along a particular road, will remember that surveillance next time he drives along the same road (the memory effect) and adjust his speed accordingly. The experiments were of the before and after type, and were conducted on roads with 90 km/h speed limits. The results were analysed in two different ways; the behaviour of the different populations was studied, and the way in which the memory effect diminishes with time and the number of traffic surveillance activities the driver has encountered. Some results are as follows: the memory effect is statistically significant for at least: 10 days for traffic surveillance by radar, 17 days for helicopter, and 10 days for marked patrol cars. /TRRL/
RN- IRRD 238995
SH- H51 SAFETY 3T83 ACCIDENTS AND THE HUMAN FACTOR
DE- TRAFFIC SURVEILLANCE SPEED LIMIT DRIVER BEHAVIOR MEMORY BEFORE AND
AFTER STUDIES RADAR HELICOPTERS POLICE CARS SURVEILLANCE POLICE SPEED
LIMIT DRIVER BEHAVIOUR RADAR EMERGENCY VEHICLE AIRCRAFT

AN- 00189716
DT- DA
TI- RIDE QUALITY EVALUATION IV: MODELS OF SUBJECTIVE REACTION TO AIRCRAFT
MOTION
DA- Engineering Index
PD- 19780700
AU- Jacobson, ID Richards, LG
PY- 1978
LA- English
SF- ATRIS A 7901
SC- 007051 EIX790200038
PG- pp 521-529
RF- 5 Ref.
JV- 21
IS- 7
JN- Ergonomics
CS- Taylor and Francis Limited 10-14 Macklin Street London WC2B 5NF England
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
AB- Time motion histories and judgments of perceived comfort were obtained for three planes (Nord, Twin Otter, Beech) and a helicopter (S-61). Regression models were obtained predicting rated comfort from rms values for six degrees of freedom of motion. The model c' = 2.1 + 17.1T + 17.2V gives a good fit to the plane data, but is less acceptable for the helicopter data.
SH- A17 PASSENGER DEMAND
DE- PASSENGER COMFORT RIDE QUALITY MOTION STUDIES HELICOPTERS SIKORSKY S-61
HELICOPTER SIX DEGREES OF FREEDOM HUMAN FACTOR

AN- 00176653
DT- DA
TI- PREDICTION OF PILOT OPINION RATINGS USING AN OPTIMAL PILOT MODEL
DA- Engineering Index
PD- 19771000

AU- Hess, RA
PY- 1977
LA- English
SF- ATRIS A 7801
SC- EIX780400192
PG- pp 459-475
RF- 28 Ref.
JV- 19
IS- 5
JN- Human Factors
CS- Human Factors Society Johns Hopkins University Press Baltimore MD 21218
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
AB- A brief review of some of the more pertinent applications of analytical pilot models to the prediction of aircraft handling qualities is undertaken. The term "handling qualities" as applied to piloted aircraft can be defined as "those qualities or characteristics of an aircraft that govern the ease and precision with which a pilot is able to perform the tasks required in support of an aircraft role". The relative ease with which multiloop piloting tasks can be modeled via the optimal control formulation makes the use of optimal pilot models particularly attractive for handling qualities research. To this end, a rating hypothesis is introduced which relates the numerical pilot opinion rating assigned to a particular vehicle and task to the numerical value of the index of performance resulting from an optimal pilot modeling procedure as applied to that vehicle and task. This hypothesis is tested using data from piloted simulations and is shown to be reasonable. An example concerning a helicopter landing approach is introduced to outline the predictive capability of the rating hypothesis in multiaxis piloting tasks.
SH- A18 PERSONNEL
DE- PILOT PERFORMANCE MODEL AIRCRAFT FLIGHT CONTROL SIMULATION HELICOPTERS
AIRCRAFT LANDING TASK PERFORMANCE

AN- 00176644
DT- DA
TI- EFFECTS OF COCKPIT ENVIRONMENT ON LONG-TERM PILOT PERFORMANCE
DA- Engineering Index
PD- 19771000
AU- Stave, AM
PY- 1977
LA- English
SF- ATRIS A 7801
SC- EIX780400193
PG- pp 503-514
RF- 14 Ref.
JV- 19
IS- 5
JN- Human Factors
CS- Human Factors Society Johns Hopkins University Press Baltimore MD 21218
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
AB- A fixed-base helicopter simulator was used to examine pilot performance as influenced by noise, vibration, and fatigue. Subjects flew the simulator for periods ranging between three and eight hours while exposed to vibrations (at 17 Hz) ranging from 0.1 to 0.3 g, and noise stimuli varying between 74 (ambient) and 100 dB. Despite reports of extreme fatigue on these long flights, subject performance did not degrade. Within the limits of this study, performance tended to improve as environmental stress increased. However, subjects did suffer from lapses resulting in abnormally poor performance. These lapses are probably of short duration (seconds) and occur at unpredictable times. If such lapses occur in actual flight, they could provide an explanation for many so-called "pilot error" accidents.
SH- A18 PERSONNEL
DE- HELICOPTERS FLIGHT SIMULATORS 00-A652 00-A461 00-A901 00-A912 RESEARCH
HUMAN ENGINEERING ABILITY TESTING AVIATORS PILOT PERFORMANCE COCKPITS
HELICOPTERS FLIGHT SIMULATION AIRCRAFT NOISE VIBRATION FATIGUE HUMAN
FACTORS ENGINEERING PILOT ERRORS AIRCRAFT ACCIDENTS

AN- 00167522
DT- DA
TI- VIBRATION AND PASSENGER COMFORT
DA- Transport and Road Research Laboratory
PD- 19770600
AU- Oborne, DJ
PY- 1977
LA- English
SF- ATRIS A 7801 RRIS R 7801 IRRD I
SC- IRRD-228238
RN- Analytic
PG- pp 97-101

FG- 3 Fig.
RF- 10 Ref.
JV- 8
IS- 2
JN- Applied Ergonomics
SN- 00036870
CS- IPC Science and Technology Press Limited IPC House, 32 High Street Guildford, Surrey England
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
AB- This paper considers the effects of vehicular vibration on passenger comfort and reports the results of a series of questionnaire investigations to examine both the qualitative and quantitative effects of vibration. Although in their infancy, it is argued that field investigations of the type described in this paper are of more value to the design engineer than are many of the investigations carried out under laboratory conditions. However the author points out that the measurement errors and problems incurred during field investigations are much increased compared with laboratory studies. Relationships between vibration and motion intensity and journey comfort level are shown graphically.
RN- IRRD-228238
SH- R07 A01 AIRCRAFT 3T92 VEHICLE COMFORT 3T91 VEHICLE DESIGN AND SAFETY
DE- HUMAN FACTOR RIDE QUALITY PASSENGER COMFORT VIBRATION TESTS SURVEYS
AIRCRAFT VIBRATION PASSENGER COMFORT AIRCRAFT DESIGN HOVERCRAFT
HELICOPTERS RIDING QUALITY VEHICLE ERGONOMICS VEHICLE OCCUPANT FIELD
(TEST) QUESTIONNAIRE COMFORT VIBRATION

AN- 00157377
DT- DA
TI- INFRASOUND IN TRANSPORTATION
DA- Transport and Road Research Laboratory
PD- 19760000
AU- Tempest, W
PY- 1976
LA- English
SF- RRIS R 7702 HRIS H IRRD I
SC- IRRD 224910
RN- Monograph
PG- pp 19-46
FG- 13 Fig.
TB- 3 Tab.
RF- 11 Ref.
JN- Infrasound and Low Frequency Vibration
CS- Academic Press Incorporated (London) Limited 24/28 Oval Road London England
AV- Academic Press Incorporated 111 Fifth Avenue New York NY 10003
AB- Data are presented which show that infrasound up to 120 db levels is encountered in road and rail transportation, and that even higher levels are to be found in ships' engine rooms and in helicopters. The literature of laboratory work on the effects or infrasound provides some rather inconclusive reports of performance deterioration and balance disturbance in the range of intensities reported in vehicles. Evidence is also presented of sensations of euphoria and lethargy. Parallels are drawn between the lethargy produced by infrasound and rotary motion, and also the similarity between infrasound and high intensity audible noise in impairing relaxation time and vigilance respectively. It is reported that some individuals who report sensitivity to balance disturbance also show an unusual sensitivity to infrasound. In total these effects suggest that infrasound may well have an adverse affect on the performance of drivers. In this respect it probably adds to the already known influences of noise, motion, heat and fatigue, and in this way it may be a factor in some accidents. The magnitude of the role of infrasound in relation to the other factors mentioned is, at the moment, quite impossible to evaluate and further research is clearly needed to decide whether it is significant or entirely trivial. /TRRL/
RN- IRRD 224910
SH- R07 H52 HUMAN FACTORS 3T93 VEHICLE NUISANCE
DE- HUMAN FACTOR VIGILANCE LOCOMOTIVE CAB NOISE PHYSIOLOGICAL FACTORS NOISE
TOLERANCE NOISE (SOUND) HIGHWAY TRANSPORTATION RAIL TRANSPORTATION
VEHICLE HELICOPTERS DRIVER PERFORMANCE TRAFFIC ACCIDENT INFRASONIC
NOISE SOUND LEVEL RAILWAY VEHICLE ATTENTION DRIVER SKILL (ROAD USER)
ACCIDENT CAUSE TEXTBOOK

AN- 00156892
DT- DA
TI- REACTION OF PASSENGERS TO PUBLIC SERVICE VEHICLE RIDE
DA- Transport and Road Research Laboratory

PD- 19761000
AU- Clarke, MJ Osborne, DJ
PY- 1976
LA- English
SF- UMTRIS U RRIS R 7702 IRRD I
SC- IRRD-225508
RN- Analytic
PG- p 385
JV- 8
IS- 4
JN- Ergonomics
CS- Taylor and Francis Limited 10-14 Macklin Street London WC2B 5NF England
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
SO- This paper was presented to the 1975 Ride Quality Symposium, November 1975, pp 437-470.
AB- A series of questionnaire studies is described which was carried out on passengers in public service vehicles in the United Kingdom, particularly cross-channel hovercraft, helicopter and train. The effectiveness of the different rating techniques employed is examined and it is demonstrated that useful and reliable information can be obtained on the effects of such physical parameters as vibration, vehicle motion and noise using rating methods which involve no external standards. Some results obtained from analysis of the survey returns are presented. /Author/ /TRRL/
RN- IRRD-225508
SH- R07 3T91 VEHICLE DESIGN AND SAFETY 3T92 VEHICLE COMFORT U41AHDO SOCIOECONOMICS OF PASSENGER SERVICES
DE- HUMAN FACTOR PASSENGER COMFORT SURVEYS VIBRATION QUESTIONNAIRE RIDE QUALITY VEHICLE COMFORT VIBRATION VEHICLE OCCUPANT UNITED KINGDOM CONFERENCE PUBLIC TRANSPORT HOVERCRAFT HELICOPTER QUESTIONNAIRE MOVEMENT NOISE

AN- 00151192
DT- DA
TI- HUMAN RESPONSE TO SOUND: THE CALCULATION OF PERCEIVED LEVEL, PLDB (NOISINESS OR LOUDNESS) DIRECTLY FROM PHYSICAL MEASURES
DA- National Technical Information Service
PD- 19761117
AU- Higgins, TH
PY- 1976
LA- English
SF- ATRIS A NTIS N
SC- u7709
RN- FAA-RD-76-1 Final Rpt.
PG- 46 pp
SN- FAA202-553-001
CS- Federal Aviation Administration Systems Research and Development Service Washington DC 20590
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A035677/4ST
AB- The relationship between the perceived level, PLdB, of sound (loudness or noisiness) is shown to be a function of the sound pressure squared and the sound frequency squared. A logarithmic formula employing this basic relationship between perceived level and pressure and frequency has been developed and is found to be as accurate as the more complex methods currently in use. The results are found to be more accurate than the complex methods currently in use for the useful range of sound pressure levels and frequencies found to be associated with operational aircraft including helicopters, turbofan, turboprop and turbojet powered aircraft. This work, therefore, provides the systems engineer an easily understood and useful design and evaluation method. The formula developed clearly shows the design engineer and management personnel the relationship between the physical characteristics of an evolving system and its potential impact on human and community response.
SH- A07 ENVIRONMENT
DE- RESPONSE BIOLOGY SOUND HEARING HUMAN FACTOR SOUND PRESSURE FREQUENCIES COMMUNITY VALUES CALIBRATION PHYSICAL PROPERTIES AIRCRAFT NOISE HELICOPTERS

AN- 00145528
DT- DA
TI- NOISE CERTIFICATION CONSIDERATIONS FOR HELICOPTERS BASED ON LABORATORY INVESTIGATIONS
DA- National Technical Information Service
PD- 19760700
PY- 1976
LA- English
SF- ATRIS A NTIS N

SC- u7702
RN- FAA-RD-76-116 Final Rpt. MAN-1014
PG- 108 pp
CS- Man-Acoustics and Noise, Incorporated Seattle WA
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A032028/3ST
SO- See also report dated Nov 75, AD-A018 036.
FD- Contract
CN- DOT-FA74WAI-490
AB- This is the second part of a program concerning noise certification for V/STOL and helicopter aircraft. Aspects considered were: an engineering calculation procedure which validly and reliably reflects annoyance to helicopter operations; estimates of noise exposure levels which could be compatible with human activities in areas surrounding heliports; noise exposure modeling for helicopter noise; certification measurement approaches for helicopter noise certification. The basics of the program involved human response evaluations of conventional takeoff and landing (CTOL) aircraft noise, simulations of helicopter noise emphasizing 'slap' or pulsating noise effects, and recordings of a wide variety of helicopter operations.
SH- A01 AIRCRAFT
DE- NOISE POLLUTION HELICOPTERS SHORT TAKEOFF AIRCRAFT NOISE EXPOSURE LEVEL
AIRCRAFT NOISE ACOUSTIC MEASUREMENT HUMAN FACTORS ENGINEERING INTENSITY
NOISE CERTIFICATION CRITERIA STATISTICAL ANALYSIS SIMULATION MODEL ANALYSIS OF VARIANCE ENVIRONMENTAL PROTECTION EXPERIMENTAL DATA COMMUNITY RELATIONS LABORATORY TESTS AIRCRAFT NOISE/ANNOYANCE CERTIFICATION

AN- 00127902
DT- DA
TI- DEALING WITH TECHNOLOGY'S MORE NOISY ADVANCES
DA- Transport and Road Research Laboratory
PD- 19750314
AU- De S Deva-Aditya, NJ Hill, C
PY- 1975
LA- English
SF- ATRIS A RRIS R 7601 HRIS H 7601 IRRD I
SC- IRRD 214549
PG- pp 523-524
TB- 2 Tab.
JV- 152
IS- 11
JN- Municipal Engineering
CS- Municipal Engineering Publications, Limited 178-202 Portland Street London W1N 6NH England
AV- Linda Hall Library 5109 Cherry Street Kansas City MO 64110-2498
AB- The authors discuss the increasing noise problem associated with present day technology and the methods that are being used to measure noise level. They first deal with noise from high-speed electric passenger express trains with particular reference to the proposed (but shelved) channel tunnel rail link, the Japanese adaptations of the NNI concept and the attitude in France. It is pointed out that the proposed ctrl noise level of 67db(a) leq corresponded to a facade peak level of about 83db(a). Low-speed rail terminal noise generation is discussed, which would go on by night as well as day and, because the background noise is less, would have a more disturbing effect. Extension of the leq scale is discussed and the American proposals for the ldn index which takes account of the time of day. Good agreement is demonstrated between the estimated facade ldn level of 72db(a) and the leq of 67db(a) suggested for high-speed railways. It is suggested that compensation should be considered if construction and demolition noise continued at a high level for more than two working months in succession. Helicopter generated noise is examined. The complex nature of this noise is investigated, and the advantages of straightforward peak db(a) noise measurement are pointed out. Measured noise levels are discussed in relation to doe recommendations for limiting housing development. The authors conclude that the simplicity of the versatile leq db(a) noise measuring approach will assist the noise control engineer in his problems. /TRRL/
RN- IRRD 214549
SH- R10 A07 ENVIRONMENT A03 H52 HUMAN FACTORS H15 SOCIOECONOMICS 3T93
VEHICLE NUISANCE
DE- ENVIRONMENTAL EFFECTS NOISE CONTROL JAPANESE NATIONAL RAILWAYS SHIN
KANSEN ACOUSTIC MEASUREMENT NOISE LEVEL ENVIRONMENT NOISE LEVEL ELECTRIC TRAINS TERMINALS BACKGROUND NOISE CONSTRUCTION NOISE HELICOPTERS NOISE MEASUREMENT TRAFFIC NOISE NOISE METERS NOISE POLLUTION PUBLIC TRANSIT RAIL RAPID TRANSIT TECHNOLOGY URBAN TRANSPORTATIONS SYSTEMS HIGHWAY CONSTRUCTION HELICOPTERS RESIDENTIAL
AREA ELECTRIC RAILROADS SOUND MEASUREMENT ELECTRICITY RAILWAY RAPID
TRANSIT SYSTEM FRANCE JAPAN UNITED KINGDOM USA CLASSIFICATION TIME

AIRCRAFT ROAD CONSTRUCTION PUBLIC TRANSPORT CONSTRUCTION

AN- 00093460
DT- DA
TI- NOISE CERTIFICATION CRITERIA AND IMPLEMENTATION CONSIDERATIONS FOR
V/STOL AIRCRAFT. VOLUME I
DA- National Technical Information Service
PD- 19751100
PY- 1975
LA- English
SF- ATRIS A NTIS N
SC- u7602
RN- FAA-RD-75-190 Final Rpt. MAN-101H
PG- 84 pp
CS- Man-Acoustics and Noise, Incorporated Seattle WA Federal Aviation Administration Systems Research and Development Service Washington DC 20590
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD-A018036/4ST
FD- Contract
CN- DOT-FA74WAI-490
AB- As a means of determining the accuracy and reliability of engineering calculation procedures that could be utilized as a basis for noise certification of V/STOL commercial aircraft, 36 persons made annoyance judgments to 34 noise signals presented at 5 different levels. The signals included recordings of conventional jet aircraft operations, turboprop and reciprocating engine powered commercial aircraft, helicopter flybys, and simulations of V/STOL operations. Both relative annoyance and absolute acceptability judgments were obtained.
SH- A01 AIRCRAFT A07 ENVIRONMENT
DE- *Commercial aircraft *Aircraft noise *Short takeoff aircraft *Psychophysics Intensity Experimental data Test methods Human factors engineering Magnetic tape Standards Vertical takeoff aircraft Ratings ENVIRONMENT AIRCRAFT NOISE CERTIFICATION SHORT TAKEOFF AIRCRAFT COMMERCIAL AIRCRAFT AIRCRAFT NOISE/ANNOYANCE JET AIRCRAFT NOISE HELICOPTERS ANNOYANCE

AN- 00090158
DT- DA
TI- AN ANALYTICAL INVESTIGATION OF FLUID CARGO VAPOR DISPERSION
DA- National Technical Information Service
PD- 19741100
AU- Chou, JH Corlett, RC
PY- 1974
LA- English
SF- NTIS N HRIS H 7503
SC- u7507
RN- Final Rpt.
PG- 77 pp
CS- Washington University, Seattle Department of Mechanical Engineering Seattle WA 98195 United States Coast Guard 400 7th Street, SW Washington DC 20590
AV- National Technical Information Service 5285 Port Royal Road Springfield VA 22161 AD/A-004487/5ST
FD- Contract
CN- DOT-CG-34075-A
AB- Means for analytical prediction of the dispersion field of toxic or combustible vapor vented from a tanker are critically evaluated. Particular emphasis is given the conservative delineation of the flammable surface separating spatial domains outside of which dangerous combustion is unlikely and inside of which it is (and an analogous toxic surface) in the light of normal available data and the uncertainties therein. Approximate analyses covering buoyancy and jet momentum effects are included. The problem of assignment of appropriate flammability limits in a turbulent and inhomogeneous mixture is reviewed. Experimental and analytical means of dealing with flow past obstacles and other geometrically complex phenomena are evaluated. The effects of helicopter downwash on vapor dispersion is also briefly analyzed. Finally, the procedure for analysis of vapor dispersion within tanks is outlined.
SH- H52 HUMAN FACTORS H34 GENERAL MATERIALS
DE- *TANKERS *FUEL TANKS *AIR POLLUTION VENTS COMBUSTION HELICOPTERS
DOWNWASH MATHEMATICAL MODELS VAPORS TANKER TOXICITY COMBUSTION
DISPERSION DOWNWASH HELICOPTERS

AZ- 2197324
AA- <NTIS> ADP010629/XAB
TI- Exploratory Use of VR Technologies for Training Helicopter Deck-Landing Skills
AU- Magee, L. E.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
PY- 1 Nov 2000
PG- 3p
NT- Presented at the RTO Human Factors and Medicine Panel Workshop, Orlando FL, 5-9 Dec 1997, p21-1/21-3. This article is from ADA388966 The Capability of Virtual Reality to Meet Military Requirements (la Capacite de la rea1ite virtuelle a repondre aux besoins militaires).
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A01/MF A01
JA- USGRDR0116
CP- Canada
AB- Canadian Forces (CF) pilots and landing safety officers require intensive training to develop the individual and team skills required for safe helicopter deck landings. These skills are currently acquired at sea, following individual training with independent simulators unequipped with visual displays. DCIEM is exploring the feasibility of using commercial, off-the-shelf technologies as the essential components for simulators for training the pilot of the Sea King helicopter and the landing safety officer (LSO) of a Canadian Patrol Frigate (CPF). The objective of this project is to assess virtual reality and computer networking technologies that could be exploited in the development of a federation of interconnected, low-cost simulators. The human factors of visual and motion cueing, and coupling of the simulators, present the major technical challenges to the project's success. This paper will describe the exploratory development models, some preliminary reactions, and the experimental plan proposed to assess the training effectiveness of the helicopter simulators.
DE- *Flight training; *Helicopters; *Virtual reality; *Deck safety equipment; Coupling(Interaction); Symposia; Skills; Military forces(Foreign); Low costs; Pilots; Canada; Teams(Personnel); Off the shelf equipment; Operational effectiveness; Human factors engineering; Display systems; Safety; Frigates; Officer personnel; Flight simulation ; Patrol craft; Cueing; Visual aids; Landing
ID- Component reports; Foreign reports; Nato furnished; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 62B (Computers, Control, and Information Theory--Computer Software); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2192188
AA- <NTIS> ADA386456/XAB
TI- Effects of Head-Supported Devices on Female Aviators During Simulated Helicopter Rides. Part I: Biomechanical Response
TI- <NOTE> Final rept
AU- Barazanji, K. W. ; Alem, N. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- ARL-2000-16
PY- Jun 2000
PG- 64p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- USGRDR0112
CP- United States
AB- Researchers at the U.S. Army Aeromedical Research Laboratory (USAARL) recently concluded that weight-moment of head-supported devices (HSDs) worn by male aviators should not exceed 82.8 +/- 22.9 Newton-centimeters (N-cm). The goal of this study was to define a safe range of weights and centers of mass of HSDs that can be tolerated by female helicopter pilots without affecting their health or degrading their performance. Twelve subjects were exposed to whole- body vibration while wearing an HSD with various mass properties. During exposure, biomechanical head acceleration, neck muscle activities, and performance responses were recorded. This paper reports the biomechanical response findings. Head pitch, anterior-posterior, and axial accelerations were measured for 12 different helmet configurations during sinusoidal vertical vibration having a magnitude of 0.45 m/s2 and frequencies swept from 2 Hz to 17 Hz at the rate of 0.25 Hz/sec. Results indicated that head pitch and axial acceleration levels for female subjects were lower than those for their male counterparts. This may be attributed to differences in seat damping.
DE- *Flight helmets; *Fatigue(Physiology); *Neck(Anatomy); Vibration; Damping; Helicopters; Thresholds(Physiology); Biomechanics; Females; Aviation medicine
ID- Hsd(Head supported devices); NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2189882
AA- <NTIS> ADA385583/XAB
TI- Two-Part Study on the Use of Bathymetric and Nautical Mapping Information in a Moving Map Display to Support Mine Counter Measures Operations
AU- Trenchard, M. E. ; Lohrenz, M. C. ; Myrick, S. A. ; Gendron, M. L.
CS- Naval Research Lab. Detachment, Stennis Space Center, MS.
CS- <CODE> 104619000; 425300
RN- NRL/PP/7440--00-0013
PY- 21 Aug 2000
PG- 9p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- USGRDR0109
CP- United States
AB- Cockpit moving map displays have been employed in the tactical air community for several years to support air-to-air and air-to-ground missions and have been shown to be excellent situational awareness (SA) tools. This study examines the potential of using the next-generation cockpit moving map display to support the difficult Mine Counter Measures (MCM) and Mine Sweeping Operations. Specifically, the Naval Research Laboratory - Stennis Space Center (NRLSSC) will leverage the Naval Air Systems Command's Tactical Aircraft Moving Map Capability (TAMMAC) digital moving map system as a demonstration platform to incorporate bathymetric and nautical map data designed to support in-flight MCM operations. Of critical importance to this project is a two-part human factors study to: (1) determine MCM helicopter aircrew preferences from the various types of map data under consideration, and (2) measure and evaluate aircrew performance both with and without the moving map capability. This study is being conducted as part of NRLSSC's Generation and Exploitation of Common Environment (GECE) project that will Support MCM and amphibious operations in Fleet Battle Experiment - India (FBE-I) or Kernal Blitz 2001 (KB 01).
DE- *Mine countermeasures; *Bathymetry; *Digital maps; Cockpits; Human factors engineering; Helicopters; Data displays; Online systems; Naval tactical data system
ID- NTISDODXA
SH- 48I (Natural Resources and Earth Sciences--Cartography); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 2189792
AA- <NTIS> ADA385471/XAB
TI- Gateway: Volume 9, Number 4
TI- <NOTE> Publication
AU- Armstrong, S. ; Steinberg, R. ; Fineberg, M. ; Hollnagel, E.
CS- Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH.
CS- <CODE> 105801000; 417777
RN- CSERIAC-GWIX4
CN- SPO700-98-D-4001
PY- Jun 1999
PG- 17p
NT- Original contains color plates: All DTIC reproductions will be in black and white.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0109
CP- United States
AB- This issue contains articles on the following subjects: (1) Advocating User-Centered Software Design; (2) Developing a Suppression-Sensitive Synthetic Dismounted Infantry Team; (3) Control Versus Dependence: Striking the Balance in Function Allocation; (4) Rotorcraft Human Factors Research Facilities at the NASA Ames Research Center.
DE- *Software engineering; *Computer aided design; *Human factors engineering; *Combat simulation; Adaptive systems; User needs; Rotary wing aircraft; Periodicals
ID- Suppressive fire; NTISDODXA
SH- 62B (Computers, Control, and Information Theory--Computer Software); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2187779
AA- <NTIS> ADA384560/XAB
TI- Cockpit Accommodation in USN/USMC Helicopters
TI- <NOTE> Professional paper

AU- Tucker, H. ; Crawford, J.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
PY- 2000
PG- 7p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- USGRDR0107
CP- United States
AB- Anthropometric accommodation guidance for USN/USMC helicopters is outdated, undocumented, and in some cases nonexistent. Recent reassignments of aviators within the USN/USMC due to poor accommodation have highlighted an area where operational dollars could be saved by safely and correctly assigning candidate aviators to a specific training and career pipeline. These issues were revealed during the course of NAVAIRSYSCOM (PMA-202) Aircrew Accommodation Expansion Program where NAVAIR 4.6 at Patuxent River was tasked to perform a baseline accommodation assessment 0 fin-service USN/USMC aircraft.
DE- *Anthropometry; *Aircraft seats; Cockpits; Flight crews; Helicopters; Aircraft design
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2187557
AA- <NTIS> ADA384324/XAB
TI- Proceedings of the Technical Cooperative Program Workshop: Inflatable Restraints in Aviation
TI- <NOTE> Final rept
AU- Crowley, J. S. ; Dalgard, C. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-2000-21
PY- Aug 2000
PG- 206p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- USGRDR0107
CP- United States
AB- Aviation accidents frequently result in death or injury--occupant flail with resultant head injury is the leading cause of fatality and serious injury in Army helicopter accidents. Inflatable restraints are a proven safety technology in the automotive world, and airbags are being developed for Army helicopters as well. Other applications in transport safety such as inflatable motorcycle helmet collars and inflatable restraint harnesses may be useful in aviation--research is underway in exciting novel areas. There are many questions to be answered before airbags and similar systems can be fielded in aircraft. Hot issues range from the unique characteristics of a helicopter crash pulse to the effects of unintended airbag deployment on injury and aircraft control. Tools useful in this research include computer modeling, anthropometric test devices, cadaver research, and flight simulation/testing. In December 1999, a workshop entitled 'Inflatable Restraints in Aviation' was held in Huntsville, Alabama, that brought together a multidisciplinary group of world experts in inflatable restraint technology and applications. The workshop was co-sponsored by the U.S. Army Aeromedical Research Laboratory, and The Technical Cooperation Program (TTCP), Subgroup U, Technical Panel 7 (Human Factors in Aviation). The emphasis of the meeting was on the potential need for inflatable restraints in aviation, and the special integration and safety problems unique to the aviation environment. The workshop was very well attended, and the scientific presentations excellent.
DE- *Helicopters; *Aviation safety; *Army aircraft; *Air bag restraint systems; Flight testing; Army research; Human factors engineering; Aviation accidents; Harnesses; Wounds and injuries; Death; Head(Anatomy); Flight simulation; Workshops; Helmets; Crashes; Aviation medicine; Collars
ID- Inflatable restraints; Ttcp(The technical cooperation program); NTISDODXA
SH- 74GE (Military Sciences--General); 51B (Aeronautics and Aerodynamics--Aeronautics); 57U (Medicine and Biology--Public Health and Industrial Medicine)

AZ- 2184192
AA- <NTIS> ADA382925/XAB
TI- Aviators with Two or More Pilot-Error Accidents

TI- <NOTE> Technical rept
AU- Berner, W. H. ; Miller, D. F.
CS- Army Board for Aviation Accident Research, Fort Rucker, AL.
CS- <CODE> 002302000; 036600
PY- Dec 1971
PG- 16p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0103
CP- United States
AB- In an attempt to develop indicators which would permit identification of those Army aviators most likely to suffer pilot-error accidents, USABAAR's data base was interrogated for aviators who had two or more pilot-error accidents during a 30-month period. One hundred and twenty-three such aviators and 249 accidents were identified. These accidents were analyzed for causative factors and the aviators for distinguishing characteristics which might assist in identifying those with a high potential for pilot-error accidents. No characteristics permitting this identification could be documented. Moreover, several empirical points for commanders and supervisors to use in the prevention of pilot error accidents were developed.
DE- *Accident investigations; *Aviation accidents; *Pilot error; Aircraft pilots; Pilot performance; Military commanders; Supervisors; UH-1 helicopter; Data bases; Accident prevention; Mortality rate; Performance(Human); Statistical data; Errors; Aviation safety; Aviation personnel; Roles(Behavior)
ID- Pilot error accidents; NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics); 92B (Behavior and Society--Psychology)

AZ- 2184191
AA- <NTIS> ADA382924/XAB
TI- OH-13 and OH-23 Accident Summary
TI- <NOTE> Rept. for 1 Jul 1966-30 Jun 1967
AU- Thompson, P. R.
CS- Army Board for Aviation Accident Research, Fort Rucker, AL.
CS- <CODE> 002302000; 036600
PY- 30 Jun 1967
PG- 30p
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LA- English
PC- PC A03/MF A01
JA- USGRDR0103
CP- United States
AB- This summary was prepared to help commanders at all levels, aviation safety officers, maintenance officers, aviators, and related aviation personnel prevent future accidents and preserve combat resources through a review of OH-13 and OH-23 mishaps and their cause factors. The term 'mishap', as used in this summary, includes accidents, incidents, forced landings, and precautionary landings, as defined by paragraph 7, AR 385-40. Aircraft losses or damages which were the direct result of hostile action in RVN are not included. Information presented in this summary was taken from accident and other mishap reports submitted from all Army commands, as required by section IV, AR 385-40.
DE- *OH-13 helicopter; *OH-23 helicopter; *Accident prevention; *Aviation safety; *Aviation personnel; Combat support; Reports; Maintenance; Pilot performance; Aircraft pilots; Flight control systems; Aircraft equipment; Survival(Personnel); Military commanders; Mortality rate; Malfunctions; Aircraft landings; Airworthiness; Crash injuries
ID- NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2184190
AA- <NTIS> ADA382923/XAB
TI- CH-34 and CH-37 Accident Summary
TI- <NOTE> Rept. for 1 Jul 1966-30 Jun 1967
AU- Thompson, P. R.
CS- Army Board for Aviation Accident Research, Fort Rucker, AL.
CS- <CODE> 002302000; 036600
PY- 30 Jun 1967
PG- 20p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at

orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0103
CP- United States
AB- This summary was prepared to help commanders at all levels, aviation safety officers, maintenance officers, aviators, and related aviation personnel to prevent future accidents and preserve combat resources through a review of past CH-34 and CH-37 mishaps and their cause factors. The term mishap, as used in this summary, includes accidents, incidents, forced landings, and precautionary landings, as defined by paragraph 7, AR 385-40. Information presented in this summary was taken from accident and other mishap reports submitted from all Army commands during FY 1967, as required by section IV, AR 385-40. Aircraft losses or damages which were the direct result of hostile action in RVN are not included. Each mishap brief is preceded by a USABAAR log number so that queries may be directed to USABAAR if additional information is desired. Information on Modification Work Orders (MWOs) was extracted from Department of the Army Pamphlet No. 310-7, U.S. Army Equipment Index of Modification Work Orders, April 1968. Technical Bulletin (TB) information was furnished by USAAVSCOM.
DE- *Helicopters; *Aviation accidents; *Accident prevention; Military commanders; Army aviation; Maintenance; Combat support; Military aircraft; Damage; Pilot performance; Aircraft pilots; USABAAR; USAAVSCOM; Statistical data; Officer personnel; Aviation safety; Malfunctions; Aviation personnel; Aircraft landings
ID- CH-34 aircraft; CH-37 aircraft; NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2184179
AA- <NTIS> ADA382898/XAB
TI- CH-37 Accident Summary
TI- <NOTE> Rept. for 1 Jul 1957-30 Nov 1966
AU- Christian, W. P.
CS- Army Board for Aviation Accident Research, Fort Rucker, AL.
CS- <CODE> 002302000; 036600
PY- 30 Nov 1966
PG- 14p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0103
CP- United States
AB- This report is a review of CH-37 accidents, incidents, forced landings, and precautionary landings during the period July 1957 through November 1966. During this period, there were 264 mishaps reported. Of these, 29 were major accidents and four were minor accidents. There were 47 incidents, 89 forced landings, and 95 precautionary landings. Review of the major accidents indicated that pilot factors accounted for 48.3% of the major accidents, while materiel failures or malfunctions were responsible for 37.9%. Weather, supervision, and maintenance were responsible for the remaining 13.8%. Selected briefs of mishaps and cause factors are included to illustrate types of mishaps which occurred during this period. Each brief is preceded by a USABAAR log number so that queries may be directed to USABAAR if additional information is desired. It will be noted that many incidents, forced landings, and precautionary landings are recorded in this summary with cause factors not reported. This results from reporting units failing to provide supplemental information as it becomes available. Reports of this nature, without supplemental data, are of little use to the aviation safety program and all units reporting similar mishaps are urged to follow through with supplemental data as soon as it becomes available. This accident summary should be of particular interest to commanders and personnel of National Guard and reserve units now employing CH-37 equipment.
DE- *Aviation accidents; Pilot performance; Aircraft pilots; Engine failure ; Weather; Supervision; Aircraft maintenance; Aviation safety; National Guard; Military aircraft; Helicopters; Aircraft equipment; Malfunctions ; Aviation personnel; Aircraft landings
ID- *CH-37 aircraft; NTISDODXA
SH- 85A (Transportation--Air Transportation); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2183684
AA- <NTIS> ADA383181/XAB
TI- Display of Aircraft State Information for Ambient Vision Processing using Helmet Mounted Displays
TI- <NOTE> Final rept. Dec 1997-Sep 2000
AU- Sharkey, T. J. ; Hennessy, R. T. ; Marlow, T. W.
CS- Monterey Technologies, Inc., CA.

CS- <CODE> 117341000; 436297
RN- MTI20.972904
CN- DAAH10-98-C-0020
PY- Sep 2000
PG- 320p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A15/MF A03
JA- USGRDR0103
CP- United States
AB- This report describes the work performed by Monterey Technologies, Inc. under a Phase 2 Small Business Innovation Research (SBIR) contract. The goal of the work was the development and evaluation of a novel head mounted display (HMD) that provide helicopter pilots aircraft state information in a way that allows processing by the ambient visual system. A generic helicopter simulator was built for use as a testbed. Ambient displays were presented in the pilot's peripheral field of view while the pilots performed a series of low speed flight maneuvers. The characteristics of the ambient displays were manipulated in three separate evaluations. The first evaluation focused on the size, shape, and density of the objects in the ambient display. The second experiment focused on the relationship between longitudinal motion of the aircraft and motion of the ambient objects across the display. The third experiment examined the effect of providing a horizon. In general, the presence of the ambient displays resulted in improved performance for some, but not all, flight tasks. Detailed results of these studies and recommendations for future research on the effects of ambient displays on pilot performance are presented.
DE- *Helmet mounted displays; Simulators; Test beds; Performance(Human); Processing; Pilots; Motion; Display systems; Low velocity; Helicopters; Maneuvers; Vision; Flight speeds; Head up displays
ID- Sbir(Small business innovation research); NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2180928
AA- <NTIS> ADP010331/XAB
TI- Test and Evaluation of the Man-Machine Interface between the Apache Longbow and an Unmanned Aerial Vehicle
AU- Kraay, A. G. ; Pouliot, M. L. ; Wallace, W. J.
CS- Boeing Co., Mesa, AZ.
CS- <CODE> 115795000; 436932
PY- Apr 2000
PG- 7p
NT- Presented at RTO SCI Symposium on Warfare Automation: Procedures and Techniques for Unmanned Vehicles, Ankara, Turkey, 26-28 Apr 1999. Presented at American Helicopter Society Annual Forum (54th), Washington, DC, 20-22 May 1998. This article is from ADA381871 Advances in Vehicle Systems Concepts and Integration. (les Avancees en concepts systemes pour vehicules et en integration).
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- USGRDR0026
CP- United States
AB- The Boeing Company is studying a concept that involves teaming a manned rotorcraft, the Apache Longbow (TM), with a unmanned air vehicle (UAV). During 1997 Boeing developed a preliminary man-machine interface between the Apache Longbow and an unmanned air vehicle. An early assessment of the man- machine interface in a virtual simulation environment was conducted. The study concentrated on the effects of crew workload during manned-unmanned teaming operations and acceptability of the design in terms of presentation of the data, functionality, and utility. A limited assessment of operational measures of effectiveness was also conducted. Subject pilots were satisfied with the man- machine interface, did not experience task overload and were able to perform UAV control tasks. Subjects did experience some difficulty with target acquisition and tracking, however. Initial data suggests that the potential exists to detect targets beyond the organic sensor range of current attack/reconnaissance rotorcraft without being exposed to threat detection.
DE- *Helicopters; *Man machine systems; *Drones; Performance(Engineering); Target acquisition; Operational effectiveness; Data displays; Flight simulation; Virtual reality; Reconnaissance aircraft
ID- *Unmanned aerial vehicles; Component reports; Nato furnished; Ah- 64d aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering);

51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2180010
AA- <NTIS> ADA381402/XAB
TI- Physiological Responses to Wearing the Helicopter Aircrew Integrated Life Support System (HAILSS) in Hot Environments
TI- <NOTE> Final rept
AU- Kaufman, J. W. ; Shender, B. S. ; Askew, G. K. ; Schaaf, L. ; Farahmand, K.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
RN- NAWCADPAX-99-189-TR
PY- 8 Aug 2000
PG- 51p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- USGRDR0025
CP- United States
AB- Individuals wearing encapsulating garments require auxiliary cooling systems to sustain physical and cognitive performance when exposed to high temperatures or workloads. The Helicopter Aircrew Integrated Life Support System (HAILS S) is designed to minimize thermal problems by incorporating normal flight suit functions with protective functions fire, chemical and biological warfare (CBW), and cold water immersion in a single, integrated clothing ensemble. This study evaluated the effectiveness of the HAILSS cooling concept by comparing heat loads incurred while performing up to 6 hi of physical work in either HAILSS or the current A/P22P-9(V) CBW protective ensemble. This study exposed seven test subjects (six male, one female) to six experimental trials each. Subjects wore the HAILSS (h20, h75) and CB m20, HAILSS% N 75 35 (a) Need for head ventilation (b) Airflow though breathing valve adequate but saliva a problem, mouth too were M.L.nt moderate physical work (40% of an individual's maximum oxygen uptake) and cognitive tasks. In addition, each subject had one exposure using HA%S without the chemical protective AR-5 hood (h75n) and another employing HAILSS with cooled ventilation air (24C inlet air temperature) (h75c) in the hot/humid condition. Test results indicated 20% RH trials lasted significantly longer (p<O.Ol) and were significantly less stressful (p<O.O5) than 75% RH trials based on various physiological parameters. Increasing heat removal by ancillary cooling brought the level of heat strain experienced in the HAILSS assemble at 75% RH to roughly that of Mk 1 or HAILSS at 20% RH. HAILSS or Mk I without ancillary cooling was demonstrably more stressful to wear at 75% RH than at 20% RH. Operational mission performance would likely degrade at this higher RH without active cooling. These results demonstrate that ambient relative humidity significantly affects heat removal even in totally encapsulated protective clothing ensembles.
DE- *Life support systems; Test and evaluation; Thermal properties; Auxiliary; Integrated systems; Exposure(General); Performance(Human); High temperature; Cognition; Air flow; Ventilation; Helicopters; Physiological effects; Biological warfare; Chemical warfare; Encapsulation; Cooling and ventilating equipment; Response(Biology); Respiration; Workload; Protective clothing; Cold water; Immersion; Humidity; Flight clothing; Heat stress(Physiology); Saliva
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 2175103
AA- <NTIS> ADA379445/XAB
TI- Human Factors Analysis of Fiscal Year 90 to 97 Rotary Wing and TACAIR flight Mishaps
TI- <NOTE> Master's Thesis
AU- Denham, K. R.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Jun 2000
PG- 116p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A07/MF A02
JA- USGRDR0023
CP- United States
AB- Human error is present in approximately 60 to 80 percent of all Naval Aviation (NA) flight mishaps (FMs). This indicates a need to identify the patterns and relationships of human error associated with NA FMs in

order to develop tailored intervention strategies. This study uses the Human Factors Analysis and Classification System (HFACS), a human error oriented accident Investigation and analysis process, to conduct post-hoc analysis of 77 rotary wing and 141 Tactical Aircraft (TACAIR) Class A and B human error FMs from Fiscal Year 90 to 97. This study indicates that Skill-Based Error, Decision Error, Adverse Mental State (AMS) and Crew Resource Management (CRM) are the predominant human error types associated with NA FMs. A nonparametric bootstrap simulation is performed for singular and combinations of human error types to develop the most effective intervention strategies. For the rotary wing community, the CRM human error type represents the best target for selected intervention strategies and potential cost savings. The AMS human error type provides the best target for selected intervention strategies and potential cost savings for the TACAIR community. The use of flight simulators is viewed as the most effective intervention strategy for both predominant human error types identified.

DE- *Human factors engineering; *Error analysis; *Aviation accidents; Rotary wings; Naval aviation; Decision making; Performance(Human); Cost estimates; Theses; Flight simulators; Intervention; Mental ability; Tactical aircraft; Poisson equation

ID- NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2169297

AA- <NTIS> ADA377892/XAB

TI- Helicopter Aircrew Integrated Life Support System (HAILSS) Aircraft Integration Tests

TI- <NOTE> Professional paper

AU- Reason, W.

CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.

CS- <CODE> 104822000; 424295

PY- Apr 1999

PG- 6p

NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A02/MF A01

JA- USGRDR0020

CP- United States

AB- The Helicopter Aircrew Integrated Life Support System (HAILSS) ensemble is an impermeable coverall designed for protection in the Chemical and Biological threat arena. Additionally, the garment can be used as an anti- exposure system because the impermeable fabric effectively makes the garment a dry suit. It has booties sewn and sealed at the ankles and butyl rubber neck and wrist seals. The system employs a mesh spacer material that provides for conditioned air flow through the garment with one-way check valves on each lower sleeve for conditioned air exhaust. The entire ensemble is worn over a skin tight moisture wicking underwear. The systems is provided with protective head gear including a modified HGU-56/P two-part helmet with an integrated hood that provides for goggle demisting and aviator respiration.

DE- *Life support systems; *Integrated systems; Biological agents; Flight crews; Helicopters; Chemical agents; Respiration; Protective clothing; Butyl rubber; Coveralls

ID- Hailss(Helicopter aircrew integrated life support system); NTISDODXA

SH- 44H (Health Care--Health Care Technology); 51C (Aeronautics and Aerodynamics--Aircraft); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 2167595

AA- <NTIS> ADA377094/XAB

TI- Evaluation of Night Vision Goggles (NVG) for Maritime Search and Rescue: HH-65A Sweep Width Verification and Laser Illuminator Evaluation

TI- <NOTE> Final rept

AU- Gross, K. ; Wallace, H. ; Larson, D. ; McClay, T.

CS- Analysis and Technology, Inc., North Stonington, CT.

CS- <CODE> 061297000; 407767

CN- DTCG39-94-D-E56616

PY- Oct 1999

PG- 146p

NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A08/MF A02

JA- USGRDR0019

CP- United States

AB- The U.S. Coast Guard R&D Center conducted field tests to evaluate the

search effectiveness of Coast Guard HH-65A helicopters equipped with night vision goggles (NVG). The purpose of the tests was to determine if the HH-65A's NVG search performance differed significantly from that of the Coast Guard HH- 60J, and to assist the Coast Guard in deciding whether to continue to experiment with a near-infrared (IR), wide-area illuminator as an alternative to the aircraft's landing/hover lights. Helicopters searched test ranges for small boats, life rafts, and mannequins. Analysts collected aircraft and target positions, target detection logs, and environmental and human factors data. Following reconstruction and analysis, sweep width data from the two aircraft were compared. No statistically significant differences in NVG search performance were found between the two aircraft. HH-65A data were combined with existing HH-60J data to produce updated sweep width tables incorporating additional illumination, environmental, and human factors conditions. Active illumination improved sweep width under all conditions tested. Low-intensity, near-IR illumination provided a small sweep width improvement over landing lights when whitecaps were present.
DE- *Helicopters; *Search and rescue; Field tests; Illumination; Lasers; Night vision devices; Goggles; Near infrared radiation; Life rafts; Coast guard; Landing lights
ID- Hh-65a helicopters; Nvg(Night vision goggles); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57U (Medicine and Biology--Public Health and Industrial Medicine)

AZ- 2167411
AA- <NTIS> ADA376906/XAB
TI- Initial Results of Instrument-Flying Trials Conducted in a Single-Rotor Helicopter
TI- <NOTE> Technical note
AU- Crim, A. D. ; Reeder, J. P. ; Whitten, J. B.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; 240400
RN- NACA-TN-2721
PY- Jun 1952
PG- 18p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0019
CP- United States
AB- Instrument-flying trials have been conducted in a single-rotor helicopter, the maneuver stability of which could be changed from satisfactory to unsatisfactory. The results indicated that existing longitudinal flying- qualities requirements based on contact flight were adequate for instrument flight at speeds above that for minimum power. However, lateral-directional problems were encountered at low speeds and during precision maneuvers. The adequacy, for helicopter use, of standard airplane instruments was also investigated, and the conclusion was reached that special instruments would be desirable under all conditions and necessary for sustained low-speed blind flight.
DE- *Helicopters; *Instrument flight; Velocity; Stability; Low velocity; Precision; Instrumentation; Maneuvers
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2165769
AA- <NTIS> ADA376686/XAB
TI- FLIGHTFAX: Army Aviation Risk-Management Information. Volume 28, Number 4
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> 065116000; 411551
PY- Apr 2000
PG- 12p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0017
CP- United States
AB- This article is drawn from information from the Safety Center database, and from a study conducted for the Flight Safety Foundation of approach and landing accidents worldwide. Summary statistics, conclusions of the study, and approach tips and techniques are presented to highlight the risk involved and possible ways of assessing and dealing with that risk. A review of US Army Safety Center accident data of IFR accidents since FY80 provided the basis for the following results. The review

encompassed all Class A accidents involving Army aircraft on instrument-flight plans. Since FY80, there have been 18 Class A IFR accidents. Of these accidents, 33% were rotary wing and 67% were fixed-wing. There were 25 fatalities with approximately the same ratio of rotary-wing/fixed-wing fatalities - 32% and 68% respectively.
DE- *Aviation safety; *Military publications; *Army aircraft; Rotary wings; Human factors engineering; Casualties; Fixed wing aircraft; Mortality rate; Aircraft landings; Risk analysis
ID- IFR(Instrument Flight Rules); NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 2164325
AA- <NTIS> ADA375855/XAB
TI- Development of the U.S. Navy Advanced Personal Air Conditioning System (APACS)
AU- Kaufman, J.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
PY- 1999
PG- 6p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- USGRDR0016
CP- United States
AB- This paper describes the technology behind the development of the USN APACS man-mounted cooling system, a key component of HAILSS. APACS represents a lightweight, man-mounted cooling system for aircrews requiring no airframe modifications. This system is suitable for all crew stations and can be used during preflight inspections or by nonflying personnel.
DE- *Flight crews; *Cooling; *Helicopters; *Air conditioning equipment; *Protective clothing; *Flight clothing; Stations; Modification; Airframes; Lightweight
ID- Man mounted; Apacs(Advanced personal air conditioning system); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 2164288
AA- <NTIS> ADA375818/XAB
TI- Helicopter Aircrew Integrated Life Support System (HAILSS)
TI- <NOTE> Professional paper
AU- Dolinar, P.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
PY- 2000
PG- 4p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A01/MF A01
JA- USGRDR0016
CP- United States
AB- The Helicopter Aircrew Integrated Life Support System (HAILSS) program is a U.S. Navy led effort that began in April 1997 at the Naval Air Warfare Center Aircraft Division (NAWCAD) Patuxent River, MD. The main contractor is Gentex Corporation, Carbondale, PA. The HAILSS ensemble provides CB, anti-exposure and fire protection in single 2-layered impermeable garment, greatly reducing the layers of clothing currently required. Since no comparable system currently exists, it is difficult to compare protection ensembles. However, if you compare the Worst case scenario, up to seven layers of clothing would be required to provide the same level of protection HAILSS offers in just two layers. A more probable comparison of likely worn layers would show a nearly 20% reduction in weight of the HAILSS ensemble versus currently worn systems.
DE- *Life support systems; *Helicopters; Integrated systems; Biological agents; Flight crews; Layers; Probability; Helicopters; Wear; Chemical agents; Fire protection; Protective clothing
ID- Hailss(Helicopter aircrew integrated life support system); NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2164208

AA- <NTIS> ADA375734/XAB
TI- Development of an Advanced Energy Absorber
TI- <NOTE> Professional paper
AU- Richards, M. K. ; Podob, R.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
PY- 21 Oct 1999
PG- 10p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- USGRDR0016
CP- United States
AB- The attenuation of vertical impact forces in helicopter mishaps is one of the prime factors in determining survivability. Within the cockpit, energy-absorbing crewseats have made significant improvements in helicopter crash survival. The first crashworthy crewseats used fixed-load energy absorbers (EA's) to limit the load on the occupant's spine. These EA's were not adjustable and stroked at a factory-established, constant load through their entire operating range. Energy absorbers (also known as energy attenuators or load limiters) were then developed with a provision for manually adjusting the load so that a wide range of occupants would have equal protection in a crash. An EA load is selected that is proportional to the occupant's weight so that each occupant will experience similar acceleration and use similar stroking space in a crash. This technology was applied in programs to retrofit new seats into the U.S. Navy's CH-53 Sea Stallion and SH-3 Sea King aircraft. Work is currently underway to produce the next-generation energy absorber. The improved EA must be able to perform several functions. It must exhibit a load-deflection curve that produces the most efficient operation within the limits of human tolerance and within the limited vertical space available in military helicopters. It must also provide equal protection for the entire aircrew population, from the smallest female to the largest male. The efforts to date have produced very promising results. This paper summarizes the development of the advanced energy absorber stroking profile and the seat dynamic test results.
DE- *Attack helicopters; *Seats; *Energy absorbers; Military aircraft; Survivability; Cockpits; Acceleration; Human factors engineering; Impact strength; Protection; Limiters; Tolerances(Physiology); Dynamic tests; Crashes; Retrofitting; Attenuators
ID- Crewseats; Fixed loads; Spines; Ch-53 aircraft; Sh-3 aircraft; Sea stallion; Sea king; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 41J (Manufacturing Technology--Tooling, Machinery, and Tools)

AZ- 2160676
AA- <NTIS> MIC-100-02366/XAB
TI- Recommendations to implement Gyro-IPT, helicopter configuration, for disorientation training at CFSAT
TI- <NOTE> DCIEM technical memorandum no. TM 1999-046
AU- Cheung, B. ; Wong, W. T. ; Holbrook, L. J.
CS- Defence & Civil Institute of Environmental Medicine (Canada), Toronto.
CS- <CODE> 999999999; 0621200
PY- c1999
PG- 9p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E07/MF E01
JA- USGRDR0014
CP- Canada
AB- The GYRO IPT is the most recent version of the GYRO-1 series of flight simulators. It features upgrades on the pitch and roll motion capability and options for data acquisition and medical monitoring. The major advantage of the device is its interactive closed-loop (pilot-in-the-loop) feature that forces the trainee to relate any demonstration to actual flight situations. With the acquisition of the GYRO IPT at the Canadian Forces School of Aeromedical Training (CFSAT), a further evaluation was completed on the helicopter configuration of the device and how the disorientation profiles specific to the helicopter might be implemented into existing undergraduate pilot training syllabus. This report presents the evaluation results, including the capability of the GYRO-IPT to elicit the type of vestibular illusions that are related to the inadequacy of the semicircular canals system and to demonstrate most of the visual illusion profiles such as leans, autokinesis, distance and depth perception, and false horizon. Improvements required to enhance some these demonstrations are noted.
DE- *Flight simulators; Flight; Physiological aspects
ID- *Foreign technology; NTISTFCAN

SH- 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 2153096
AA- <NTIS> ADA371405/XAB
TI- VFR Helicopter Obstacle-Rich Environments: Test and Evaluation
TI- <NOTE> Letter rept
AU- Sawyer, B. M. ; Peisen, D. J.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
RN- FAA-RD-94/41; XHA/600/R-XD
PY- Aug 1994
PG- 34p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- USGRDR0008
CP- United States
AB- This is the first in a series of two letter reports detailing the specific test and evaluation requirements, scenarios, data processing techniques, and government/industry comments concerning pilot performance in an obstacle rich environment. The second report will develop and recommend the requirements for a piloted helicopter visual simulator to support data collection in this effort. This report details the issues and the development of test and evaluation criteria necessary to evaluate the psychological effects of an increasingly obstacle rich VFR heliport environment on the ability of a pilot to operate. In addition, it addresses a conceptual application of target level of safety, to assist the FAA and individuals concerned with heliport planning with regard to the proximity of obstacles to a VFR heliport. The effect of an increasingly obstacle rich helicopter environment on pilot performance will be tested by collecting definitive performance data through the use of a piloted, visual helicopter simulator. Results will be verified with actual flight testing. This study is divided into two phases. Phase 1 is further divided into four tasks: (1) test and evaluation requirements, (2) simulation requirements and facilities, (3) simulation test plan, and (4) pilot briefing materials. The product of task 3 is the completed test plan. The product of task 4 is pilot briefing material that explains their role in the test and participation requirements.
DE- *Flight testing; *Helicopters; *Flight simulation; Performance(Human); Pilots; Human factors engineering; Data acquisition; Flight simulators
ID- NTISDODXA; NTISDOTFAA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development)

AZ- 2152771
AA- <NTIS> N19990116787/XAB
TI- Analytical Comparison of the Fidelity of 'Large Motion' Versus 'Small Motion' Flight Simulators in a Rotorcraft Side-Step Task
AU- Hess, R. A.
CS- California Univ., Davis.
CS- <CODE> 004365000; CC907079
SP- National Aeronautics and Space Administration, Washington, DC.
CN- NCC2-5238
PY- 1999
PG- 11p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- USGRDR0008; STAR3806
CP- United States
AB- This paper presents an analytical and experimental methodology for studying flight simulator fidelity. The task was a rotorcraft bob-up/down maneuver in which vertical acceleration constituted the motion cue. The task considered here is aside-step maneuver that differs from the bob-up one important way: both roll and lateral acceleration cues are available to the pilot. It has been communicated to the author that in some Verticle Motion Simulator (VMS) studies, the lateral acceleration cue has been found to be the most important. It is of some interest to hypothesize how this motion cue associated with 'outer-loop' lateral translation fits into the modeling procedure where only 'inner-loop' motion cues were considered. This Note is an attempt at formulating such an hypothesis and analytically comparing a large-motion simulator, e.g., the VMS, with a small-motion simulator, e.g., a hexapod.
DE- *Rotary wing aircraft; *Mathematical models; *Computerized simulation; *Vertical motion simulators; Aircraft maneuvers; Accuracy; Cues; Pilot

performance; Flight simulators
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85A (Transportation--Air Transportation)

AZ- 2152572
AA- <NTIS> ADA371213/XAB
TI- Flight Evaluation of the Communications Earplug in the OH-58D helicopter. Part 2. Questionnaire Data
TI- <NOTE> Final rept
AU- Murphy, B. A. ; Moro, B. T.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-RN-2000-05
CN- DAMD17-93-C-3101
PY- Oct 1999
PG- 103p
NT- ADA371212.
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LA- English
PC- PC A07/MF A02
JA- USGRDR0007
CP- United States
AB- Aviators assigned to OH-58D helicopter operational units participated in an expanded field assessment of the communications earplug (CEP). Characteristics of the CEP have been determined through laboratory and field testing over the past several years. Results of the laboratory studies showed that aviators were protected and provided with speech communications capability. The CEP is a low-cost and simple approach that is readily available for immediate fielding. During FY 98, Project Manager-Aircrew Integrated Systems (PM-ACIS) purchased enough CEPs to outfit all aviators currently assigned to OH- 58D operational units. The objective of the purchase was to form a large sample of users for evaluating the effectiveness of the current CEP configuration in solving the problems associated with hearing protection and communication in the OH-58D helicopter. The acceptability of the CEP was assessed by comparison with the helmet systems currently used in the OH-58D helicopter. Comments and responses provided by the volunteers show that the CEP, with some modifications, is a substantial improvement over current systems. With improved cockpit communications, flying becomes less fatiguing and stressful. The CEP performs well during daily missions and is considered a viable solution to the problem of inadequate speech clarity and understanding in the Kiowa Warrior helicopter. Over 90 percent of the participants rated the CEP as having greater overall operational value than the aviator helmet as it is currently used. Aviators view the CEP as a viable solution to the communications problem and feel it should be fielded to all aviation units. Part 1 of this study presents the principal findings in summary form. Part II contains the data-set necessary to allow close inspection of individual subject responses.
DE- *Questionnaires; *Voice communications; *Ear protectors; Cockpits; Helicopters; Daily occurrence; Flight helmets; Aircraft noise
ID- *Oh-58d helicopter; Cep(Communications earplug); NTISDODXA
SH- 88B (Library and Information Sciences--Information Systems); 46A (Physics--Acoustics); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 45F (Communication--Verbal); 51GE (Aeronautics and Aerodynamics--General)

AZ- 2152571
AA- <NTIS> ADA371212/XAB
TI- Flight Evaluation of the Communications Earplug in the OH-58D helicopter. Part 1. Research Report
TI- <NOTE> Final rept
AU- Murphy, B. A. ; Moro, B. T.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-RN-2000-04
CN- DAMD17-93-C-3101
PY- Oct 1999
PG- 46p
NT- ADA371213.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- USGRDR0007
CP- United States
AB- Aviators assigned to OH-58D helicopter operational units participated in an expanded field assessment of the communications earplug (CEP).

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DE- *Helicopters; *Voice communications; *Ear protectors; Test and evaluation; Flight testing; Cockpits; Pilots; Solutions(General); Daily occurrence; Aircraft noise

ID- *Oh-58d helicopter; Cep(Communications earplug); NTISDODXA

SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2150747

AA- <NTIS> MIC-99-07543/XAB

TI- Experimental questions and preliminary experiment design to evaluate ELBOWS display alternatives

TI- <NOTE> DCIEM publication no. 98-CR-50

AU- Churchill, L. L.

CS- Defence & Civil Institute of Environmental Medicine (Canada), Toronto.

CS- <CODE> 999999999; 0621200

PY- c1998

PG- 13p

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LA- English

PC- PC E07/MF E01

JA- USGRDR0006

CP- Canada

AB- This paper discusses possible experimental work to answer a critical question involved in the design of the ELBOWS obstacle warning system for helicopter pilots and flight engineers: What warning style most effectively presents the required information to the aircrew. It first sets out issues to be considered in the experiment: The general style of warning, command or information, that is most appropriate for ELBOWS; preferred and optimal warning styles; characteristics of audio alerts & visual displays; two- versus three-dimensional sound under realistic work loads; determination of the optimal false alarm rate; the effect of aircraft performance characteristics on the minimum range of the system; and whether audio warnings can be ignored. The paper then discusses experimental design, with reference to assessing the distinctiveness of audio alerts, simulator experiments, and experiments at Defence & Civil Institute of Environmental Medicine.

DE- *Human engineering; Helicopters; Electronic equipment; Information display systems

ID- *Foreign technology; NTISTFCAN

SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics); 85D (Transportation--Transportation Safety)

AZ- 2145739

AA- <NTIS> ADA368617/XAB

TI- Current Aeromedical Issues in Rotary Wing Operations. (Problemes actuels de medecine aeronautique poses par les operations utilisant des voilures tournantes)

TI- <NOTE> Conference proceedings

CS- NATO Research and Technology Organization, Neuilly-sur-Seine (France).

CS- <CODE> 115479000; 434743

RN- RTO-MP-19; AC/323(HFM)TP/4

PY- Aug 1999

PG- 331p

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Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A16/MF A03
JA- USGRDR0003
CP- Other
AB- These proceedings include the Technical Evaluation Report, Keynote Address, and 41 papers from the Symposium sponsored by the NATO/RTO Human Factors and Medicine Panel, which was held in San Diego, California, USA from 19-21 October 1998. Rotary wing operations include military or civilian missions such as transport, medevac, and combat. A range of human factors problems may be implicated in helicopter mishaps, such as spatial disorientation or excessive workload. Furthermore, flying a helicopter can contribute to various specific pathologies, ranging from lower back pain to flight phobias. In several helicopter accidents, it has been suggested that injuries could have been avoided if adequate safety and protection technologies had been used. Although helicopters can be used for medevac involving large numbers of wounded, the use of helicopters has to be fully integrated with other transport systems and their equipment should be adapted for this type of mission. New training methods, such as crew resource management or spatial disorientation training, and new technologies, such as the 'tactile situation awareness system' (TSAS) may, when fully implemented, help to avoid accidents. Utilization of swimming pools with specific tools for helicopter evacuation training can greatly reduce the risk of death by immersion. On the other hand, more effort is needed to improve the personal flight equipment. Although epidemiological data suggest that the risk of accidents and injuries is already low in certain air forces, the introduction of new protection technologies may help to further reduce the numbers of wounded. This symposium provided a review of the state-of-the-art concerning the various human factors implicated in helicopter operations, new methods and systems for increasing safety and efficiency of the helicopter operations, and new methods and systems for increasing safety and efficiency of the helicopter crew.
DE- *Aerospace medicine; *Medical evacuation; Military operations; NATO; Symposia; Flight crews; Human factors engineering; Helicopters; Aviation accidents; Protective equipment; California; Resource management; Rotary wing aircraft; Search and rescue; Physiological disorientation
ID- Proceedings; Nato furnished; Foreign report; Rotary wing operations; Rescue operations; NTISDODXA
SH- 57GE (Medicine and Biology--General); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2139943
AA- <NTIS> AVA06755-VNB1/XAB
TI- Helicopters in Fire Control
CS- Department of Agriculture, Washington, DC.
CS- <CODE> 000584000
RN- AVA06755
CN- 18000
PY- 1994
PG- AV-VHS 1/2 inch - 1 cassette
NT- Audiovisual. This cassette is 1/2 inch VHS, color with playing time of 13 minutes. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- Not available NTIS
JA- GRAI9925
CP- United States
AB- The small helicopter has demonstrated a wide utility in fire control. Shows the various ways in which it has proved valuable and how it uses must be wisely managed by personnel and coordinated with other air and ground equipment.
DE- *Fire control systems; *Fire equipment; *Helicopters; Control stimulation; Utilization; Pilot performance; Audiovisual aids; Management
ID- NTISAVAG
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2135164
AA- <NTIS> ADA365396/XAB
TI- HNV-3D: Multipurpose Head Mounted Display
CS- Delft Sensor Systems, Oudenaarde (Belgium).
CS- <CODE> 116092000; 436488
PY- 30 Jun 1999
PG- 58p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
PC- PC A05/MF A01
JA- GRAI9922
CP- Belgium
AB- HNV-3D stand for Holographic Night Vision goggles with 3 Dimensional vision perception and sensor fusion. They have been especially developed for the advanced future needs of individual soldiers, drivers, special forces, helicopter crew, The lightweight HNV-3D goggles are considered to cover the requirements of the soldier of the 21st century. They offer a unique concept of image mixture with total depth perception and day/night awareness of the battlefield environmental situation. Due to the Holographic Optical Elements (HOEs) total see-through image is guaranteed in a large field of view during unexpected changes in light level conditions. Data information (such as digitised battlefield information) is constantly available in the field of view and can be consulted by the user at any time without disturbing the observation of the outside world.
DE- *Night vision devices; *Goggles; Military personnel; Military requirements; Military equipment; Display systems
ID- Hnv-3d(Holographic night vision 3 dimensional); NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 2134793
AA- <NTIS> ADA364938/XAB
TI- VFR Heliport Operations in an Obstacle-Rich Environment (ORE)
TI- <NOTE> Final rept
AU- Sawyer, B. M. ; Boiz, E. H. ; Daum, J. M. ; Grenell, J. F. ; Wilkinson, P. R.
CS- Science Applications International Corp., Arlington, VA.
CS- <CODE> 085431000; 398460
RN- ATSO-97R-2; DOT/FAA/ND-98/3
CN- DTFA01-93-C-00030
PY- May 1999
PG- 272p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A13/MF A03
JA- GRAI9922
CP- United States
AB- This investigation studied helicopter pilot performance and perception in a visual flight rule (VFR) heliport terminal obstacle-rich environment (ORE). Simulations were conducted in September and October 1996 as part of a larger effort focused on examining operational safety at U.S. heliports. Concerns raised by pilots operating at a city-center heliport motivated the study. Although none of the obstacles at this heliport protruded into the minimum recommended approach/departure airspace, pilots and their management complained of safety concerns when operating there. The ORE program was sponsored by the General Aviation and Vertical flight Program Office (AND- 710) of the Federal Aviation Administration (FAA).
DE- *Performance(Human); *Pilots; *Helicopters; *Heliports; *Safety; *Visual flight rules; Simulation; Airborne; Air space; Operation; Air transportation; Perception
ID- Ore(Obstacle-rich environment); Vfr(Visual flight rule); NTISDODXA
SH- 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2131954
AA- <NTIS> ADA363413/XAB
TI- Map Enhancement for Terrain Visualization Under Night Vision Goggle Compatible Lighting Systems
TI- <NOTE> Research paper
AU- Thompson, W. C.
CS- Oregon State Univ., Corvallis.
CS- <CODE> 013388000; 272200
PY- Mar 1999
PG- 43p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9920
CP- United States
AB- For the Army aviator, Night Vision Goggle (NVG) flight in the tactical rotary-wing profile is a very demanding, task saturated environment. Map navigation is just one of the many tasks that must be accomplished

during flight. The dim, monochromatic lighting required for NVG flight alters map colors, decreases image detail and map feature contrast, often making terrain feature recognition more difficult. A cartographic analysis and resulting map enhancement is needed to improve feature recognition, allowing easier navigation and safer flight. In this study, it was found that when applying a non-gray scale (magenta based) relief shading to a 1:50,000 scale military topographic line map, the surveyed aviators determined this shading improved or significantly improved their ability to visualize the terrain. It was also found that a medium level of shading (75% DEM opacity) was preferred.
DE- *Human factors engineering; *Night vision devices; *Topographic maps; *Night flight; Cockpits; Flight training; Terrain; Helicopters; Air navigation; Visual perception; Goggles; Monochromatic light
ID- *Night vision goggles; An/avs-6; Uh-60 aircraft; NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 76D (Navigation, Guidance, and Control--Navigation Systems); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2130519
AA- <NTIS> ADA362972/XAB
TI- Evaluating Performance Effects of a Medication (Dexedrine) in the Simulator Versus Aircraft Environment
TI- <NOTE> Final rept
AU- Caldwell, J. A. ; Roberts, K. A. ; Jones, H. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-99-15
CN- 30162787A879; OC
PY- Apr 1999
PG- 20p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9920
CP- United States
AB- A quasi-experimental approach assessed the pilot performance comparability of simulator versus in-flight results. Flight data from three sleep-deprivation studies were pooled. Twenty aviators were included, 10 who flew a UH-60 helicopter simulator and 10 who flew a UH-60A aircraft under the influence of Dexedrine or placebo during 40 hours of continuous wakefulness. Performance on straight and levels, right and left turns, climbs and descents, and a left-descending turn (assessed at 0100, 0500, 0900, 1300, and 1700) tended to correspond in the simulator and aircraft. Generally, performance under Dexedrine was better than under placebo. However, only half of the maneuvers showed consistent, statistically significant stimulant/fatigue effects in both flight platforms. Measurement sensitivity was lower in the aircraft, likely because of error variance due to environmental influences (weather, temperature, and turbulence) and other factors (radio traffic and anxieties about safety). Thus, actual in-flight studies, while desirable in terms of face-validity, underestimate the impact of stressors such as fatigue on pilots.
DE- *Performance(Human); *Pilots; *Sleep deprivation; *Flight simulation; Measurement; Aircraft; Errors; Inflight; Fatigue; Placebos; Army aviation
ID- NTISDODXA
SH- 92B (Behavior and Society--Psychology); 57T (Medicine and Biology--Psychiatry); 57W (Medicine and Biology--Stress Physiology)

AZ- 2129902
AA- <NTIS> MIC-99-03323/XAB
TI- Human factors engineering study for a Griffon Mission Planning System: Final project report
TI- <NOTE> DCIEM publication no. 97-CR-19
AU- McKay, D. E.
CS- Canadian Marconi Company, Kanata, (Ontario).
CS- <CODE> 999999999; 1035940;
SP- Defence & Civil Institute of Environmental Medicine (Canada).
PY- c1997
PG- 821p
NT- Contents: Vol. 1: Main report and annexes A and B -- vol. 2: Annexes C to I.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A99/MF E01
JA- GRAI9919
CP- Canada
AB- Describes a project that completed a human factors engineering study of

the mission planning process for the CH146 Griffon helicopter used by the Canadian Forces. Specific objectives were to identify and document the steps of mission planning using representative scenarios, evaluate three mission planning system alternatives, determine the number of systems required, recommend hardware and software to meet mission planning requirements, and begin construction of a database of CH146 human factors information that can be used for future analyses and life cycle support. Site visits were conducted to operational units to gather information to support the mission and function analysis. Three levels of functions are identified and documented for all missions, and mission planning elements are decomposed to the task level. Six mission planning scenarios are documented, addressing pre-flight planning, in-flight planning, and post-flight debriefing. Operational sequence diagrams of the scenarios are included, and an information flow and processing analysis of critical sequences is provided. Evaluation of three mission planning systems resulted in development of a prototype, for which numerous improvements were identified and implemented. Appendices include function flow diagrams, inventories and descriptions of mission functions, and screen layouts.
DE- *Human engineering; *Military; Helicopters; Decision support systems; Transportation; Planning
ID- *Foreign technology; NTISTFCAN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 2126296
AA- <NTIS> ADA362157/XAB
TI- Unmanned Aerial Vehicle/Remotely Piloted Aircraft Design Selection Based on Service-Stated Meteorological/Oceanographic Requirements
TI- <NOTE> Master's thesis
AU- Stanton, R. J.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Mar 1999
PG- 100p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A06/MF A02
JA- GRAI9916
CP- United States
AB- A decision tool for choosing most efficient unmanned aerial vehicles (UAV's)/remotely piloted aircraft (RPA) for Meteorological/ Oceanographic (METOC) data collection is presented. A Microsoft Access database query (written in Structured Query Language) links RPA flight performance parameters to individualized METOC Elements of Measurement, a subset of a larger Joint Service METOC Requirements database table, presented elsewhere in the thesis in full. Successful aircraft performance parameters include vast controllability/ programmability ranges, flexible (including shipboard) launches and recoveries, atmospheric profiling capabilities, hover ability, long endurance and airframes free of propeller or rotor wash. A sampling of existing (or planned) airborne METOC instrumentation, their ranges and accuracies are included, in database form, for further reference.
DE- *Requirements; *Aircraft; *Performance(Engineering); *Unmanned; *Remotely piloted vehicles; Data bases; Decision making; Parameters; Accuracy; Efficiency; Theses; Flight; Sampling; Airframes; Meteorology; Data acquisition; Hovering; Oceanography; Propellers
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2123870
AA- <NTIS> ADA361321/XAB
TI- Aviator Behavior and Performance as Affected by Aircrew Life Support and Protective Equipment
AU- Waugh, J. D. ; Fatkin, L. T. ; Patton, D. J. ; Mullins, L. L. ; Burton, P. A.
CS- Army Research Lab., Aberdeen Proving Ground, MD. Human Research and Engineering Directorate.
CS- <CODE> 105322002; 426250
RN- ARL-MR-440
CN- 1L161110274A
PY- Mar 1999
PG- 110p
NT- Original contains color plates: All DTIC reproductions will be in black and white.
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LA- English
PC- PC A07/MF A02
JA- GRAI9915
CP- United States
AB- A methodology for quantifying Army rotary wing aviator performance as influenced by aircrew life support, survival, and nuclear-biological-chemical clothing and equipment ensembles was examined in a set of expimental trials conducted in an AH-64 (Apache) combat mission simulator. The methodology was based on an aircrew evaluation procedure originally developed for use in the crew coordination training of all Army aviators. It uses a set of 13 basic qualities, each with behavioral anchors and a 7-point rating scale, and it is administered by specifically trained senior aviator evaluators. Ten crews, two aviators in each, while fully encumbered, performed three combat missions for record, representative of typical operational tasks, with one 'variation' trial conducted without the over-water components of the ensemble. Measures of effectiveness and flight data, as well as stress assessment and equipment 'complaints' citations, were recorded. The results indicated that the behavior- anchored scores were not sensitive enough to statistically discriminate among the independent variables of repeated measures and the variation trials even though graphically, differences were readily apparent. Attempts to apply transformations to the data, based on the aviator subjects' relative flying experience and their apparent accommodation to the trials were also statistically unsuccessful. The additional measures collected did not yield statistically significant discriminations nor did they correlate well with the evaluation score. A number of options for improving the technique are offered.
DE- *Performance(Human); *Protective equipment; *Protective clothing; *Aviation personnel; Flight crews; Stress(Physiology); Helicopters; Behavior; Life support systems
ID- NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 51GE (Aeronautics and Aerodynamics--General); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 2122496
AA- <NTIS> ADA360838/XAB
TI- Sensor Data Fusion and Integration of the Human Element. (la Fusion de donnees de senseur et l'integration du facteur humain)
CS- NATO Research and Technology Organization, Neuilly-sur-Seine (France).
CS- <CODE> 115479000; 434743
RN- RTO-MP-12; AC/323(SCI)TP/4
PY- Feb 1999
PG- 236p
NT- Presented at the System Concepts and Integration Symposium, Ottawa, Canada, 14-17 Sep 98.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A12/MF A03
JA- GRAI9915
CP- Other
AB- Partial contents include: (1) On the Design of a Decision Support System for Data Fusion and Resource Management in a Modern Frigate; (2) Measures of Merit for Collaborative Collection, Connection, and Execution Management; (3) Contextual Information and Multisensor Data Fusion for Battlefield Applications Image Data Fusion for Future Enhanced Vision Systems; (4) A Distributed System for Command and Control Applications with Programming Language Abstraction; (5) Novel Concepts for Identity Fusion in an Air Combat Environment; (6) Integration of the Human Operator into Complex Air Systems Using Alternative Control Technologies; (7) Fusion and Display of Data According to the Design Philosophy of Intuitive Use; (8) Enhanced and Synthetic Vision System Concept for Application to Search and Rescue Missions Fusion and Display of Tactical Information Within Battlefield Helicopters; (9) The Multi-Sensor Integration System for NATO E-3A Mid-Term Modernization; (10) Environment Perception Process in Maritime Command and Control Utilizing CORBA Concepts for Command and Control Systems; and (11) Integrating Voice Recognition and Automatic Target Cueing to Improve Aircrew-System Collaboration for Air-to-Ground Attack.
DE- *Command and control systems; *Data fusion; *Man machine systems; Image processing; Integrated systems; Symposia; Target recognition; France; Speech recognition; Data displays; Multisensors; Tactical data systems; Decision support systems
ID- *Sensor fusion; Aq f99-06-1172; Foreign reports; NTISDODXA
SH- 62GE (Computers, Control, and Information Theory--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45C (Communication--Common Carrier and Satellite)

AZ- 2116725
AA- <NTIS> N19990009997/XAB
TI- Short Haul Civil Tiltrotor Study in MIDAS: Auto versus Manual Nacelle Procedures for Commanded Go-Around
AU- Atencio, A. ; Banda, C.
CS- Army Aviation and Missile Command, Moffett Field, CA. Aeroflightdynamics Directorate.
CS- <CODE> 115727001; ZT001315
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.15:208753; NASA/TM-1998-208753,A-9900314
CN- RTOP 538-07-15; DA-6211A-A47A-AF2075
PY- Nov 1998
PG- 162p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A02
JA- GRAI9911; STAR3703
CP- United States
AB- Tiltrotor aircraft combine the speed and range of a turboprop performance with the ability to take off and land in a vertical mode like a helicopter. These aircraft will transport passengers from city center to city center and from satellite airports to major hub airports to make connections to long range travel. The Short Haul Civil Tiltrotor (SH(CT)) being studied by NASA is a concept 40 passenger civil tiltrotor (CTR) transport. The Man-machine Integration Design and Analysis System (MIDAS) was used to evaluate human performance in terms of crew procedures and pilot workload for a simulated 40 passenger Civil Tiltrotor Transport on a steep approach to a vertiport. The scenario for the simulation was a normal approach to the vertiport that is interrupted by a commanded go-around at the landing decision point. The simulation contrasted an automated discrete nacelle mode control with a fully manual nacelle control mode for the go-around. The MIDAS simulation showed that the pilot task loading during approach and for the commanded go-around is high and that pilot workload is near capacity throughout. The go-around in manual nacelle mode was most demanding, resulting in additional time requirements to complete necessary tasks.
DE- *Short haul aircraft; *Man machine systems; *Automatic control; *Nacelles; *Manuals; *Aircraft design; *Manual control; Pilot performance; Passengers; Helicopters; Crew procedures(Preflight); Crew procedures(Inflight); Simulation; Workloads(Psychophysiology); Decision making; Tasks; Human factors engineering
ID- NTISNASA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 2110455
AA- <NTIS> N19990004107/XAB
TI- Instrumentation for X-Ray Astronomy from High-Altitude Balloons: Recent Developments and Future Plans
AU- Ramsey, B. D. ; Peskov, V. ; Fonte, P. ; Podoliak, E.
CS- National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
CS- <CODE> 019043002; ND736801
SP- Academy of Sciences (USSR), Moscow, USSR.
RN- NAS 1.15:207905; NASA/TM-1998-207905
PY- 1997
PG- 11p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9909; STAR3626
CP- United States
AB- We describe our current effort and future plans to develop new detectors and methods for studying hard x-ray emission from the Universe during balloon flights.
DE- *X ray astronomy; *Balloon flight; *Universe; *X ray astrophysics facility; *Gamma ray astronomy; *Spaceborne astronomy; *Astronomical interferometry; *Gamma ray observatory; X rays; High altitude; Balloons ; Emission; Radiography; Vertical flight; Astronomical satellites
ID- NTISNASAE
SH- 54B (Astronomy and Astrophysics--Astronomy and Celestial Mechanics)

AZ- 2105682
AA- <NTIS> ADA356084/XAB
TI- Efficacy of Dexedrine for the Sustainment of Helicopter Pilot Performance During 64 Hours of Continuous Wakefulness
TI- <NOTE> Final rept
AU- Caldwell, J. A. ; Smythe, N. K. ; DeDuc, P. A. ; Prazinko, B. F. ;

Caldwell, J. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-TR-99-01
CN- 3M162787A879; OC
PY- Oct 98
PG- 68p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9906
CP- United States
AB- The purpose of this investigation was to establish the efficacy of Dexedrine for sustaining aviator performance despite 64-hours of extended wakefulness. Although earlier flight studies yielded favorable results with no significant side effects, they were restricted to sleep-deprivation periods of only 40 hours. Due to requirements for longer periods of sustained wakefulness, it was necessary to study the efficacy of Dexedrine for maintaining aviator performance during 3 days and 2 nights without sleep. To accomplish this, computerized evaluations of aviator flight skills were conducted at regular intervals as subjects completed standardized flights in a UH-60 helicopter simulator, both: under Dexedrine and placebo. Laboratory-based assessments of cognitive, psychological, and central nervous system status were completed as well. Dexedrine (10 mg.) was given prophylactically (prior to signs of fatigue) at midnight, 0400, and 0800 on both deprivation days in one cycle, and placebo was given on both days in the other. Results indicated simulator flight performance was maintained by Dexedrine for up to 58 hours, while performance under placebo rapidly deteriorated. The drug was most beneficial.
DE- *Performance(Human); *Drugs; *Aviation personnel; *Amphetamines; Test and evaluation; Simulators; Military operations; Army research; Pilots; Helicopters; Flight; Organic compounds; Fatigue; Computer applications; Sleep deprivation; Placebos; Central nervous system
ID- *Dexedrine; *Wakefulness; *Helicopter pilots; *Sustainment; Uh-60 aircraft; Aviator performance; NTISDODXA
SH- 57E (Medicine and Biology--Clinical Medicine); 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry); 57W (Medicine and Biology--Stress Physiology); 74GE (Military Sciences--General)

AZ- 2104049
AA- <NTIS> N19980234596/XAB
TI- Flight Testing and Real-Time System Identification Analysis of a UH-60A Black Hawk Helicopter with an Instrumented External Sling Load
AU- McCoy, A. H.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; NS368219
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:196710; NASA/CR-1998-196710,A-9809853
CN- RTOP 581-30-22
PY- Jun 98
PG- 94p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9904; STAR3625
CP- United States
AB- Helicopter external air transportation plays an important role in today's world. For both military and civilian helicopters, external sling load operations offer an efficient and expedient method of handling heavy, oversized cargo. With the ability to reach areas otherwise inaccessible by ground transportation, helicopter external load operations are conducted in industries such as logging, construction, and fire fighting, as well as in support of military tactical transport missions. Historically, helicopter and load combinations have been qualified through flight testing, requiring considerable time and cost. With advancements in simulation and flight test techniques there is potential to substantially reduce costs and increase the safety of helicopter sling load certification. Validated simulation tools make possible accurate prediction of operational flight characteristics before initial flight tests. Real time analysis of test data improves the safety and efficiency of the testing programs. To advance these concepts, the U.S. Army and NASA, in cooperation with the Israeli Air Force and Technion, under a Memorandum of Agreement, seek to develop and validate a numerical model of the UH-60 with sling load and demonstrate a method of near real time flight test analysis. This thesis presents results from flight tests of a U.S. Army Black Hawk helicopter with various external loads. Tests were conducted as the U.S. first phase of this MOA task. The primary load

was a container express box (CONEX) which contained a compact instrumentation package. The flights covered the airspeed range from hover to 70 knots. Primary maneuvers were pitch and roll frequency sweeps, steps, and doublets. Results of the test determined the effect of the suspended load on both the aircraft's handling qualities and its control system's stability margins. Included were calculations of the stability characteristics of the load's pendular motion. Utilizing CIFER(R) software, a method for near-real time system identification was also demonstrated during the flight test program.
DE- *Helicopters; *Loads(Forces); *Systems stability; *Military operations; *Military helicopters; *Flight tests; *Flight characteristics; Uh-60a helicopter; Testing time; System identification; Real time operation; Flight simulation; Cost reduction
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2099934
AA- <NTIS> PB99-107526/XAB
TI- Improving the Continued Airworthiness of Civil Aircraft: A Strategy for the FAA's Aircraft Certification Service
CS- National Research Council, Washington, DC. Aeronautics and Space Engineering Board.
CS- <CODE> 019026397
SP- Federal Aviation Administration, Washington, DC.
RN- ISBN-0-309-06185-7; DTFA03-96-C-00041
PY- c1998
PG- 92p
NT- Sponsored by Federal Aviation Administration, Washington, DC.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9901
CP- United States
AB- As part of the national effort to improve aviation safety, the Federal Aviation Administration (FAA) chartered the National Research Council to examine and recommend improvements in the aircraft certification process currently used by the FAA, manufacturers, and operators. The Committee on Aircraft Certification Safety Management was formed to execute this task, which included the following key elements: define an improved approach for managing risk and promoting the safety of U.S. civil aircraft, with a focus on the continued airworthiness of large transport airplanes; identify barriers to implementing the recommended approach and how they might be overcome; discuss the special needs of general aviation and rotorcraft.
DE- *Aviation safety; *Certification; *Air transportation; *Civilian aircraft; Risk; Maintenance; United States government; Government policies; Aircraft industry; Human factors engineering; Design; Operations; Helicopters
ID- Air worthiness; NTISNASNRC; NTISDOTFAA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 2098356
AA- <NTIS> ADA353096/XAB
TI- Combat Mission Training Research at the 58th Special Operations Wing: A Summary
TI- <NOTE> Final rept. Sep 95-Jun 97
AU- Spiker, V. A. ; Nullmeyer, R. T. ; Tourville, S. J. ; Silverman, D. R.

CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> 029731000; 405951
RN- AL/HR-TR-1997-0182
CN- F41624-95-C-5011; 1123; B2; B3
PY- Jul 98
PG- 58p
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LA- English
PC- PC A05/MF A01
JA- GRAI9901
CP- United States
AB- This report summarizes three empirical studies conducted at Kirtland Air Force Base during 1995-1997. The first study examined the relationship between crew resource management (CRM) processes and mission performance for MC- 130P Combat Shadow crews who were receiving annual simulator refresher training. Using independent assessments of process and performance, a strong, positive correlation (r=.86) was observed between CRM effectiveness at the crew-level and their performance during a simulated tactical mission. A strong association

between the quality of a crew's mission planning activities and subsequent mission performance (r=.60) was also observed. A second study investigated human factors characteristics of an aerial gunner/scanner simulator (AGSS) recently installed at the 58th Special Operations Wing. The AGSS is a virtual reality (VR) training device that uses a CRT-based, helmet-mounted display and a three degree-of-freedom motion base to train rotary-wing gunners and scanners. A usability assessment by 11 aerial gunner instructors showed that while the devices's VR properties have enormous training potential, the device's human factors aspects need improvement, including the CRTs, head tracker, fitting procedures, and cables. A third study explored the impact of networked simulation on combat mission training. Ninety-nine crewmembers participating in nine networked training exercises were surveyed following training in which MH- 53J, MH-60G, TH-53A, and MC-130P weapon system trainers were linked. Survey results strongly support the value of networked training in such areas as multiship tactics, aerial refueling operations, formation flight, situation awareness, and mission team coordination. Areas in need of improvement include establishing training objectives, incorporating emergency procedures into the scenario, and leveling the task demands across crew positions and weapon system.

DE- *Computerized simulation; *Flight crews; *Training devices; Flight training; Performance(Human); Teams(Personnel); Operational effectiveness; Resource management; Military training; Flight simulators

ID- Annual refresher training; Combat training; Crm(Crew resource management); NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92D (Behavior and Society--Education, Law, and Humanities)

AZ- 2098183

AA- <NTIS> ADA352464/XAB

TI- Design Issues for Helmet-Mounted Display Systems for Rotary-Wing Aviation

TI- <NOTE> Final rept

AU- Rash, C. E. ; McLean, W. E. ; Mora, J. C. ; Ledford, M. H. ; Mozo, B. T.

CS- Army Aeromedical Research Unit, Fort Rucker, AL.

CS- <CODE> 002138000; 035550

RN- USAARL-RN-98-32

CN- 30162787A879

PY- Jul 98

PG- 186p

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LA- English

PC- PC A10/MF A02

JA- GRAI9901

CP- United States

AB- Since the l970s, the trend in Army aviation has been to rely on helmet-mounted displays (HMDs) to provide the aircrew with pilotage imagery, flight information, and fire control imagery and symbology. This paper is intended to serve as both a checklist and a guide for designers of future integrated helmet and display systems for rotary-wing aircraft. In this paper: (1) salient performance parameters of such systems are identified; (2) recommendations for values of these parameters are suggested, based on past research and the opinions of subject matter experts; (3) an analysis of potential health and safety hazards is provided; (4) a human factors engineering assessment (HFEA) is provided; and (6) lessons learned from previously fielded U.S. Army HMD systems are summarized. However, this paper is not a cookbook for building an integrated helmet and display system.

DE- *Human factors engineering; *Display systems; *Helmet mounted displays; Integrated systems; Lessons learned; Hazards; Parameters; Safety; Rotary wing aircraft; Army aviation; Aircraft fire control systems

ID- Air warrior; NTISDODXA

SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2097845

AA- <NTIS> N19980211552/XAB

TI- Second International Airborne Remote Sensing Conference and Exhibition

TI- <NOTE> Final Report

CS- Environmental Research Inst. of Michigan, Ann Arbor.

CS- <CODE> 056172000; E0356283

SP- National Aeronautics and Space Administration, Washington, DC.

RN- NAS 1.26:206351; NASA/CR-1997-206351

CN- NAG2-1044

PY- 1996

PG- 2p

NT- Presented at International Airborne Remote Sensing Conference and Exhibition, 2nd, Mountain View, CA, 24-27 Jun. 1996.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A01/MF A01
JA- GRAI9825; STAR3618
CP- United States
AB- The conference provided four days of displays and scientific presentations on applications, technology, a science of sub-orbital data gathering and analysis. The twelve displayed aircraft equipped with sophisticated instrumentation represented a wide range of environmental and reconnaissance missions,including marine pollution control, fire detection, Open Skies Treaty verification, thermal mapping, hydrographical measurements, military research, ecological and agricultural observations, geophysical research, atmospheric and meterological observations, and aerial photography. The U.S. Air Force and the On-Site Inspection Agency displayed the new Open Skies Treaty verification Boeing OC 135B that promotes international monitoring of military forces and activities. SRI's Jetstream uses foliage and ground penetrating SAR for forest inventories, toxic waste delineation, and concealed target and buried unexploded ordnance detection. Earth Search Sciences's Gulfstream 1 with prototype miniaturized airborne hyperspectral imaging equipment specializes in accurate mineral differentiation, low-cost hydrocarbon exploration, and nonproliferation applications. John E. Chance and the U.S. Army Corps of Engineers displayed the Bell 2 helicopter with SHOALS that performs hydrographic surveying of navigation projects, coastal environment assessment, and nautical charting surveys. Bechtel Nevada and U.S. DOE displayed both the Beech King AIR B-200 platform equipped to provide first response to nuclear accidents and routine environmental surveillance, and the MBB BO-105 helicopter used in spectral analysis for environmental assessment and military appraisal. NASA Ames Research Center's high-altitude Lockheed ER-2 assists in earth resources monitoring research in atmospheric chemistry, oceanography, and electronic sensors; ozone and greenhouse studies and satellite calibration and data validation. Ames also showcased the Learjet 24 Airborne Observatory that completed missions in Venus cloud cover analysis, Quadantid meteor shower studies, extra-solar far infrared ionic structure lines measurement, Cape Kennedy launch support, and studies in air pollution, The Products and Services Exhibit showcased new sensor and image processing technologies, aircraft data collection services, unmanned vehicle technology, platform equipment, turn-key services, software a workstations, GPS services, publications, and processing and integration systems by 58 exhibitors. The participation of aircraft users and crews provided unique dialogue between those who plan data collection a operate the remote sensing technology, and those who supply the data processing and integration equipment. Research results using hyperspectral imagery, radar and optical sensors, lidar, digital aerial photography, a integrated systems were presented.
DE- *Conferences; *Remote sensing; *Data processing; Environmental laboratories; Pollution control; Fire control; Military technology; Aerial photography
ID- NTISNASA
SH- 68A (Environmental Pollution and Control--Air Pollution and Control); 51C (Aeronautics and Aerodynamics--Aircraft); 48GE (Natural Resources and Earth Sciences--General)

AZ- 2096215
AA- <NTIS> ADA352470/XAB
TI- Designing Optimal Hierarchies for Information Retrieval with Multifunction Displays
TI- <NOTE> Final rept
AU- Francis, G.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-98-33
CN- 30162787A879; PB
PY- Jul 98
PG- 64p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9825
CP- United States
AB- Modern aircraft use computer screens with a push button interface to replace a variety of single purpose instruments. Such multifunction displays (MFDs) are gradually being introduced into military helicopters, with future aircraft likely to be highly dependent on computers. Studies have shown that poor design of MFD hierarchies has a significant impact on user satisfaction and performance. The purpose of this study was to extend a theoretical analysis of hierarchy search

into a methodology for gathering data and building a hierarchy layout that minimized the time needed to find items in a hierarchy. Pilot studies demonstrate the effectiveness of the methodology and show that optimizing hierarchy layout may lead to a 25% reduction in search times.
DE- *Human factors engineering; *Flight instruments; *Data displays; Cockpits; Helicopters; Information retrieval; Man computer interface
ID- Hierarchies; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2092529
AA- <NTIS> ADA350729/XAB
TI- Human Factors Perspective on Human External Loads
AU- Shehab, R. L. ; Schlegel, R. E. ; Palmerton, D. A.
CS- Oklahoma Univ., Norman. Dept. of Psychology.
CS- <CODE> 006843074; 388226
CN- DTFA02-95-T-80473
PY- May 98
PG- 29p
NT- Prepared in cooperation with the FAA Civil Aeromedical Institute, Oklahoma City, OK.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9823
CP- United States
AB- To determine if there is a need for imposing new regulations on HEL operations, the Rotorcraft Standards Directorate of the Aircraft Certification Service requested the Civil Aeromedical Institute to review all available accident databases to determine if HEL operations are unsafe or sufficiently problematic to warrant a change in the existing regulations. This report investigates HEL accidents, categorizes commercially available equipment used in different personnel lifting operations, and provides human-factor related recommendations affecting the use of these HEL lifting devices. A review of accident data between 1973 and 1996 from several databases did not reveal any accident trends or highlight any specific safety issues related to HEL operations. A review of commercially-available HEL equipment showed the devices were designed for either short-term, rescue-type operations or long-term, work-related activities where the user is required to remain in the device for extended periods of time. Suggestions concerning the safety, comfort, and use of HEL devices are provided, as well as recommendations that standard operating procedures, training for HEL crew members, and minimal equipment specifications be added to the current regulation.
DE- *Loads(Forces); *Helicopters; *Safety; *Hoists; Aircraft; Human factors engineering; Crews; External; Lift; Regulations; Rotary wing aircraft; Rescue equipment; Accidents
ID- Hel(Human external loads); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2092468
AA- <NTIS> ADA350657/XAB
TI- Calculating A Helicopter Pilot's Instrument Scan Pattern from Discrete, 60-Hz Measures of the Line-of-Sight: The Evaluation of an Algorithm
AU- Temme, L. A. ; Woodall, J. ; Still, D. L.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> 065612000; 406061
RN- NAMRL-1403
PY- 17 Jun 98
PG- 33p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9823
CP- United States
AB- In order obtain data to develop and evaluate theories relating instrument scanning to flight performance we recorded the line of sight (LOS) of student naval helicopter pilots as they flew prescribed maneuvers in a motion- based, high fidelity, instrument training simulator. These LOS data were discrete, 60 Hz samples of eye pointing. For some types of analysis it is helpful to think of a scan pattern as a sequence of fixations and to use an averaging algorithm to transform the 60 Hz data into such a sequence, a scan path. An appropriate algorithm was identified, developed and evaluated. As part of this evaluation, we developed a String Similarity measure, SS, a measure of

the similarity between two scan paths. The evaluation of the algorithm, consisting of observing the algorithm's output as a function of the algorithm's parameter values, showed that the algorithm behaved in a sensible fashion, logically consistent with the input data. This increased our confidence in our implementation of the fixation algorithm. The SS metric proved to be an informative, useful tool that may have addition uses in the analysis scanning behavior and flight performance.
DE- *Performance(Human); *Visual perception; *Eye movements; Algorithms; Line of sight; Flight training; Pilots; Human factors engineering; Helicopters; Flight instruments; Flight simulators; Man machine systems

ID- NTISDODXA
SH- 57A* (Medicine and Biology--Anatomy); 57S* (Medicine and Biology--Physiology); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2092322
AA- <NTIS> ADA350472/XAB
TI- Effects of Head-Supported Devices on Female Aviators during Simulated Helicopter Missions
TI- <NOTE> Annual rept. for May 98
AU- Alem, N.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
PY- May 98
PG- 122p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9823
CP- United States
AB- This report describes the work completed during the first project year of this research study. The objective of the study is to identify safe weight and location limits of head-supported devices worn by female aviators during simulated helicopter rides. The working hypothesis is that female pilots will tolerate some range of HSD weight moments beyond which their biomechanical and performance responses will deteriorate. The report contains a review of relevant studies followed by detailed description of the experimental and analytical procedures.
DE- *Females; *Flight helmets; *Headgear; Simulation; Pilots; Helicopters; Safety; Instrumentation; Night vision devices; Muscles; Protective clothing; Fatigue(Physiology); Electromyography
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51GE (Aeronautics and Aerodynamics--General); 74GE (Military Sciences--General)

AZ- 2092290
AA- <NTIS> ADA350437/XAB
TI- Avionics System Development for a Rotary Wing Unmanned Aerial Vehicle
TI- <NOTE> Master's thesis
AU- Greer, D. S.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Jun 98
PG- 122p
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LA- English
DT- Thesis
PC- PC A07/MF A02
JA- GRAI9823
CP- United States
AB- The Naval Postgraduate School has developed a successful Rapid Flight Test Prototyping System (RFTPS) for the development of software for remote computer control of fixed wing Unmanned Aerial Vehicles (UAV). This thesis reviews the work accomplished to mount sensors on a small remote controlled helicopter with instrumentation compatible with the RFTPS: an inertial measurement unit, a Global Positioning System (GPS) receiver, an altitude sensor and associated power supply and telemetry equipment. A helicopter with sufficient lift capability was selected and a lightweight aluminum structure was built to serve as both an avionics platform for the necessary equipment and also as a landing skid. Since the altitude sensors used for fixed wing UAV's, such as barometric sensors and GPS, do not provide sufficient accuracy for low altitude hover control, a lightweight, precision altimeter was developed using ultrasound technology. Circuitry was developed to drive a Polaroid 6500 Series Ranging Module and process the output data in a

form compatible with the RFTPS avionics architecture. Flight testing revealed severe vibrations throughout the helicopter. An alternative avionics package of reduced size was constructed to house the sonic altimeter and a three-axis accelerometer. Subsequent test flight results and recommendations for further research are provided.
DE- *Flight testing; *Helicopters; *Remote systems; *Avionics; *Unmanned; Output; Control; Vibration; Detectors; Computers; Computer programming; Accuracy; Theses; Reduction; Platforms; Global positioning system; Precision; Power supplies; Lightweight; Mounts; Altimeters; Lift; Altitude; Fixed wing aircraft; Remote control; Hovering; Low altitude; Landing; Telemeter systems
ID- Rftps(Rapid fight test prototyping system); NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 76GE (Navigation, Guidance, and Control--General)

AZ- 2083978
AA- <NTIS> SAE AS 8043/XAB
TI- Torso Restraint Systems. (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cMar 86
PG- 18p
NT- Copyright Society for Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA. 15096, USA. This document is available from NTIS under license from SAE.
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LA- English
PC- PC$40.50
JA- GRAI9818
CP- United States
AB- This Aerospace Standard specifies laboratory test procedures and minimal requirements for the manufacturer of torso restraint systems for use in small fixed wing aircraft and rotorcraft. establish a minimum level of quality which can be called upon by the designer of those systems. However, compliance with this standard alone may not assure adequate performance for the restraint system under normal and emergency conditions. Such performance requires consideration of factors beyond the scope of this standard, and must be demonstrated by a system evaluation procedure which includes the seat, the occupant, the specific restraint installation and the cabin interior configuration.
DE- *Standards; *Aircraft
ID- *Restraint devices; *Safety lap belts; Torso; Rotorcraft; NTISSAE; NTISSDAC
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety)

AZ- 2083977
AA- <NTIS> SAE AS 8039/XAB
TI- Minimum Performance Standard General Aviation Flight Recorder (Reaffirmed, May 91). (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cJan 85
PG- 28p
NT- Copyright Society for Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA. 15096, USA. This document is available from NTIS under license from SAE.
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LA- English
PC- PC$55.50
JA- GRAI9818
CP- United States
AB- The standards contained herein apply to recording equipment intended primarily for installation in multi-engine, turbine powered aircraft (fixed and rotary wing) for automatically recording flight data parameters and audio information. Large aircraft operating under Code of Federal Regulations Title 14, Aeronautics & Space, part 121. This Aerospace Standard (AS) specifies minimum performance standards for recording automatically aircraft flight par ameters and (or) aural communication between flight crew members, aural warning sounds, and communications to and from aircraft necessary for flight operations. the use of individual Cockpit Voice Recorder (CVR) or Flight Data Recorder (FDR) equipment, or a combination CVR/FDR.
DE- *Standards; *Aircraft
ID- *Recording equipment; *Flight recorders; Gas turbine engines; Performance standard; NTISSAE; NTISSDAC

SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2083595
AA- <NTIS> SAE ARP 1217/XAB
TI- Instrumentation Requirements for Turboshaft Engine Performance Measurements (Reaffirmed Pending Revision, May 89). (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cMay 79
PG- 4p
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LA- English
PC- PC$25.50
JA- GRAI9818
CP- United States
AB- This Aerospace Recommended Practice (ARP) defines the measurement parameters that may be used by a pilot or operator to monitor the thermodynamic health of a turboshaft engine in a helicopter and the measurement system accuracies desired.
DE- *Standards
ID- *Engine performance; *Instrumentation; Measurements; Turboshaft engines ; Gas turbine; NTISSAE; NTISSDAC
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 2083587
AA- <NTIS> SAE ARD 50018/XAB
TI- Integration of Vertical Flight Aircraft into the National Airspace System. (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cMar 95
PG- 30p
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LA- English
PC- PC$70.50
JA- GRAI9818
CP- United States
AB- The scope of this document, although limited to human factors issues, is actually quite broad. controls, aircraft stability, power margins, and pilot training, to name a few, all bring their own human factors issues to the overall objective of integrating vertical flight aircraft into the NAS. This document is a compilation of human factors issues relating to vertical flight systems. report of the human factors 'health' of vertical flight as well as provide an historical perspective of the issues that have been considered. affect the issues.

DE- *Standards; *Aircraft
ID- *National Airspace System; Helicopters; Vertical flight; NTISSAE; NTISSDAC
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2082897
AA- <NTIS> SAE AIR 1963/XAB
TI- Cockpit Information Required for Helicopter Turbine Engine Operation and Maintenance (Reaffirmed, May 91). (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cDec 87
PG- 5p
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LA- English
PC- PC$25.50
JA- GRAI9818

CP- United States
AB- The purpose of this document is to provide the propulsion engineer's recommendations for the instrumentation that is required for the safe operation and maintenance of turbine engines as installed in helicopters. It should be used as a guide for cockpit layout, as well as a reference for maintenance considerations throughout the propulsion area. Propulsion instruments should receive attention early in the design phase of the helicopter. within the scope of this document.
DE- *Standards
ID- *Airborne monitoring; *Helicopters; *Gas turbine engines; NTISSAE; NTISSDAC
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 2078419
AA- <NTIS> MIC-98-03745/XAB
TI- Canadian Forces search and rescue helicopter human engineering system analysis report
AU- McKay, D. E. ; Kobierski, R. D.
CS- Canadian Marconi Company. Human Factors Engineering, Kanata, (Ontario). Defence & Civil Institute of Environmental Medicine (Canada). Human Factors Division.
CS- <CODE> 999999999; 9999999
PY- c1995
PG- 459p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E19/MF E01
JA- GRAI9817
CP- Canada
AB- This report details the purpose, scope, conduct, results, conclusions, and recommendations of a study conducted to identify the operational deficiencies of an assumed air vehicle (helicopter) used for search and rescue (SAR) operations, fitted with off-the-shelf technologies. The assumed air vehicle is evaluated against a derived list of functions to identify those that the crew/vehicle combination might not be able to complete in all-weather, day/night scenarios. Limiting factors are identified for functions which would be difficult to perform. After an introduction, section 2 summarizes the current SAR role, describes SAR helicopter missions, and identifies system requirements. Section 3 presents a function analysis and includes a composite mission scenario and associated function decomposition down to four levels. Section 4 describes the operational concept and assumed air vehicle, and documents the allocation of functions to man or machine. Section 5 identifies operational capability deficiencies for an off-the-shelf air vehicle operating in accordance with the derived operational concept. Section 6 presents some current research and development projects applicable to the identified deficiencies. Appendices include a complete inventory of functions, a composite mission scenario, and glossary.
DE- *Human engineering; *Search and rescue operations; Helicopters
ID- NTISTFCAN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 2073490
AA- <NTIS> AD-A342 941/2/XAB
TI- Effects of Seat Stroke Distance on the Allowable Mass of Head Supported Devices
TI- <NOTE> Final rept
AU- Mobasher, A. A. ; Brozoski, F. T. ; McEntire, B. J. ; Alem, N. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-98-26
CN- 30162787A878; EA
PY- Apr 98
PG- 16p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9816
CP- United States
AB- The effects of stroking distance of energy attenuating helicopter seat on head supported device (HSD) masses were investigated in various helicopter crash scenarios. The Articulated Total Body (ATB) model was used to simulate the helicopter pilot's biodynamic response to five different crash pulses. Parameters of the simulations included two

allowable seat stroking distances (2.5 and 25 cm) and four HSD masses (0.45, 1.4, 2.7, and 4.1 kg). The simulations were performed with the mid-sized Hybrid III manikin as the occupant model, and the HSD center of mass (CM) coincident with the CM of the Hybrid III head. Moments and forces produced by the ATB simulations at the head/neck interface (occipital condyles) were assessed against injury thresholds to determine the risk of neck injury. Acceptable head supported masses were established then for the given impact conditions. The report concludes that acceptable HSD mass was highly dependant on seat stroke distance and impact conditions, which include crash pulse magnitude, direction and shape. For a Hybrid III dummy, increased available seat strokes resulted in lower loads transmitted to the head/neck interface, thereby allowing larger HSD masses to be worn.
DE- *Helicopters; *Aircraft seats; Scenarios; Impact; Interfaces; Pilots; Moments; Response; Attenuation; Wounds and injuries; Range(Distance); Thresholds(Physiology); Crashes; Head up displays; Biodynamics; Energy absorbers; Neck(Anatomy)
ID- Hsd(Head supported device); Atb(Articulated total body); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2071072
AA- <NTIS> AD-A341 702/9/XAB
TI- Layered Protocol Analysis of a Control Display Unit
AU- Farrell, P. S. ; Semprie, M. A.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
PY- Dec 97
PG- 79p
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LA- English
PC- PC A06/MF A01
JA- GRAI9815
CP- Canada
AB- Layered Protocol Theory (LPT) has been described as a special case of Perceptual Control Theory (PCT) where its core tenet is, All communication is the control of belief. It was recognized that LPT could be used to analyse the interaction between communicating partners in the context of human-machine systems. System interface problems were identified for the Control Display Unit (CDU) in the CH-146 Griffon helicopter. This application presented a good opportunity to conduct a Layered Protocol analysis on the pilot CDU system. Aspects of LPT were discussed in detail including the LPTool, its Network View, GPG View, and Nine Element View. A pilot CDU interaction was modeled with the aid of the LPTool program. The analysis yielded a list of interaction deficiencies between pilot and CDU which supported previous observations. The deficiencies were addressed in a new interface design that would provide the necessary controls and displays so that the required messages could be successfully transmitted and interpreted.
DE- *Human factors engineering; *Display systems; *Man machine systems; Cockpits; Interfaces; Pilots; Helicopters; Feedback; Deficiencies; Data displays; Perception
ID- *Foreign technology; *Lpt(Layered protocol theory); *Layered protocol theory; Cdu(Control display unit); Perceptual control theory; Ch-146 aircraft; NTISDODXA
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2070831
AA- <NTIS> AD-A341 285/5/XAB
TI- Role of Protective Visors in Injury Prevention During U.S. Army Rotary-Wing Aviation Accidents
TI- <NOTE> Final rept
AU- Reynolds, B. S. ; Rash, C. E. ; Colthirst, P. M. ; Ledford, M. H. ; Mora, J. C.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-98-18
CN- 30162787A879; PE
PY- Jan 98
PG- 28p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9815
CP- United States

AB- Visors under the associated flight helmets are considered aviation life support Equipment (ALSE). The role of visors is to reduce the frequency and severity of facial injuries. To investigate this role, the Army aviation accident database from the U.S. Army Safety Center, Fort Rucker, Alabama, and the ALSE Retrieval Program (ALSERP) database from the U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama, were investigated for visor related accident data. In addition, a review of past analyses of head and facial rotary-wing accident data was conducted. The findings support the premise that visors, when properly deployed, play a major role in reducing the frequency and severity of facial injuries.
DE- *Aviation accidents; *Wounds and injuries; *Life support systems; *Rotary wing aircraft; *Flight helmets; Data bases; Army research; Aeronautics; Safety; Information retrieval; Army; Alabama; Prevention; Army aircraft; Army aviation; Medical laboratories; Aviation medicine; Face(Anatomy); Visors
ID- Injury prevention; Rotary wing accidents; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 57E (Medicine and Biology--Clinical Medicine); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 2070664
AA- <NTIS> AD-A341 106/3/XAB
TI- Human Factors Evaluation of Vocoders for Air Traffic Control Environments Phase II: ATC Simulation
TI- <NOTE> Technical rept
AU- Sollenberger, R. L. ; LaDue, J. ; Carver, B. ; Heinze, A.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN97/25
CN- DTFA03-94-C-00042
PY- Dec 97
PG- 48p
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LA- English
PC- PC A04/MF A01
JA- GRAI9815
CP- United States
AB- Vocoders offer a potential solution to radio congestion by digitizing human speech and compressing the signal to achieve low bandwidth voice transmissions. A reduction in bandwidth will allow the addition of more communication channels to the system and reduce radio congestion. This air traffic control simulation study is the second phase of a research effort to compare the effectiveness of two 4.8 kbps vocoders (designated as A and B for test purposes) with the current analog radio communication system. Sixteen air traffic controllers from Level 5 Terminal Radar Approach Controls participated in the study and performed 12 one hour traffic scenarios over 3 days of testing. Scenarios consisted of medium and high traffic volumes designed to produce different levels of controller tasidoad. The communications configuration allowed each simulation pilot to transmit with jet, propeller, or helicopter background noises. The results indicated that the vocoders did not affect controller workload or performance. In general, intelligibility and acceptability ratings were highest for analog radio, slightly lower for vocoder B, and lowest for vocoder A. In addition, intelligibility and acceptability ratings were highest for jet background noise, slightly lower for propeller background noise, and lowest for helicopter background noise. Controller taskload had no effect on intelligibility and acceptability. This human factors evaluation indicated that both vocoders were highly intelligible and acceptable for air traffic control environments. Even the least preferred vocoder did not substantially interfere with controller performance. This study suggests that vocoder technology could replace the current analog radio system in the future.
DE- *Environments; *Human factors engineering; *Air traffic controllers; *Voice communications; *Vocoders; Simulation; Performance(Human); Pilots; Air traffic control systems; Solutions(General); Helicopters; Communication and radio systems; Workload; Bandwidth; Noise pollution; Analog systems; Channels; Background noise; Jet aircraft noise; Aircraft noise
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45F (Communication--Verbal)

AZ- 2070653
AA- <NTIS> AD-A341 094/1/XAB
TI- Altitude and Night Vision Goggles
TI- <NOTE> Final rept. Jan 93-Sep 97
AU- DeVilbiss, C.
CS- Air Force Research Lab., Brooks AFB, TX. Human Effectiveness Directorate.

CS- <CODE> 114856001; 434430
RN- AFRL-HE-BR-TP-1998-0001
CN- 7184; 60
PY- Mar 98
PG- 23p
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LA- English
PC- PC A03/MF A01
JA- GRAI9815
CP- United States
AB- This paper presents the findings from a study to quantify the effect of mild hypoxia and breathing supplemental oxygen on an aircrew member's static visual acuity while using night vision goggles (NVG). In this within subjects experiment, static NvG visual acuity was measured for 15 subjects at six simulated altitude levels (i.e., ground level, 5,000, 10,000, 15,000, 18,000 and 20,000 feet). Three target contrasts (i.e., high, medium, and low) were used for each visual acuity measurement under both simulated starlight and quarter moon illumination levels. Two supplemental oxygen conditions (i.e., 100% and normal setting) were used at all altitudes and a no supplemental oxygen condition was used up to 10,000 feet. Overall, there was a significant decrease in average visual performance across all conditions from the equivalent of 20/44 Snellen acuity at ground level to the equivalent of 20/46 at 20,000 feet. Overall, the 100% and normal oxygen conditions were not significantly different from one another. At the two lowest altitudes, the no supplemental oxygen condition did not differ significantly from the other two oxygen conditions. However, at the 10,000 ft. altitude, the no supplemental oxygen condition was significantly degraded from both the 100% and normal conditions. Since this study was conducted under an existing generic altitude protocol, the results did not provide complete information on the impact on visual acuity while performing operations at 15,000 feet without supplemental oxygen, applicable to helicopter operations in the mountains. A follow-up study was recommended but not funded.
DE- *Night vision devices; *Visual acuity; *Visual perception; *Goggles; Simulation; Aviation personnel; Measurement; Illumination; Targets; Oxygen; Helicopters; Hypoxia; Altitude
ID- NTISDODXA
SH- 57S (Medicine and Biology--Physiology); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2070514
AA- <NTIS> AD-A340 938/0/XAB
TI- Accelerated Methods for the Determination of Long Term Fatigue Properties of Glass Reinforced Plastics for Rotor Craft Applications
TI- <NOTE> Final rept. Jun 96-Nov 97
AU- Martin, R. H.
CS- Materials Engineering Research Lab. Ltd., Hertford (England).
CS- <CODE> 114845000; 427372
RN- ERO-1
CN- N68171-96-C-9061
PY- Nov 97
PG- 85p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9815
CP- United Kingdom
AB- The aim of this work was to develop an accelerated and cost effective method of generating long term fracture data for use in life prediction analysis of structures. Two materials were used in this project. These were S2/8552 and S2/F584, both glass epoxy systems. Delamination onset was monitored at both 5Hz and 20Hz and no difference in cycles to delamination onset was identified. It was concluded that longer term tests could be run at between 15 and 20Hz to represent structural tests at 5Hz. A multistation fatigue machine was modified to allow up to six composite DCB test pieces to be tested at the same time. Each station had its own instrumentation to monitor individual specimens for compliance changes. The machine operated electro-mechanically. The multistation machine was used to generate delamination onset data up to io8 cycles at 17Hz for both materials. For both materials a consistent decrease in the values of G between 10(exp 0) and 10(exp 8) cycles was observed. It was estimated that the increase in frequency and the use of an electromechanical multistation fatigue machine, reduces the cost of generating long term fatigue data to under 5% of that using conventional testing approaches.
DE- *Fatigue(Mechanics); *Accelerated testing; *Delamination; *Glass reinforced plastics; Cost effectiveness; Predictions; Monitoring;

Composite materials; Military vehicles; Fracture(Mechanics); Cycles; Electromechanical devices; Instrumentation; Epoxy compounds; Life tests ; United kingdom
ID- *Foreign technology; *Rotorcraft; Interlaminar fracture; NTISDODXA
SH- 71F (Materials Sciences--Composite Materials); 71O (Materials Sciences--Plastics); 71L (Materials Sciences--Materials Degradation and Fouling); 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 41K (Manufacturing Technology--Engineering Materials)

AZ- 2068783
AA- <NTIS> AD-A340 327/6/XAB
TI- VFR Heliport Obstacle-Rich Environments: Draft Test Plan
TI- <NOTE> Letter rept
AU- Sawyer, B. M. ; Peisen, D. J. ; Bolz, E. H.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
RN- DOT/FAA/RD-94/42
PY- Aug 94
PG- 36p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9814
CP- United States
AB- This draft test plan describes the evaluation of the psychological impact of an obstacle rich VFR heliport environment on pilot performance. This evaluation would use a visual flight simulation. included in this report are objectives and issues, simulator requirements, data collection methodology, and a test plan syllabus.
DE- *Pilots; *Psychological tests; *Heliports; Requirements; Performance(Human); Facilities; Helicopters; Flight simulation; Visual aids
ID- Obstacle avoidance; VFR(Visual Flight Rules); Obstacle rich environment ; NTISDODXA; NTISDOTFAA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2068781
AA- <NTIS> AD-A340 325/0/XAB
TI- VFR Heliport Obstacle-Rich Environments: Simulation Requirements and Facilities
TI- <NOTE> Letter rept
AU- Sawyer, B. M. ; Peisen, D. J. ; Bolz, E. H.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
RN- DOT/FAA/RD-94/43
PY- Aug 94
PG- 22p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9814
CP- United States
AB- This document identifies simulation requirements and facilities for the visual flight simulation evaluation of the psychological impact of an obstacle rich VFR heliport environment on pilot performance. This report addresses the investigative process, test methodology, simulator requirements, and simulation data collection methodology.
DE- *Performance(Human); *Pilots; *Heliports; Requirements; Facilities; Helicopters; Psychological tests; Flight simulation; Visual aids
ID- Obstacle avoidance; VFR(Visual Flight Rules); Obstacle rich environment ; NTISDODXA; NTISDOTFAA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 2068674
AA- <NTIS> AD-A340 128/8/XAB
TI- Visor Use Among U.S. Army Rotary-Wing Aviators
TI- <NOTE> Final rept
AU- Rash, C. E. ; Mora, J. C. ; Ledford, M. H. ; Reynolds, B. S. ; Ivey, R. H.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-98-16
CN- 3O162787A879; PB
PY- Jan 98

PG- 73p
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LA- English
PC- PC A05/MF A01
JA- GRAI9814
CP- United States
AB- Visors are optical devices that provide a level of comfort and protection from dust, wind, sun glare and particle fragments and, in the case of a crash, from tree branches, rocks, debris and aircraft structural parts. This report presents the results of a survey whose objective was to document visor usage, and identify problems associated with optical quality, and maintenance in Army rotary wing aviation. The survey was distributed to U.S. Army aviators and crewmen at Fort Hood, Texas; Fort Rucker, Alabama; Fort Campbell, Kentucky; and Fort Bragg, North Carolina. The survey identified that guidelines for visor use need to be established. Minor problems with haze, distortion, luminous transmittance, and prismatic deviation were also identified. Other problems include' mechanical difficulties, e.g., visors sticking and coming off track, inadequate custom trimming for IHADSS visors, and ANVIS incompatibility. Data support that dual visor design results in higher percentage of visor use.
DE- *Visors; Optical equipment; Optical properties; Army personnel; Pilots; Transmittance; Dust; Particles; Distortion; Rotary wing aircraft; Fragments; Army aircraft; Haze; Structural components; Sun; Prismatic bodies; Glare
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 2064824
AA- <NTIS> SAE ARP 1217A/XAB
TI- Instrumentation Requirements for Turboshaft Engine Performance Measurements (Revised May 97). (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cMay 97
PG- 4p
NT- Supersedes SAE ARP 1217. Copyright Society for Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA. 15096, USA. This document is available from NTIS under license from SAE.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC$25.50
JA- GRAI9813
CP- United States
AB- This Aerospace Recommended Practice (ARP) defines the measurement parameters that may be used by a pilot or operator to monitor the thermodynamic health of a turboshaft engine in a helicopter and the measurement system accuracies desired.
DE- *Standards
ID- *Engine performance; *Instrumentation; Measurements; Turboshaft engines ; Gas turbine; NTISSAE; NTISSDAC
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 2063862
AA- <NTIS> SAE AIR 1963A/XAB
TI- Cockpit Information Required for Helicopter Turbine Engine Operation and Maintenance (Revised Jun 97). (SAE Standard)
CS- Society of Automotive Engineers, Inc., Warrendale, PA.
CS- <CODE> 058588000
PY- cJun 97
PG- 5p
NT- Supersedes SAE AIR 1963. Copyright Society for Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA. 15096, USA. This document is available from NTIS under license from SAE.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC$25.50
JA- GRAI9813
CP- United States
AB- The purpose of this document is to provide the propulsion engineer's recommendations for the instrumentation that is required for the safe operation and maintenance of turbine engines as installed in

helicopters. It should be used as a guide for cockpit layout, as well as a reference for maintenance considerations throughout the propulsion area. Propulsion instruments should receive attention early in the design phase of the helicopter. within the scope of this document.
DE- *Standards
ID- *Airborne monitoring; *Helicopters; *Gas turbine engines; NTISSAE; NTISSDAC
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 2061538
AA- <NTIS> MIC-98-02105/XAB
TI- Evaluation of surface evacuation procedures for a ditched helicopter, phase II
CS- Cord Group Ltd., Calgary, (Alberta).
CS- <CODE> 999999999; 9999999;
SP- Federal Panel on Energy Research & Development (Canada); Canada. National Energy Board.
RN- ISBN-0-662-25747-2
PY- c1996
PG- 105p
NT- On cover: Program of Energy Research and Development.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E12/MF E01
JA- GRAI9812
CP- Canada
AB- In July 1995, initial testing was conducted using a helicopter simulator to review the ease of evacuating a precariously balanced ditched helicopter directly into a life raft (dry method) or indirectly by swimming to the life raft (wet method). This report describes another series of tests, conducted to determine the effect of higher wind and sea conditions on the performance of the two evacuation procedures and the advantages of conventional and improved aviation life rafts when used with those procedures. The tests were conducted in Bergen Fjord, Norway, with 53 subjects performing 32 evacuations in total. The life rafts tested were a canopy type and an open type without canopy. Results are presented comparing the dry and wet evacuations using the two types of rafts on either the leeward or windward sides of the ditched helicopter. Problems with the procedures and rafts are noted and recommendations for evacuation are presented.
DE- *Helicopters; *Evacuation; Aircraft survival equipment; Life rafts
ID- Aircraft accidents; NTISTFCAN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85D (Transportation--Transportation Safety)

AZ- 2057057
AA- <NTIS> AD-A336 474/2/XAB
TI- Spatial Disorientation Awareness Training Scenarios for U.S. Army Aviators in Visual Flight Simulators
CS- Army Aeromedical Research Unit, Fort Rucker, AL.
CS- <CODE> 002138000; 035550
RN- USAARL-98-17
CN- 30162787A879; OA
PY- Jan 98
PG- 51p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9811
CP- United States
AB- Spatial disorientation (SD) remains an important source of attrition in military flying. SD was considered to be a significant factor in 291 (30 percent) of Class A-C helicopter accidents in the U.S. Army during an 8 year period between 1987 and 1995. The monetary cost of SD is high and the fatality rate is between one and one half to two times that of non-disorientation accidents. One method of reducing the impact of SD is through enhanced awareness and training of aviators. It is not possible to demonstrate many of the disorienting circumstances safely during actual flight. It can, however, be safely and effectively demonstrated in a visual flight simulator. Actual SD accident summaries from the U.S. Army Safety Center (USASC) were reviewed and those accidents which could reasonably be replicated in a visual simulator were selected. The resulting visual simulator scenarios are used to train aviators to recognize, avoid and overcome SD. In addition, the scenarios provide training to assist aviators in overcoming SD once encountered. Other, yet equal, benefits from this method of training are the reinforcement of aircrew coordination elements and the development of decision-making, risk assessment, and judgement skills.

DE- *Spatial distribution; *Visual perception; *Flight simulators; *Physiological disorientation; *Visual acuity; Scenarios; Risk; Decision making; Military aircraft; Training; Army personnel; Pilots; Attrition; Costs; Helicopters; Safety; Casualties; Mortality rate; Accidents
ID- Sd(Spatial disorientation); NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 57E (Medicine and Biology--Clinical Medicine); 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 2050281
AA- <NTIS> AD-A334 196/3/XAB
TI- Case-Based Reasoning Approach to Operator Assessment and Operator Machine Interface Enhancement
TI- <NOTE> Final rept. 20 Feb-20 Dec 97
AU- Stottler, R. ; Davis, A.
CS- Stottler-Henke Associates, Inc., Belmont, CA.
CS- <CODE> 103836000; 421795
RN- OMIA-145
CN- N00421-97-C-1134
PY- 2 Jan 98
PG- 39p
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LA- English
PC- PC A04/MF A01
JA- GRAI9809
CP- United States
AB- In Phase 1 we investigated a case-based reasoning (CBR) approach to Operator Assessment and Operator Machine Interface Enhancement for the LAMPS SH-60R Multi Mission Helicopter Upgrade (MMHU). We Developed a limited prototype case-based Operator Assessment and Operator Machine Interface Enhancement System (OA/OMIES), for the SH-60R sensor operator for a small subset of ASW situations. We developed a generic OA/OMIES architecture applicable in many other domains. The OA/OMIES tests operator knowledge through the use of tactical scenarios, derives the operators mental model based on his deficiencies revealed in the mental model. The prototype implementation provided and absolute proof by example of the feasibility of our ideas. The case-based approach offers the further benefits of automatically of semi-automatically generating the operators mental model and of the largely circumventing the difficult and time consuming process of constructing and explicit expert mental model. Our approach could be easily extended to constitute and Intelligent Tutoring System (ITS) for the SH-60R as well.
DE- *Learning machines; *Artificial intelligence; *Man machine systems; Scenarios; Optimization; Helicopters; Man computer interface; Operators(Personnel); Mental ability; Antisubmarine warfare
ID- *Case based reasoning; Sbir(Small business innovation research); Sh-60r aircarft; Lamps(Light airborne multipurpose system); NTISDODXA
SH- 62GE (Computers, Control, and Information Theory--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2045343
AA- <NTIS> AD-A332 850/7/XAB
TI- U.S. Army Aviation Life Support Equipment Retrieval Program: Head and Neck Injury Among Night Vision Goggle Users in Rotary-Wing Mishaps
TI- <NOTE> Final rept
AU- Shannon, S. G. ; Mason, K. T.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-98-02
PY- Oct 97
PG- 13p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9807
CP- United States
AB- The relationship between night vision goggle (NVG) use in the U.S. Army and head/neck injury risk is unknown. A 10-year retrospective study of traumatic head/neck injuries among U.S. Army aircrew members wearing NVGs in rotary-wing mishaps was conducted by review of U.S. Army Safety Center and U.S. Army Aviation Epidemiology Data Register records. Among 704 cockpit aircrew members, 403 (57.2 percent) suffered some degree of injury during the mishap. Among the 403 injured crewmembers, 250 (62.0

percent) had head and/or neck injuries. A disproportionate number of cockpit aircrew members in nonsurvivable mishaps had head and/or neck injuries (87.0 percent) compared to those in survivable mishaps (19 percent). Crewmembers wearing NVGs had a significantly increased risk for head and/or neck, head only, and neck only injury. When stratified by type of NVG, and based on logistic regression models that included aircraft type (UH-60 versus other) and survivability as covariates, crewmembers wearing the AN/PVS-5 carried the burden of this injury risk (RR=2.01, Ci95-1.58.57). For crewmembers wearing the aviator's night vision imaging system (ANVIS), the risk of head and/or neck, head only, or neck only injury was not statistically greater than crewmembers not wearing NVGs (RR=l.22, c195=O.94,l.58). Aircrew wearing the older AN/PVS-5 were at increased risk for head/neck injury during a rotary-wing mishap, while ANVIS users with the ANVIS break-away feature were not at increased risk for head/neck injury.
DE- *Wounds and injuries; *Night vision devices; *Head(Anatomy); *Traumatic shock; *Neck(Anatomy); Mathematical models; Aircraft; Risk; Survivability; Cockpits; Flight crews; Army personnel; Regression analysis; Safety; Logistics; Goggles; Army; Stratification
ID- NTISDODXA
SH- 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology); 57E (Medicine and Biology--Clinical Medicine); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 74GE (Military Sciences--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2044030
AA- <NTIS> MIC-98-00094/XAB
TI- Evaluation of surface evacuation procedures for a ditched helicopter
CS- Cord Group Ltd., Calgary, (Alberta).
CS- <CODE> 999999999; 9999999;
SP- Federal Panel on Energy Research & Development (Canada); Canada. National Energy Board.
RN- ISBN-0-662-24016-2
PY- c1995
PG- 99p
NT- On cover: Program of Energy Research and Development.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E12/MF E01
JA- GRAI9806
CP- Canada
AB- The traditional method of evacuating a ditched upright helicopter on the water has been to inflate and hold life rafts alongside while crew and passengers step aboard. This method is generally called the dry shod method. In another method called the swim away procedure, passengers and crew wearing immersion suits first swim clear of the helicopter with the uninflated life raft, then inflate the raft and climb aboard. This report describes a series of simulated helicopter evacuation trials utilizing both above methods to determine the best procedure to be used when evacuating under different conditions. The report begins with an overview of the history of life raft development, problems with marine inflatable life rafts, and experiences with life raft performance in helicopter ditchings. Results and discussion are then presented for field trials involving dry shod and swim away evacuations from either the windward or leeward side of a floating helicopter. Results presented include times taken to evacuate, times to reach the safe zone, and times to be in the raft in a safe zone.
DE- *Helicopters; Survival (after airplane accidents shipwrecks); Aircraft survival equipment; Evacuation of civilians
ID- *Foreign technology; NTISTFCAN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85D (Transportation--Transportation Safety)

AZ- 2041301
AA- <NTIS> AD-A331 767/4/XAB
TI- Helmet-Mounted Display Design Guide
TI- <NOTE> Contractor rept
AU- Newman, R. L. ; Greeley, K. W.
CS- Crew Systems Consultants, San Marcos, TX.
CS- <CODE> 111996000; 423417
CN- NAS2-14131
PY- 3 Nov 97
PG- 406p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A19/MF A04
JA- GRAI9805
CP- United States

AB- Helmet mounted displays (HMDs) present flight, navigation, and weapon information in the pilot's line of sight. The HMD was developed to allow the pilot to retain aircraft and weapon information while looking off boresight. This document reviews current state of the art in HMDs and presents a design guide for the HMD engineer in identifying several critical HMD issues: symbol stabilization, inadequate definitions, undefined symbol drive laws, helmet considerations, and field of view (FOV) vs. resolution tradeoff requirements. In particular, display latency is a key issue for HMDs. In addition to requiring further experimental studies, it impacts the definition and control law issues. Symbol stabilization is also critical. In the case of the Apache helicopter, the lack of compensation for pilot head motion creates excessive workload during hovering and nap of the earth (NOE) flight. This translates into excessive training requirements. There is no agreed upon set of definitions or descriptions for how HMD symbols are driven to compensate for pilot head motion. A set of definitions is proposed to address this. There are several specific areas where simulation and flight experiments are needed: development of hover and NOE symbologies which compensate for pilot head movement; display latency and sampling, and the tradeoff between FOV, sensor resolution and symbology.
DE- *Human factors engineering; *Helmet mounted displays; *Head up displays ; Line of sight; Flight testing; Cockpits; Flight training; Pilots; Air navigation; Visual perception; Data displays; Flight maneuvers; Physiological disorientation; Visual acuity; Flight helmets
ID- NTISDODXA
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2040446
AA- <NTIS> MIC-97-07233/XAB
TI- Report on the review of the dual role immersion suit systems for Canadian offshore operations
CS- Cord Group Ltd., Calgary, (Alberta).
CS- <CODE> 999999999; 9999999;
SP- Federal Panel on Energy Research & Development (Canada); Canada. National Energy Board.
RN- ISBN-0-662-25692-1
PY- c1995
PG- 33p
NT- On cover: Program of Energy Research and Development.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E07/MF E01
JA- GRAI9804
CP- Canada
AB- There is a requirement for the offshore oil and gas industry to provide cold water immersion protection for personnel during helicopter flights to and from offshore installations and on the installations in the event of emergency abandonment. This report examines the advantages and drawbacks of the dual role immersion suit concept, i.e. a single immersion suit being used for both helicopter transport and during emergency abandonment. It reviews the two Canadian standards for immersion suits to determine whether one system may be able to achieve dual approval, and summarizes interviews with those involved in operations using dual-role immersion suit systems in Norway and the United Kingdom. Recommendations are made regarding the suitability of a dual-role system for Canadian conditions and an appropriate means of implementing such a system.
DE- *Protective clothing; Survival and emergency equipment; Offshore structures; Safety measures
ID- *Foreign technology; NTISTFCAN
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 47GE (Ocean Technology and Engineering--General)

AZ- 2039645
AA- <NTIS> AD-A331 227/9/XAB
TI- Background and Instrumentation for the Helicopter Instrument Scan Pattern Research Conducted at NAS Whiting Field
TI- <NOTE> Technical memorandum
AU- Temme, L. A. ; Still, D. L.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> 065612000; 406061
RN- NAMRL-TM-96-1
PY- 14 Jun 96
PG- 19p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A03/MF A01
JA- GRAI9804
CP- United States
AB- Effectively scanning and interpreting flight instruments are crucially important skills for pilots. In order to fill voids in the literature and to provide objective, fleet relevant information describing instrument scan patterns under realistic situations, NAMRL developed the capability of monitoring, in an essentially non-invasive fashion, the scanning behaviors of pilots as they fly the full sized, motion based, high fidelity, helicopter instrument training simulator at NAS Whiting Field. This paper provides a photographic description of this research installation.
DE- *Pilots; *Visual perception; *Instrument flight; Cockpits; Performance(Human); Human factors engineering; Helicopters; Flight instruments; Pattern recognition; Flight simulators; Optical scanning; Visual acuity; Instrument panels; Eye movements
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2039360
AA- <NTIS> AD-A330 891/3/XAB
TI- Project: SH-60R Operator Machine Interface Enhancement (SHOMIE)
TI- <NOTE> Monthly progress rept. 1 Aug-30 Sep 97
AU- Glenn, F.
CS- Chi Systems, Inc., Lower Gwynedd, PA.
CS- <CODE> 113747000; 427992
CN- N00421-97-C-1133
PY- Oct 97
PG- 3p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A01/MF A01
JA- GRAI9804
CP- United States
AB- Work during this period consisted primarily of developing a concept of an adaptive, intelligent interface aid for the SENSO and discussing that concept with Government representatives. Meetings attended included a project review meeting with Ms. Becky Morgan and Mr. John Suarez on 28 August 1997 and an MS HSI meeting on 5 September 1997.
DE- *Pilots; *Man machine systems; *Decision aids; Software engineering; Helicopters; Air navigation
ID- *Shomie(Sh-60r operator machine interface enhancement); Sh-60r aircraft ; Senso(Sensor operator); Interface navigation; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2039282
AA- <NTIS> AD-A330 776/6/XAB
TI- Human Factors Integration: Cost and Performance Benefits on Army Systems
TI- <NOTE> Final rept
AU- Booher, H. R.
CS- Hughes Training, Inc., Falls Church, VA. Link Operations.
CS- <CODE> 111066001; 432146
RN- ARL-CR-341
CN- DAAL01-95-C-0121; 1L162716AH70
PY- Jul 97
PG- 61p
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LA- English
PC- PC A05/MF A01
JA- GRAI9804
CP- United States
AB- This report documents and, to the degree possible, quantifies the benefits of human factors integration (HFI) effort to selected Army programs. Four Army weapon systems were identified for documenting HFI lessons learned and quantitative benefits. These systems are two aviation systems, Comanche and Apache; one nuclear, biological, chemical (NBC) reconnaissance vehicle, Fox; and the Army's advanced howitzer program, Crusader. The Comanche aircraft provides the most comprehensive lessons learned for HFI, based on its application of the Army's manpower and personnel integration (MANPRINT) program from its inception. The Apache helicopter provides some quantitative examples of benefits from HFI applications on design and development of changes to a system already in the Army inventory. The Fox reconnaissance vehicle (XM93E1 NBC) demonstrates quantitative benefits and lessons learned

from HFI applications on a non-major system. The Crusader was chosen because it illustrates the critical role played by HFI technologies in conducting realistic battlefield scenarios in war games. Attention is given to the effects of HFI in five major areas: (1) The acquisition process; (2) System design and development; (3) Operational performance and testing; (4) Cost avoidance, and (5) Safety benefits.
DE- *Lessons learned; *Human factors engineering; *Benefits; Scenarios; Aircraft; Acquisition; Army personnel; Battlefields; Weapon systems; Aeronautics; Costs; Army equipment; Manpower; Helicopters; Integration; Safety; Inventory; War games; Vehicles; Avoidance; Reconnaissance; Howitzers
ID- NTISDODXA; NTISDODAF
SH- 74GE (Military Sciences--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2033866
AA- <NTIS> ASTM-F 1124-91/XAB
TI- Rotary Wing Advanced Life Support Transport Units. (ASTM Standard)
CS- American Society for Testing and Materials, West Conshohocken, PA.
CS- <CODE> 113500000
PY- cJul 91
PG- 9p
NT- This specification is under the jurisdiction of ASTM Committee on Emergency Medical Services and is the direct responsibility of Subcommittee F30.01 on EMS Equipment. Current edition approved April 1, 1991. Published July 1991.
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LA- English
PC- PC$27.00
JA- GRAI9802
CP- United States
AB- Copyright American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA, 19428, USA. This document is available from NTIS under license from ASTM.
DE- *Standards
ID- *Life support; *Rotary wings; *Emergency medical services; National air medical transport units; NTISASTM; NTISSDAA
SH- 44J (Health Care--Health Delivery Plans, Projects, and Studies); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 85A (Transportation--Air Transportation)

AZ- 2033864
AA- <NTIS> ASTM-F 1119-91/XAB
TI- Rotary Wing Basic Life Support Transport Units. (ASTM Standard)
CS- American Society for Testing and Materials, West Conshohocken, PA.
CS- <CODE> 113500000
PY- cJun 91
PG- 8p
NT- This specification is under the jurisdiction of ASTM Committee on Emergency Medical Services and is the direct responsibility of Subcommittee F30.01 on EMS Equipment. Current edition approved April 1, 1991. Published June 1991.
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JA- GRAI9802
CP- United States
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DE- *Standards
ID- *Life support equipment; *Air medical transport; *Emergency medical services; National air medical transport units; NTISASTM; NTISSDAA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 85A (Transportation--Air Transportation)

AZ- 2031847
AA- <NTIS> AD-A329 484/0/XAB
TI- Long-Duration Exposure Criteria for Head-Supported Mass
TI- <NOTE> Final rept
AU- Butler, B. P. ; Allen, N. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-97-34
CN- 30162787A878; EB

PY- Aug 97
PG- 59p
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LA- English
PC- PC A05/MF A01
JA- GRAI9802
CP- United States
AB- The modern crew station of Army helicopters uses the helmet as an integral component of the aircraft control systems. What was once viewed as a simple device for crash protection now supports devices including night vision goggles, chemical mask, head-up displays, and weapon aiming systems. These devices combine to increase the biomechanical stress in the neck. This study investigated the effects of increasing helmet torque on the motion of the helmeted head under the conditions of long duration whole body vibration exposure. Twelve U.S. Army volunteer aviators were exposed to 4 hours of whole body vibration, similar to that found in a UH-60 helicopter, while wearing four different helmets. Helmet torques, as calculated at the point where the head connects to the spine, ranged from a standard aviator helmet to a helmet with a chemical mask and a night vision goggle. Head motion was measured using a three dimensional active infrared marker system attached to a fixture held in the subject's teeth.
DE- *Human factors engineering; *Flight helmets; *Endurance(Physiology); Vibration; Army personnel; Pilots; Helicopters; Night vision devices; Aviation safety; Weight reduction; Biomechanics; Helmet mounted displays; Head up displays; Spinal column; Neck(Anatomy)
ID- Uh-60 aircraftDa320693; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51GE (Aeronautics and Aerodynamics--General)

AZ- 2029724
AA- <NTIS> AD-A328 597/0/XAB
TI- Mass Requirements for Helicopter Aircrew Helmets
AU- McEntire, B. J. ; Shanahan, D. F.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
PY- 25 Aug 97
PG- 7p
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LA- English
PC- PC A02/MF A01
JA- GRAI9801
CP- United States
AB- Helicopter aircrew helmets are becoming more sophisticated with increased mission requirements. This increase results in additional mass being supported on the aircrew's head. Ultimately, there is a limit to how much mass can be supported by the aircrew without increasing the fatigue rates and neck injury risk in accidents. This paper reviews the past mass property requirements of Army helicopter helmets. Current requirements for the RAH-66 Comanche helmet are also detailed with the rationale for their derivation.
DE- *Flight crews; *Helmets; Military requirements; Helicopters; Fatigue; Army aircraft; Accidents; Neck(Anatomy)
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51GE (Aeronautics and Aerodynamics--General); 85A (Transportation--Air Transportation)

AZ- 2029688
AA- <NTIS> AD-A328 544/2/XAB
TI- SH-60R Operator Machine Interface Enhancement (SHOMIE)
TI- <NOTE> Monthly progress rept. 1 Jun-31 Jul 97
AU- Glenn, F.
CS- Chi Systems, Inc., Lower Gwynedd, PA.
CS- <CODE> 113747000; 427992
CN- N00421-97-C-1133
PY- 14 Aug 97
PG- 4p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A01/MF A01
JA- GRAI9801

CP- United States
AB- A systematic approach, designated SH-60R Operator Machine Interface Enhancement (SHOMIE), is proposed for developing decision aid enhancements to the SENSO and ATO crew stations of the SH-60R aircraft which is currently under development by the Navy. The methodology begins with determination of functional performance requirements via a technique based primarily, but not exclusively, on cognitive task analysis. Cognitive performance limitations are determined both analytically and empirically and then used to derive functional requirements for decision aid concepts to overcome the identified limitations. Relevant software and algorithmic techniques for realizing the desired functionality are then derived from an evaluation of viable candidates obtained from a taxonomic analysis of aiding technologies. Finally, the decision aid concepts are specified as structured architectural designs which are then implemented as software prototypes. The Phase 1 effort will focus primarily on the SENSO crewstation because the SENSO's tasks are expected to be changed more radically than the ATO's with the introduction of new sensor information processing software. Also to restrict the scope of the effort to a manageable level and still assure operational relevance, we propose to focus on the domain of acoustic search and localization in littoral ASW missions. CHI Systems has worked extensively in this domain, having developed a variety of ASW decision aids, training tools, cognitive task analyses, and testbeds, all of which will greatly facilitate the development of the decision aids to be formulated by the SHOMIE methodology.
DE- *Attack helicopters; *Work stations; *Man machine systems; *Antisubmarine aircraft; Computer programs; Algorithms; Performance(Human); Human factors engineering; Decision aids; Antisubmarine warfare
ID- Sh-60r aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2027392
AA- <NTIS> AD-B176 951/2/XAB
TI- Active Noise Cancellation Stethoscope. Phase 1
TI- <NOTE> Final rept. 16 Feb-15 Aug 93
AU- Zacharias, G. L. ; Miao, A. X. ; Moore, J. A. ; Collier, R. D. ; Asdigha, M.
CS- Charles River Analytics, Inc., Cambridge, MA.
CS- <CODE> 084097000; 398060
CN- DAMD17-93-C-3092
PY- 15 Aug 93
PG- 58p
NT- Approved for Public Release; Distribution Unlimited. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9724
CP- United States
AB- This Phase I study demonstrated the basic feasibility of developing a hybrid active/passive noise canceling stethoscope for rotorcraft aeromedical evacuation use. The hybrid design makes full use of active and passive noise reduction techniques, and incorporates: (1) primary and reference stethoscopes to pickup the relevant patient sounds and to measure the surrounding ambient noise environment; (2) a hybrid noise canceling headset used by the medic to listen to the transduced heart/lung sounds and to reduce the ambient noise levels; and (3) a custom ANC processor to further reduce noise pickup at the primary stethoscope. Under the Phase I effort we reviewed commercially-available hardware, assembled candidate components in a prototype system, developed custom ANC algorithms for patient signal processing, and demonstrated end-to-end operation of the system. Engineering evaluations of noise reduction capability and psychoacoustic evaluations of patient sound clarity were made to demonstrate system feasibility and to identify system requirements for full-scope prototype development under a follow-on program. The Phase I evaluation clearly demonstrated the system's ability to extract clean patient sounds in high ambient level noise, in situations in which one would normally experience inaudible patient sounds using conventional or electronic stethoscopes. Stethoscope, Active Noise Cancellation, Medevac, Noise, Auscultation Device, SBIR, Phase I, RAD II.
DE- *Noise reduction; *Stethoscopes; *Medical personnel; Aeromedical evacuation; Algorithms; Ambient noise; Electronics; Evacuation; Heart; Lung; Patients; Prototypes; Psychoacoustics; Signal processing; Sound; Background noise; Circuit boards; Computer programming; Cost analysis; Emergencies; Military medicine; Military personnel
ID- NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology); 57E (Medicine and Biology--Clinical Medicine); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 2026443
AA- <NTIS> AD- 337 986/4/XAB
TI- Residual Radiation from a Very-Low-Yield Burst
AU- Morgenthau, M. ; Schumchyk, M.
CS- Chemical Research and Development Labs., Edgewood Arsenal, MD.
CS- <CODE> 002358000; 036900
RN- AEC-WT1678
CN- 2.10
PY- 15 Dec 60
PG- 58p
NT- Report on Operation Hardtack.
NT- Approved for Public Release;Distribution Unlimited. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9724
CP- United States
AB- This project participated during Shots Quince and Fig to determine the radiation intensities of contaminated areas resulting from a very-low-yield, surface nuclear detonation. This objective was accomplished by: (1) monitoring the crater and lip shortly after detonation, (2) performing helicopter-to-ground surveys at preselected points, (3) making a number of ground surveys during and after sample collection, (4) determining the gross gamma decay of the residual radiation from collected fallout samples, and (5) documenting the alpha contamination. (Author).
DE- *Nuclear explosions; Radiation; Radiological contamination; Fallout; Surface burst; Instrumentation; Monitors; Intensity
ID- Hardtack operation; NTISDODXA; NTISDE
SH- 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 77D (Nuclear Science and Technology--Nuclear Explosions and Devices); 74H (Military Sciences--Nuclear Warfare)

AZ- 2017172
AA- <NTIS> AD-A326 987/5
TI- Helicopter Visual Segment Approach Lighting System (HALS) Test Report (1989)
TI- <NOTE> Technical note for period ending Aug 88
AU- Billmann, B. R. ; Shollenberger, S.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
PY- Jun 89
PG- 317p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A15/MF A03
JA- GRAI9722
CP- United States
AB- The establishment of precision instrument approaches to heliports is hindered by the visual segment guidance which currently exists at most urban area heliports. The Heliport Versus Segment Approach Lighting System (HALS) has been developed to meet this requirement. This Technical Note reports on a test designed to obtain pilot performance subjective pilot data on the Helicopter Visual Segment Approach Lighting System (HALS). Results identify the performance measures which correlate with the pilot's ability to visually acquire a HALS equipped heliport. Conclusions state that HALS can support existing minima to heliports. Pilots reported unacceptable Cooper-Harper ratings for rate of closure and workload without HALS.
DE- *Approach lights; *Heliports; Helicopters; Visual perception; Workload; Landing lights
ID- *Hals(Helicopter visual segment approach lighting system); Terps(Terminal instrument procedures); Mls(Microwave landing system); Cooper harper ratings; NTISDODXA
SH- 85A (Transportation--Air Transportation); 50B (Civil Engineering--Civil Engineering)

AZ- 2017055
AA- <NTIS> AD-A326 856/2
TI- Aircrew Centered System Design Analysis Considerations for the MH-53E Helicopter
TI- <NOTE> Master's thesis
AU- Gibson, G. J.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Dec 96
PG- 140p
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LA- English
DT- Thesis
PC- PC A08/MF A02
JA- GRAI9722
CP- United States
AB- An analysis was made of the aircrew centered system design aspects for the MH-53E helicopter. These aircrew centered design features included changes in the cockpit, aircraft weight, and drag coefficient. The cockpit evaluation compared the current MH-53E cockpit configuration with design changes currently under review by the Navy. This evaluation suggests that the proposed cockpit design display change may reduce aircrew load stress and improve mission effectiveness. Changes in subsystem components may either increase or decrease the weight of the MH-53E. Similarly, changes in crew tasking may result in a need for more or less fuselage volume size. Therefore, the sensitivity of MH-53E performance to generic changes in weight and drag was investigated in order to make source assessment of equipment and crew tasking changes upon MH-53E mission effectiveness.
DE- *Human factors engineering; *Helicopters; *Aircraft design; Avionics; Cockpits; Flight crews; Theses; Fuselages; Aerodynamic drag; Weight reduction; Drag reduction; Horizontal indicators
ID- Mh-53e aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2015160
AA- <NTIS> AD-A326 337/3
TI- Augmentation of Research at the Center of Excellence in Rotorcraft Technology (CERT)
TI- <NOTE> Final rept
AU- Schrage, D. P. ; Sankar, L. N. ; Komerath, N. ; Peters, D. A. ; Hodges, D. H.
CS- Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
CS- <CODE> 010263051; 403914
RN- GIT-AER-E16-X35; ARO-32323.8-EG-RW
CN- DAAH04-94-G-0072
PY- 31 Mar 97
PG- 238p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A03
JA- GRAI9721
CP- United States
AB- Rotorcraft technology is one of the most challenging, multidisciplinary and interdisciplinary problems in engineering. For its sustained advancement requires a critical mass of researchers conducting interdisciplinary research in the four critical rotorcraft disciplines: aerodynamics, rotor dynamics aeroelasticity, structures materials, and flight mechanics controls. To support and sustain this research requires a combination of analysis capabilities and experimental facilities, including the necessary research instrumentation. The Georgia Tech CERT has accumulated this critical mass of researchers and developed the necessary facilities with previous Army and Georgia Tech investments. The unique capabilities of rotorcraft (vertical flight lifting capability, ability to operate from unprepared surfaces, low speed agility maneuverability, etc.) make them essential weapon support systems for the U.S. Army and other military services in the foreseeable future. Therefore, the problem studied is to sustain the advancement of rotorcraft technology by conducting leading edge research using sufficient research instrumentation for the direct benefit of future rotorcraft, as well as technology upgrades for existing rotorcraft.
DE- *Aeronautical engineering; *Rotary wing aircraft; Flight control systems; Composite materials; Helicopter rotors; Aeroelasticity; Structural response; Flight envelope; Flight maneuvers; Aerodynamic lift
ID- NTISDODXA; NTISDODA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 2014950
AA- <NTIS> AD-A326 082/5
TI- Lightweight Emergency Flotation System for the CH-46 Helicopter
TI- <NOTE> Final rept. Sep 79-Jan 81
AU- Reilly, M. J.
CS- Boeing Vertol Co., Philadelphia, PA.

CS- <CODE> 058114000; 403682
RN- NADC-79169-60
PY- Feb 81
PG- 86p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9721
CP- United States
AB- Helicopters are subject to roll over and sinking within a minute of being force down in sea states of 2 or greater. Crew egress is difficult and many drownings occur. Boeing was awarded a contract to develop a lightweight, automatically deployed flotation system to remedy the situation. An innovative system was designed which employs water scoops attached to 2 floats providing substantially increased stability for negligible weight. The concept was proven in wave tank tests and by full scale float and deployment system demonstrations.
DE- *Floats; *Helicopters; Deployment; Emergencies; Lightweight; Aviation safety; Scoops; Ditching
ID- H-46 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 2014761
AA- <NTIS> AD-A325 776/3
TI- LPU-21/P Life Preserver Casing Material Program
TI- <NOTE> Final rep
AU- Lewyckj, J. Z.
CS- Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> 032381022; 393532
RN- NADC-82075-60
PY- Oct 82
PG- 16p
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LA- English
PC- PC A03/MF A01
JA- GRAI9721
CP- United States
AB- LPU-21/P Life Preserver Casings manufactured from High Temperature Aramid Cloth (MIL-C-81814) has a tendency to unravel at edges, making manufacture difficult with seam separation. A new Aramid Plain Weave Cloth (MIL-C-83429) does not unravel as easily. A number of preservers were manufactured from the new cloth and were given a special evaluation by operational squadrons. The casings withstood wear well and the new material would eliminate most of the raveling and seam separation problems.
DE- *Life preservers; Casings(Linings); Linings; Test and evaluation; Materials; High temperature; Helicopters; Fabrics; Squadrons
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57U (Medicine and Biology--Public Health and Industrial Medicine); 71I (Materials Sciences--Fibers and Textiles)

AZ- 2013064
AA- <NTIS> AD-A325 683/1
TI- Back Pain and Endurance Training of Back Muscles: Justification for Further Study in Helicopter Pilots
TI- <NOTE> Master's thesis
AU- Ladner, T. J.
CS- Air Force Inst. of Tech., Wright-Patterson AFB, OH.
CS- <CODE> 000805000; 012200
RN- AFIT-97-047
PY- 29 May 97
PG- 39p
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LA- English
DT- Thesis
PC- PC A04/MF A01
JA- GRAI9720
CP- United States
AB- The purpose of this study is to review the literature systematically to determine if available published evidence is sufficient to recommend endurance training of back musculature as a preventive measure for

helicopter back pain. Based on this review further studies will be recommended to evaluate the effectiveness of back musculature training in helicopter back pain.
DE- *Pilots; *Helicopters; *Muscles; *Pain; *Endurance(Physiology); Measurement; Training; Theses; Military research; Prevention; Exercise(Physiology)
ID- *Back pain; Musculature endurance training; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57E (Medicine and Biology--Clinical Medicine); 51B (Aeronautics and Aerodynamics--Aeronautics); 74GE (Military Sciences--General)

AZ- 2012571
AA- <NTIS> AD-A324 991/9
TI- Proceedings of the First Triservice Conference on Rotary-Wing Spatial Disorientation: Spatial Disorientation in the Operational Rotary-Wing Environment
TI- <NOTE> Final rept
AU- Braithwaite, M. G. ; DeRoche, S. L. ; Alvarez, E. A. ; Reese, M. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
CN- USAARL-97-15; 3M162787A879; OA
PY- Apr 97
PG- 142p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A08/MF A02
JA- GRAI9720
CP- United States
AB- Several recent studies at the U.S. Army Aeromedical Research Laboratory (USAARL) and the U.S. Army Safety Center (USASC) have highlighted the significant contribution of Spatial Disorientation (SD) to helicopter accidents. In the U.S. Army the cost can be approximated at $58M and 14 lives each year. Following some local training initiatives by USAARL and the U.S. Army School of Aviation Medicine (USASAM), the first Triservice Symposium on Spatial Disorientation in Rotary-Wing Operations was held from 24 September 1996 through 26 September 1996 at USASAM. This symposium sought to address three main areas: (1) the seriousness of the SD hazard; (2) current methods to control the hazard; and (3) the associated safety and risk management concerns. This report contains the proceedings of the symposium. The symposium was considered to be a success in raising the awareness of the impact of SD on rotary-wing flying operations in the aeromedical and safety communities of the services. It was clear that SD imposes a particular hazard to rotary wing operations which differs in many respects to that experienced by fixed wing operators. There was unanimous agreement that initiatives to overcome the problem must be made. In order to maintain the impetus established by the symposium and secure funding for the various initiatives, the report contains a memorandum detailing the important factors and makes recommendations for future activity in the area. Work is required in education, training, research, and equipment procurement. Control factors are discussed and recommendations made according to whether the approach should be solely directed towards the U.S. Army, or on a triservice basis.
DE- *Helicopters; *Aviation safety; *Physiological disorientation; Spatial distribution; Symposia; Army research; Flight training; Army training; Psychomotor function; Pilots; Cost estimates; Human factors engineering ; Aviation accidents; Perception(Psychology); Awareness; Army aviation; Aeromedical evacuation; Aviation medicine
ID- Proceedings; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology)

AZ- 2009461
AA- <NTIS> AD-A324 116/3
TI- Australian Airborne Trials of the Sikorsky S-70B-2 Helicopter: Part 1 - Performance Measurements
TI- <NOTE> Technical rept
AU- Arney, A. M. ; Fieldhouse, I.
CS- Defence Science and Technology Organisation, Canberra (Australia).
CS- <CODE> 057314000; 394805
RN- DSTO-TR-0463-PT-1; DODA-AR-009-955
PY- Jan 97
PG- 73p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01

JA- GRAI9718
CP- Australia
AB- Airborne tests have been conducted using an instrumented Sikorsky S-7OB-2 helicopter. These tests were flown by a Royal Australian Navy Test Pilot and were primarily aimed at establishing limits for the S-7OB-2 when operating from an Adelaide' class FFG-7 frigate. While the aircraft was instrumented, the opportunity was taken to fly a series of performance and flight dynamic tests to establish baseline data that will be used to further develop a mathematical model of the helicopter. This report details the scope of the performance tests, describes data processing procedures, and presents results of the tests.
DE- *Flight testing; *Helicopters; Mathematical models; Data processing; Military forces(Foreign); Performance(Engineering); Test methods; Base lines; Instrumentation; Frigates; Dynamic tests
ID- *Foreign technology; Foreign reports; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 2006799
AA- <NTIS> AD-A323 538/9
TI- Flightfax; Spatial Disorientation, Volume 25, Number 7
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> 065116000; 411551
PY- Apr 97
PG- 12p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9716
CP- United States
AB- Basic to any discussion of spatial-disorientation controls is recognizing that there are two types of SD. The challenge of Type 1 SD is to find a way to apply controls (the appropriate course of action) when you are unaware that you are in an SD situation. The challenge of Type 2 SD is to apply the right controls to the specific SD situation. Identifying appropriate controls for both types of SD was an issue at last fall's Tri-Service Spatial Disorientation in Rotary Wing Operations Conference held at Fort Rucker. This conference produced control proposals in four major categories: (1) education, (2) training, (3) research, and (4) equipment. What follows is a discussion of these proposals, modified slightly to include input from the Aviation Leaders' Training Conference and the Aviation Brigade Safety Officer Conference held in January 1997 and input from standardization pilots and human factors experts at Fort Rucker.
DE- *Human factors engineering; *Helicopters; *Aviation safety; *Physiological disorientation; Attitude control systems; Flight training; Army training; Performance(Human); Psychomotor function; Pilots; Aviation accidents; Collision avoidance; Perception(Psychology) ; Awareness; Army aviation; Altitude controllers; Space perception; Positioning reactions; Airborne early warning; Airborne warning and control system
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 57W (Medicine and Biology--Stress Physiology); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2004736
AA- <NTIS> AD-A322 607/3
TI- Flight Simulator Evaluation of a Novel Display to Minimize the Risks of Spatial Disorientation
TI- <NOTE> Final rept
AU- Braithwaite, M. G. ; Durnford, S. J. ; DeRoche, S. L. ; Alvarez, E. A. ; Jones, H. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-97-11
CN- 3M162787A879
PY- Feb 97
PG- 168p
NT- Document partially illegible. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A02
JA- GRAI9715
CP- United States
AB- A novel instrument display designed to reduce cognitive workload and improve accuracy of flight and recovery from a disorienting episode was tested against flight with standard instruments in a UH-60 dynamic

helicopter simulator. Sixteen non-UH-60 rated pilots flew a standard instrument profile and recovered from a series of unusual attitudes both with and without a secondary task. Results from all aspects of the assessment proved the benefits of the new display. Not only was there evidence of enhanced flight control, but also an improved performance on a secondary task (auditory tone identification), and reduced control input errors. Evidence from analysis of the secondary task scores showed that cognitive workload was reduced when using the novel display compared to the standard instruments. The display should be further developed to make it possible to utilize it in a head-up display or other night vision device. It should also be developed to include the capability to display hover information and an instrument landing system. Future testing should be carried out in real flight.

DE- *Attack helicopters; *Human factors engineering; *Flight simulators; *Physiological disorientation; Flight testing; Spatial distribution; Attitude control systems; Performance tests; Performance(Human); Pilots ; Liquid crystal display systems; Man machine systems; Flight maneuvers ; Workload; Aviation safety; Perception(Psychology); Instrument panels; Positioning reactions; Motor reactions

ID- Uh-60 aircraft; NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2004681

AA- <NTIS> AD-A322 522/4

TI- Effects of Heat Stress and an Encumbered Aviator Uniform on Flight Performance in a UH-60 Helicopter Simulator

AU- Reardon, M. J. ; Smythe, N. ; Omer, J. ; Helms, B. ; Estrada, A.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; 404578

RN- USAARL-97-12

CN- 3M162787A879

PY- Feb 97

PG- 134p

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LA- English

PC- PC A08/MF A02

JA- GRAI9715

CP- United States

AB- The effects on flight performance of the four combinations of an unencumbered level-zero MOPP0 aviator battle dress uniform and encumbered MOPP4 over ABDU flight ensemble in cool and hot UH-60 simulator cockpit conditions were evaluated. This report describes the flight performance results. Every 30 minutes, the right seat pilot encountered instrument meteorological conditions and ascended to 2000 feet to perform a 10-minute set of standard maneuvers. After each iteration of the set of standard maneuvers, the pilot returned to nap-of-the-earth (NOE) and contour flight between control points. The right seat pilot also performed four 1-minute hovers (HOVs) and hover turns (HOVTs). The simulator's data acquisition system captured relevant combinations of airspeed, altitude, turn and climb rates, trim, and roll for each type of flight maneuver, as well as cyclic and collective inputs during HOV and HOVT. The encumbered MOPP4 uniform was associated with reduced averaged composite scores (ACS) for five of eight maneuvers. ACS values were significantly lower for 5 of 29 separately scored flight systems parameters. The hot temperature condition reduced the ACS for only one (RSRT) of eight maneuvers. For the iterations of the maneuvers flown with AFOS on, the encumbered MOPP4 ensemble was associated with significantly lower ACS for 3 of 8 maneuvers and 5 of the 29 separately scored flight parameters. With AFCS off, the encumbered MOPP4 uniform significantly degraded the composite ACS for 2 of 4 maneuvers comprising the set of standard maneuvers that were alternately flown with AFCS off and 5 of 17 separately scored flight parameters. The hot temperature was associated with reduced composite ACS values for two of the four flight maneuvers.

DE- *Attack helicopters; *Pilots; *Flight clothing; *Heat stress(Physiology); Flight testing; Flight control systems; Cockpits; Performance tests; Army personnel; Performance(Human); High temperature ; Psychomotor function; Human factors engineering; Flight simulators; Exposure(Physiology); Flight maneuvers; Flight simulation; Army aviation; Reaction(Psychology); Adjustment(Psychology); Endurance(Physiology); Adaptation(Physiology); Heat tolerance

ID- Uh-60 aircraft; Mopp(Mission oriented protective posture); NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 57W (Medicine and Biology--Stress Physiology); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 2002881

AA- <NTIS> AD-A322 052/2

TI- Assessment of Noise Levels in and Around the Sikorsky S-7OA-9 Black Hawk Helicopter
TI- <NOTE> Technical rept
AU- King, R. B. ; Saliba, A. J. ; Creed, D. C. ; Brock, J. R.
CS- Defence Science and Technology Organisation, Canberra (Australia).
CS- <CODE> 057314000; 394805
RN- DSTO-TR-0300; DODA-AR-009-621
PY- Feb 96
PG- 61p
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LA- English
PC- PC A05/MF A01
JA- GRAI9714
CP- Australia
AB- This document reports the results of a comprehensive noise survey of the Sikorsky S-7OA-9 Black Hawk helicopter environment and provides an assessment of the hearing protection devices worn by personnel exposed to this environment. Ambient noise levels were measured in the cabin of the Black Hawk at four positions under various flight conditions and at thirteen positions outside the Black Hawk under various ground running conditions. The attenuation properties of the ALPHA helmet, the Roanwell MX-25O7 Communications Headset and the EAR earplug were also assessed. Results show that these devices do not always provide enough hearing protection to meet current conservation regulations (DIG PERS 19-4), even when worn in combination. Recommendations relating to the use of these hearing protection devices and the maximum Permissible Daily Exposure Duration (PDED) for personnel exposed to the Black Hawk environment are made.
DE- *Helicopters; *Acoustic attenuation; *Ambient noise; *Ear protectors; Noise reduction; Exposure(Physiology); Flight maneuvers; Hearing; Flight helmets; Aircraft noise; Aircraft engine noise; Aircraft cabins; Propeller noise
ID- *Foreign technology; S-70a-9 aircraft; Black hawk aircraft; Sikorsky aircraft; Earplugs; Foreign reports; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 2002449
AA- <NTIS> PB97-151138
TI- In-Flight Measurement of Eye Scanning Characteristics of Helicopter Pilots
AU- Kawahara, H. ; Funahiki, K. ; Wakairo, K. ; Tanaka, K. ; Watanabe, A.
CS- National Aerospace Lab., Tokyo (Japan).
CS- <CODE> 022054000
RN- NAL/TR-1310
PY- Oct 96
PG- 14p
NT- Text in Japanese with English abstracts. Portions of this document are not fully legible.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Japanese
PC- PC A03/MF A01
JA- GRAI9713
CP- Japan
AB- Attempts to study the control behavior of helicopter pilots have been conducted with the aim of providing fundamental information for future cockpit design, establishing procedures and training. A series of in-flight measurements of human visual scanning behavior during various flight phases were carried out: (1) hovering, (2) level light, (3) coordinated turning, and (4) approach and landing. A total of 12 pilots participated in the experiment, each of whom performed 15 repetitions.
DE- *Helicopters; *Pilot performance; *Eye movements; Flight instruments; Visual tasks; Visual perception; Cockpits; Visual fields; Flight tests; Flight simulation; Human factors engineering
ID- *Foreign technology; NTISTFSOLO
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 57W (Medicine and Biology--Stress Physiology)

AZ- 1999944
AA- <NTIS> PB97-857197
TI- Flight Simulator Training. (Latest Citations from the NTIS Bibliographic Database)
TI- <NOTE> Published Search
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.

PY- Mar 97
PG- 50-250 citations
NT- Updated with each order. Supersedes PB96-854724. Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9712
CP- United States
AB- The bibliography contains citations concerning simulation methods and simulators for use in air flight training, with emphasis on military programs. Subjects include fidelity of the simulation, maneuvering, visual fields and perception, flight control, guidance, and motion simulation. The citations explore aircraft, helicopter, and spacecraft simulators used for pilot training and upgrading of skills. References to training concepts and pilot performance are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)
DE- *Bibliographies; *Flight simulators; *Pilot training; *Training simulators; *Flight simulation; Air Force training; Army training; Navy training; Training devices
ID- Published Searches; NTISNTISN; NTISNERACD
SH- 92A* (Behavior and Society--Job Training and Career Development); 51B (Aeronautics and Aerodynamics--Aeronautics); 88E (Library and Information Sciences--Reference Materials)

AZ- 1998262
AA- <NTIS> PB97-856744
TI- Anthropometry. (Latest Citations from the Ei Compendex*Plus Database)
TI- <NOTE> Published Search
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.
PY- Mar 97
PG- 50-250 citations
NT- Updated with each order. Supersedes PB96-853288. Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9711
CP- United States
AB- The bibliography contains citations concerning modeling to predict the anthropometric, biomechanical, and work physiology parameters for age, height, and weight. The human engineering of man/equipment systems is considered. Applications include automobile, truck, and bus seating; military helicopter cockpit layout; office and school furniture, and office workplace layouts. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)
DE- *Bibliographies; *Anthropometry; Human factor engineering; Man machine systems
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1996918
AA- <NTIS> AD-A320 271/0
TI- In-Flight Investigation of the Efficacy of Dextroamphetamine for the Sustainment of Helicopter Pilot Performance
TI- <NOTE> Final rept
AU- Caldwell, J. A. ; Caldwell, J. L. ; Lewis, J. A. ; Jones, H. D. ; Reardon, M. J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-97-05
CN- 3M162787A879; OC
PY- Dec 96
PG- 66p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9711
CP- United States

AB- Current battlefield doctrine indicates that Army aviators must be prepared to engage in sustained operations against enemy forces. Fighting around the clock creates a tactical advantage because of the continuous strain that is placed upon enemy forces. However, this strategy can backfire if there are insufficient U.S. personnel to adequately staff the day and night shifts with well-rested crews. Fatigue produces slow and inaccurate performance, errors of omission, and deteriorations in mood and motivation. In some situations where adequate sleep is not possible, the administration of stimulants is the only effective countermeasure for sleep loss. This study was conducted to determine the efficacy of prophylactic Dexedrine administration for maintenance flight performance in sleep deprived helicopter pilots. Ten UH-60 pilots were exposed to two 40-hour periods of continuous wakefulness in 1 week of testing. During both periods, subjects completed flight in a specially-instrumented UH-60 helicopter, as well as electroencephalographic, cognitive, and mood tests. During one of the deprivation periods, the subjects were administered a 10-mg dose of Dexedrine.
DE- *Stimulation(Physiology); *Pilots; *Sleep deprivation; *Flight maneuvers; *Electroencephalography; Military forces(Foreign); Army personnel; Performance(Human); Battlefields; Helicopters; Shifting; Inflight; Night; Stimuli; Motivation; Doctrine; Deprivation; Amphetamines
ID- *Dextroamphetamine; Flight performance; Uh-60 aircraft; H-60 aircraft; NTISDODXA
SH- 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology); 57W (Medicine and Biology--Stress Physiology); 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry)

AZ- 1996839
AA- <NTIS> AD-A320 166/2
TI- Physiological and Psychological Effects of Thermally Stressful UH-6O Simulator Cockpit Conditions on Aviators Wearing Standard and Encumbered Flight Uniforms
TI- <NOTE> Final rept
AU- Reardon, M. J. ; Smythe, N. ; Omer, J. ; Helms, B. ; Hager, J. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-97-06
CN- 3M162787A879; OD
PY- Dec 96
PG- 116p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9711
CP- United States
AB- This study evaluated the effects of the four combinations of unencumbered MOPPO aviator battle dress uniform (ABDU) and encumbered MOPP4 over ABDU flight ensembles in cool (70 degrees F, 50 percent relative humidity (RH)) and hot (100 degrees F, 50 percent RH) UH-60 cockpit conditions. This report describes the physiological and psychological responses. The most striking, operationally relevant result was that none of the crews in the encumbered MOPP4 hot condition were able to complete the first two 2-hour sorties movements. The results of this evaluation suggest that future rotary-wing aviator flight uniform components should be designed to be lighter weight and allow greater evaporation of sweat. Methods should be sought to improve fit and comfort, particularly for the mask and helmet combination, as well as prevent pressure discomfort over the back due to the life raft. The 11.7 lb ballistic protective plate also should be lighter weight and reduced in thickness. Forced dry air microclimate cooling into the ensemble should be considered for reducing heat accumulation in the encumbered MOPP4 aviator ensemble by enhancing evaporative cooling and thereby increasing endurance times during hot weather operations.
DE- *Stress(Psychology); *Helicopters; *Heat stress(Physiology); Nuclear warfare; Army research; Cockpits; Flight training; Performance tests; Army personnel; Performance(Human); Pilots; Ventilation; Human factors engineering; Biological warfare; Chemical warfare; Tables(Data); Hot weather; Flight simulators; Response(Biology); Flight simulation; Humidity; Greenhouse effect; Flight helmets; Uniforms; Reaction(Psychology); Adjustment(Psychology); Wet bulb temperature; Body temperature; Perspiration; Endurance(Physiology); Heat acclimatization
ID- Mopp(Mission oriented protective posture); Uh-60 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92B (Behavior and Society--Psychology); 57T (Medicine and Biology--Psychiatry); 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1993388

AA- <NTIS> AD-B095 681/3
TI- Data Presentation from Air-to-Air Combat Maneuvering between an S-76 and a UH-60A
TI- <NOTE> Technical rept
AU- Wolfrom, J. A. ; Fisher, C. E.
CS- Army Aviation Systems Command, St. Louis, MO.
CS- <CODE> 027529000; 404318
RN- USAAVSCOM-TR-85-D-17
PY- Sep 85
PG- 124p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9709
CP- United States
AB- This report presents data measured during one-on-one air-to-air maneuvering tests involving Army UH-60A and Sikorsky S-76 helicompters. The engagements included preplanned manuevering engagements as well as unstructured engagements in which both helicopters were maneuvered agressively to gain a tactical advantage. The test program was conducted during July 1983 a the Naval Air Test Center, Patuxent River, Maryland, and included the OH-58A in addition to the two helicopters mentioned above. This report contains data only on the S-76 and UH-60A; data from the OH-58A has been published in two separate reports. The data for each helicopter are presented in the form of time histories of the various parameters of the various parameters as measured during the maneuvers. The parameters for which data are presented include aircraft position in space, pitch, roll, and sideslip attitueds; pitch, roll, and yaw rates; control positions; load factor; airspeed; rotor speed; altitude; and engine torque. In addition to the tie histories, several of the parameters are cross-plotted using time as the associating variable. These cross-plots permit a ready assessment of the flight envelope utilized by each helicopter during the air combat maneuvering. Originator-supplied keywords: Maneuverability; Agility; Air-to-Air combat; Manuevers; Flight testing; and Data acquisition and instrumentation.
DE- *Flight maneuvers; *Aerial warfare; *Helicopters; Aircraft; Airspeed; Data acquisition; Engines; Flight envelope; Flight testing; History; Loads(Forces); Maneuverability; Position(Location); Rates; Rotors; Sideslip; Time; Torque; Yaw; Instrumentation; Army aircraft
ID- Uh-60a aircraft; H-60 aircraft; S-76 aircraft; NTISDODXA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1993368
AA- <NTIS> AD-A319 150/9
TI- RAH-66 Comanche Health Hazard and Performance Issues for the Helmet Integrated Display and Sighting System
TI- <NOTE> Final rept
AU- Rash, C. E. ; Mozo, B. T. ; McEntire, B. J. ; Licina, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-97-1
CN- 3M162787A879
PY- Nov 96
PG- 48p
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LA- English
PC- PC A04/MF A01
JA- GRAI9709
CP- United States
AB- The helmet integrated and display sighting system (HIDSS) is a combination of a protective helmet, helmet mounted display (HMD), and helmet mounted sighting system. It is planned for use in the Army's next generation reconnaissance/attack helicopter, the RAH-66 Comanche. In 1986 and 1988, USAARL developed and published guidelines for addressing potential health hazard issues with the HIDSS. The most recent version of these guidelines was USAARL LR 88-4-21-1O, 'Revision for the health hazard issues in the MIDSS.' This paper is a further revision of these issues. In addition to recommendations provided for performance in the areas of biodynamics, optics/vision, and acoustics, a number of safety and training issues are discussed.
DE- *Attack helicopters; *Aircraft equipment; *Helmet mounted displays; Optics; Integrated systems; Hazards; Health; Safety; Acoustics; Protective clothing; Reconnaissance aircraft; Flight helmets; Biodynamics
ID- *Health hazards; Rah-66 aircraft; Hidss(Helmet integrated and display sighting system); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 49E

(Electrotechnology--Optoelectronic Devices and Systems); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1993020
AA- <NTIS> PB97-854525
TI- Head Up Displays. (Latest Citations from the Aerospace Database)
TI- <NOTE> Published Search
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.
PY- Jan 97
PG- 50-250 citations
NT- Updated with each order. Supersedes PB96-859111. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
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LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9708
CP- United States
AB- The bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)
DE- *Bibliographies; *Display devices; Avionics
ID- *Head up displays; Published Searches; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A* (Behavior and Society--Job Training and Career Development); 88E (Library and Information Sciences--Reference Materials)

AZ- 1991127
AA- <NTIS> PB97-853998
TI- Military Helicopters. (Latest Citations from the Ei Compendex*Plus Database)
TI- <NOTE> Published Search
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.
PY- Dec 96
PG- 50-250 citations
NT- Updated with each order. Supersedes PB96-856562. Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9707
CP- United States
AB- The bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 51C* (Aeronautics and Aerodynamics--Aircraft); 74E* (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1987798
AA- <NTIS> AD-A316 875/4
TI- Instrumentation for Investigating Precursors to High Reynolds Number Unsteady Flow Separation on Pitching Airfoils
TI- <NOTE> Final rept. 15 Jul 94-14 Jul 95
AU- Sinha, S. K. ; Pal, D. ; Banerjee, D. ; Pandey, M. ; Baker, C.
CS- Mississippi Univ., University.

CS- <CODE> 008124000; 234450
RN- ARO/FRI/996; ARO-32404.1-EG-DPS
CN- DAAH04-93-G-0451
PY- 10 Sep 96
PG- 50p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9706
CP- United States
AB- A pitching airfoil test facility has been developed to enable investigating the unsteady flow separation process on helicopter rotor blades under flow conditions which replicate the viscous-inviscid interactions. The facility is capable of operating at chord based Reynolds numbers of 106 and reduced frequencies of 0.23 while maintaining the Mach number below 0.15. A multi-element compliant wall sensor has been developed to measure pressure fluctuations just preceding the emption of the boundary layer. Following successful implementation on cylinders and non-pitching airfoils, this transducer has been used to detect the propagation of wall pressure fluctuations in the neighborhood of the separation point. Preliminary data obtained by sampling simultaneously the data from eight transducer strips has revealed patterns characteristic to the boundary layer emption process.

DE- *Precursors; *Airfoils; *Unsteady flow; *Flow separation; *Reynolds number; Measurement; Pitch(Motion); Detectors; Interactions; Boundary layer; Helicopter rotors; Rotor blades(Rotary wings); Variations; Sampling; Pressure; Walls; Separation; Transducers; Flow; Inviscid flow ; Viscous flow; Test facilities; Variable pressure; Compliant walls
ID- NTISDODXA; NTISDODA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1983427
AA- <NTIS> N96-30233/6
TI- Measurement of Human Pilot Dynamic Characteristics in Flight Simulation
TI- <NOTE> M.S. Thesis, Final Report
AU- Reedy, J. T.
CS- California Univ., Davis.
CS- <CODE> 004365000; CC907079
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:201099; NASA-CR-201099
CN- NCC2-241
PY- 1 Jan 87
PG- 95p
NT- N96-30233 is the same as N19960034389 microfiche number.
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LA- English
PC- PC A06/MF A01
JA- GRAI9703; STAR3411
CP- United States
AB- Fast Fourier Transform (FFT) and Least Square Error (LSE) estimation techniques were applied to the problem of identifying pilot-vehicle dynamic characteristics in flight simulation. A brief investigation of the effects of noise, input bandwidth and system delay upon the FFT and LSE techniques was undertaken using synthetic data. Data from a piloted simulation conducted at NASA Ames Research Center was then analyzed. The simulation was performed in the NASA Ames Research Center Variable Stability CH-47B helicopter operating in fixed-basis simulator mode. The piloting task consisted of maintaining the simulated vehicle over a moving hover pad whose motion was described by a random-appearing sum of sinusoids. The two test subjects used a head-down, color cathode ray tube (CRT) display for guidance and control information. Test configurations differed in the number of axes being controlled by the pilot (longitudinal only versus longitudinal and lateral), and in the presence or absence of an important display indicator called an 'acceleration ball'. A number of different pilot-vehicle transfer functions were measured, and where appropriate, qualitatively compared with theoretical pilot- vehicle models. Some indirect evidence suggesting pursuit behavior on the part of the test subjects is discussed.
DE- *Fast fourier transformations; *Flight simulation; *Least squares method; *Pilot performance; Bandwidth; Cathode ray tubes; Ch-47 helicopter; Computer graphics; Dynamic characteristics; Error analysis; Hovering
ID- NTISNASA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1982417
AA- <NTIS> AD-A314 349/2
TI- Superimposing Instrument Symbology on a Night Vision Goggle Display During Simulated Contour Flight
TI- <NOTE> Final rept. Feb 92-Jan 93
AU- Morey, J. C. ; Simon, R. A. ; Leedom, D. K.
CS- Dynamics Research Corp., Wilmington, MA.
CS- <CODE> 062809000; 388902
RN- E-21748U; ARI-CR-96-03
CN- MDA903-92-D-0025
PY- Jan 96
PG- 101p
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LA- English
PC- PC A07/MF A02
JA- GRAI9703
CP- United States
AB- This experiment examined the effect of superimposing helmet-mounted display (HMD) flight information symbology on the aviator night vision goggle (ANVIS). Twenty-five rated helicopter pilots with no previous HMD experience were assigned to either an ANVIS-HMD group or a goggles-only group (ANVIS-only). All pilots flew familiarization flights and an hour-long reconnaissance mission on the Simulator Training Research Advanced Testbed for Aviation (STRATA), a high fidelity simulator. HMD symbology and the night vision goggle effects were integrated into the out-the-window images. Performance of the ANVIS-HMD group was comparable to that of the ANVIS-only group with respect to maintaining airspeed and altitude, detecting targets, detecting wire obstacles, and landing in a confined area. Although ANVIS-HMD users' visual activity was in the horizon area of the field of view 85% of the time (compared to 63% for the ANVIS-only group), they did not scan more effectively. No evidence of cognitive capture on the symbology was found. pilot experience level and handedness were not associated with flight performance or target detections but eye dominance was.
DE- *Night vision devices; *Aviation goggles; Wire; Cognition; Pilots; Display systems; Helicopters; Barriers; Airspeed; Instrumentation; Eye; Symbols; Target detection; Flight simulation; Helmet mounted displays; Horizon; Contours; Confined environments
ID- NTISDODXA; NTISDODA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1980701
AA- <NTIS> AD-A313 890/6
TI- AASERT Annual Progress Report for Grant N00014 93-I-0723 (Center for Neural Engineering, Tennessee State University)
TI- <NOTE> Annual progress report, 1 Jun 95-30 May 96
AU- Malkani, M. J.
CS- Tennessee State Univ., Nashville.
CS- <CODE> 035265000; 394999
CN- N00014-93-1-0723
PY- Jul 96
PG- 6p
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LA- English
PC- PC A02/MF A01
JA- GRAI9702
CP- United States
AB- Four graduate students and one undergraduate student conducted research in the Center for Neural Engineering in the following areas: (1) developing frequency dependent oscillatory neural network architecture for spatial information processing. (2) long term potentiation learning rule as applied to spatial navigation. (3) design and build a servo joint-based robotic arm. (4) design of a neural controller for the control of inverted pendulum and (5) design of intelligent flight control system for helicopter roll-axis. One undergraduate and one graduate student graduate as a result of this award.
DE- *Neural nets; *Research management; *Information processing; Spatial distribution; Robotics; Flight control systems; Students; Engineering; Navigation; Nervous system; Artificial intelligence; Inversion; Tennessee; Pendulums
ID- *Neural engineering; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 41P (Manufacturing Technology--Research Program Administration and Technology Transfer); 70B (Administration and Management--Management Practice); 62GE (Computers, Control, and Information Theory--General)

AZ- 1980700
AA- <NTIS> AD-A313 889/8
TI- Center for Neural Engineering at Tennessee State University
TI- <NOTE> Annual rept. no. 4, 15 May 95-14 May 96
AU- Malkani, M. J. ; Bodruzzamen, M. ; Kuschewski, J. ; Yuer, G. ; Zein-Sabalto, S.
CS- Tennessee State Univ., Nashville.
CS- <CODE> 035265000; 394999
CN- N00014-J-92-J-1372
PY- Jul 96
PG- 68p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9702
CP- United States
AB- This Fourth annual Report provides an overview of the research activities in the Center for Neural Engineering (CNE) comprising consortium partners: Tennessee State University (TSU), Caltech, Meharry Medical College (MMC), North East Ohio Universities College of Medicine (NEOUCOM), Oak Ridge National Laboratior (ORNL), and the University of Southwest Louisiana (USL). MMC and EOUCOM provided the experimental data. A team of eight (8) researchers along with (5) undergraduate students and twelve (12) graduate students conducted research at the Center. The CNE also supported a Ph.D student at NEOUCOM. CNE conducted research in various aspects of neural computation and applied these techniques to dynamic control aircraft, (helicopter), signal classification (image processing), spatial navigation (mobile robot) medical diagnosis and oscillatory hippocampal network (spatial information processing). The research led to the completion of three Masters Theses and three senior projects; one book chapter, four referenced chapters, six non-referenced conference papers and three new grants in the areas of communication, condition based maintenance and data acquisition system for medical diagnosis.
DE- *Neural nets; *Research facilities; *Artificial intelligence; *Universities; *Consortiums; Maintenance; Signal processing; Image processing; Spatial distribution; Experimental data; Computations; Aircraft; Dynamics; Robots; Diagnosis(Medicine); Medicine; Engineering; Helicopters; Navigation; Mobile; Classification; Data acquisition; Nervous system; Communication and radio systems; Tennessee; Oscillation ; Books; Hippocampus; Grants
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 41P (Manufacturing Technology--Research Program Administration and Technology Transfer); 70B (Administration and Management--Management Practice); 62GE (Computers, Control, and Information Theory--General)

AZ- 1978978
AA- <NTIS> DE96060084
TI- Application of UAVs at the Savannah River Site
AU- Hofstetter, K. J. ; Pendergast, M. M.
CS- Westinghouse Savannah River Co., Aiken, SC.
CS- <CODE> 094916000; 9525316
SP- Department of Energy, Washington, DC.
RN- WSRC-MS-96-0319; CONF-9607137-1
CN- AC09-89SR18035
PY- 1996
PG- 16p
NT- Association for unmanned vehicle systems, Orlando, FL (United States), 15-19 Jul 1996. Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9701; ERA9650
CP- United States
AB- Small, unmanned aerial vehicles (UAVs) equipped with sensors for physical, chemical, and radiochemical measurements of remote environments have been tested at the Savannah River Site (SRS). A miniature helicopter was used as an aerial platform for testing a variety of sensors with outputs integrated with the flight control system for real-time data acquisition and evaluation. The sensors included a precision magnetometer, two broad band infra-red radiometers, a 1-inch by 1-inch NaI(Tl) scintillation detector, and an on-board color video camera. Included in the avionics package was an ultrasonic altimeter, a precision barometer, and a portable Global Positioning System. Two separate demonstration locations at SRS were flown that had been previously characterized by careful sampling and analyses and by aerial surveys at high altitudes. The Steed Pond

demonstration site contains elevated levels of uranium in the soil and pond silt due to runoff from one of the site's uranium fuel and target production areas. The soil at the other site is contaminated with oil bearing materials and contains some buried objects. The results and limitations of the UAV surveys are presented and improvements for future measurements are discussed.
DE- *Aerial Surveying; *Remote Sensing; Magnetometers; Radiation Monitoring ; Savannah River Plant; Vehicles; Meetings
ID- EDB/440100; EDB/540250; NTISDE
SH- 68GE (Environmental Pollution and Control--General); 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 1975663
AA- <NTIS> AD-A311 400/6
TI- Assessment Methodology for Integrated Helmet and Display Systems in Rotary-Wing Aircraft
TI- <NOTE> Final rept
AU- Rash, C. E. ; Mozo, B. T. ; McLean, W. E. ; McEntire, B. J. ; Haley, J. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAAARL-96-1
PY- Apr 96
PG- 242p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A03
JA- GRAI9624
CP- United States
AB- The U.S. Army is moving towards a trend of using helmet mounted displays in all rotary-wing aircraft, integrated systems consisting of the basic helmet, an optical display, eye protection, and a head tracker. This report provides a comprehensive methodology for testing all aspects of such integrated helmet and display systems. The assessment methodology encompasses both laboratory and in-flight evaluations. The major evaluation areas for the laboratory assessment are optical/visual, biodynamic, and acoustical. The in-flight evaluation assesses flight performance and logistical supportability. In addition, human factors and safety issues are addressed.
DE- *Helmet mounted displays; Test and evaluation; Methodology; Optical equipment; Laboratory tests; Integrated systems; Human factors engineering; Display systems; Inflight; Protection; Rotary wing aircraft
ID- NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1975614
AA- <NTIS> AD-A311 339/6
TI- Helicopter Gross Weight Determination from Monitored Parameters
TI- <NOTE> Final rept. Feb 85-May 86
AU- Moffatt, J. G.
CS- Aviation and Troop Command (Army), Fort Eustis, VA.
CS- <CODE> 112644000; 427797
RN- USAATCOM-TR-96-D-5
PY- May 96
PG- 29p
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9624
CP- United States
AB- When monitoring helicopter components knowledge of the gross weight an aircraft is operating at is required to differentiate damaging from non-damaging flight conditions. Several attempts have been made at estimating helicopter gross weight using aircraft-mounted instrumentation that have proven inaccurate and costly due to instrumentation and calibration needs. A simple algorithm which requires only engine torgue, hover height, pressure altitude and ambient temperature parameters to estimate gross weight has been developed. The algorithm is based on the UH-IH hover performance chart found in the operators user manual. Results of this effort indicate the algorithm can be used to determine the gross weight range (low, medium, high) while in a hover condition.
DE- *Helicopters; *Weight; Algorithms; User manuals; Temperature; Aircraft; Monitoring; Aircraft engines; Parameters; Flight; Pressure; Calibration ; Range(Extremes); Operators(Personnel); Altitude; Determination; Height; Torque; Hovering
ID- *Gross weight; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1972361
AA- <NTIS> N96-27964/1
TI- Flight Evaluation of Advanced Controls and Displays for Transition and Landing on the NASA V/STOL Systems Research Aircraft
AU- Franklin, J. A. ; Stortz, M. W. ; Borchers, P. F. ; Moralez, E.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.60:3607; A-961333; NASA-TP-3607
PY- 1 Apr 96
PG- 124p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07
JA- GRAI9622; STAR3410
CP- United States
AB- Flight experiments were conducted on Ames Research Center's V/STOL Systems Research Aircraft (VSRA) to assess the influence of advanced control modes and head-up displays (HUD's) on flying qualities for precision approach and landing operations. Evaluations were made for decelerating approaches to hover followed by a vertical landing and for slow landings for four control/display mode combinations: the basic YAV-8B stability augmentation system; attitude command for pitch, roll, and yaw; flightpath/acceleration command with translational rate command in the hover; and height-rate damping with translational-rate command. Head-up displays used in conjunction with these control modes provided flightpath tracking/pursuit guidance and deceleration commands for the decelerating approach and a mixed horizontal and vertical presentation for precision hover and landing. Flying qualities were established and control usage and bandwidth were documented for candidate control modes and displays for the approach and vertical landing. Minimally satisfactory bandwidths were determined for the translational-rate command system. Test pilot and engineer teams from the Naval Air Warfare Center, the Boeing Military Airplane Group, Lockheed Martin, McDonnell Douglas Aerospace, Northrop Grumman, Rolls-Royce, and the British Defense Research Agency participated in the program along with NASA research pilots from the Ames and Lewis Research Centers. The results, in conjunction with related ground-based simulation data, indicate that the flightpath/longitudinal acceleration command response type in conjunction with pursuit tracking and deceleration guidance on the HUD would be essential for operation to instrument minimums significantly lower than the minimums for the AV-8B. It would also be a superior mode for performing slow landings where precise control to an austere landing area such as a narrow road is demanded. The translational-rate command system would reduce pilot workload for demanding vertical landing tasks aboard ship and in confined land-based sites.
DE- *Aircraft control; *Flight control; *Flight tests; *Head-up displays; *Research aircraft; *V/stol aircraft; *Vertical landing; Approach indicators; Control stability; Deceleration; Flight characteristics; Flight paths; Flight simulation; Hovering; Pilot performance; Pursuit tracking; Roll; Stability augmentation; Workloads (Psychophysiology); Yaw
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1972353
AA- <NTIS> N96-27869/2
TI- L'Efficacite Operationnelle du Poste de Pilotage en Verre (Flight Vehicle Integration Panel Working Group 21 on Glass Cockpit Operational Effectiveness)
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; AD455458
SP- National Aeronautics and Space Administration, Washington, DC.
RN- AGARD-AR-349; ISBN 92-836-1034-2
PY- 1 Apr 96
PG- 192p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10
JA- GRAI9622; STAR3410
CP- Other
AB- The members of AGARD FMP Working Group 21, representing aircraft manufacturers, research institutions and operational organizations, met over a two year period, 1993-1995 to address the following objective: Summarize the status of current cockpits, highlight their benefits and weaknesses, and provide guidance for future cockpit design. This report, the result of those meetings, is structured around the series

of questions listed below: (1) What are the pilot and crew required to do to complete a mission successfully; (2a) What do the current glass cockpits consist of; (2b) What are some of the technological highlights and trends of these cockpits; (3) What new technologies are becoming available; (4) How can we tailor the cockpit to be the most suitable for the human operator; (5) How can and how does the use of glass cockpits change the required aircrew training process; (6) What are the key problem issues with the current design process and what suggestions can be made to improve it and; (7) What are the cockpit concepts being considered to improve the operational effectiveness of future aircraft. With consideration of the human factors issues in design as a major basis for this report, this document provides an in depth discussion of the cockpit of today's aircraft and can serve as a foundation upon which to develop a more optimized pilot-vehicle-system interface of tomorrow.
DE- *Cockpits; *Fighter aircraft; *Helicopters; *Human factors engineering; *Man machine systems; Display devices; Flight crews; Helmet mounted displays; Pilots (Personnel); System effectiveness
ID- *Foreign technology; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1966496
AA- <NTIS> AD-A309 577/5
TI- Test and Evaluation of the Spectrum Aeromed, Spectrum 500-LP (Military Version) Model 2500-US
TI- <NOTE> Final technical rept. for Mar 95
AU- Blake, B. O.
CS- Armstrong Lab., Brooks AFB, TX. Crew Systems Directorate.
CS- <CODE> 101379005; 427396
RN- AL/CF-TR-1996-0053
CN- 7184; 56
PY- May 96
PG- 18p
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9621
CP- United States
AB- The Spectrum is a fully modular, quick change air ambulance life support system used in both fixed and rotary wing aircraft. The unit provides 115VAC/60 Hz electrical power, medical air and oxygen, and vacuum. The Spectrums evaluation came at the request of Brig Gen P.K. Carlton, HQ AETC/SG to expand the role of C-21 Learjets involvment in aeromedical evacuation. Aeromedical Research staff members within the Systems Research Branch, considers the unit conditionally acceptable for use in the aeromedical evacuation environment providing all modifications to the unit have been met.
DE- *Transport aircraft; *Life support systems; *Medical equipment; *Rotary wing aircraft; *Aeromedical evacuation; Environments; Oxygen; Medicine; Tanker aircraft; Electromagnetic interference; Systems analysis; Medical research; Fixed wing aircraft; Electrical equipment; Aviation medicine; Ambulances
ID- C-21 aircraft; Electrical power; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57U (Medicine and Biology--Public Health and Industrial Medicine); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1965776
AA- <NTIS> N96-26302/5
TI- Transportation Beyond 2000: Technologies Needed for Engineering Design
AU- Huebner, L. D. ; Asbury, S. C. ; Lamar, J. E. ; Mckinley, R. E. ; Scott, R. C.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.55:10184-PT-1; NASA-CP-10184-PT-1
PY- 1 Feb 96
PG- 536p
NT- Hampton, VA, United States, 26-28 Sep. 1995.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A24/MF A04
JA- GRAI9620; STAR3409
CP- United States
AB- No abstract available.
DE- *Conferences; *Electric automobiles; *Research and development; *Research vehicles; *Transport aircraft; *Transportation; Aeronautical

engineering; Commuter aircraft; Cybernetics; Helicopters; Highways; Human factors engineering; Mechanical engineering; Propulsion system configurations; Social factors; Transportation networks
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1964296
AA- <NTIS> AD-A309 175/8
TI- Aviation Life Support Equipment Retrieval Program: Report of Aircraft Mishap 95-4, Involving the HGU-56/P Army Aviation Helmet
TI- <NOTE> Final rept
AU- Voisine, J. J. ; Licina, J. R. ; McEntire, B. J. ; Albano, J. P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-96-22
CN- 3O162787A878; EC
PY- Mar 96
PG- 12p
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9620
CP- United States
AB- In 1972, the U.S. Army Aeromedical Research Laboratory (USAARL) established the Aviation Life Support Equipment Retrieval Program (ALSERP). The purpose of this program is to evaluate the effectiveness of aviation protective equipment in an aircraft accident environment and to contribute to the improvement of this equipment through modification or development of new design criteria. Department of the Army Pamphlet 385-40, Army Accident Investigation and Reporting, requires all life support equipment which is in any way implicated in the cause or prevention of injury be shipped to USAARL for analysis. This report analyzes the first impact damaged HGU-56/P recovered from a recent Army aviation mishap involving an AH-6J helicopter.
DE- *Protective equipment; *Life support systems; *Flight helmets; Army research; Aviation accidents; Wounds and injuries; Aircraft equipment; Design criteria; Prevention; Army aviation; Medical laboratories; Accident investigations
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1963442
AA- <NTIS> AD-A308 280/7
TI- Mounting Human Entities to Control and Interact With Networked Ship Entities in a Virtual Environment
TI- <NOTE> Master's thesis
AU- Stewart, B. C.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Mar 96
PG- 93p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A06/MF A01
JA- GRAI9620
CP- United States
AB- This thesis research addresses the problem of mounting human entities to other non-human entities in the virtual environment. Previous human entities were exercised as individual entities in the virtual environment. Yet there are many applications (i.e. shipboard damage control, amphibious landings, helicopter vertical assaults) where human entities need to mount other vehicles within the virtual environment. The approach taken was to re-engineer the Naval Postgraduate School's Shiphandling Training Simulator (SHIPSIM) and Damage Control Virtual Environment Trainer (DC VET) onto a common virtual environment system (NPSNET). Using a modified potentially visible set algorithm, a ship hydrodynamics model, and a simple data PDU network packet, NPSNET human entities were given the capability to mount ship vehicles. Additionally, a control panel and voice recognition were added to allow the human entities to control and maneuver the ship vehicles in the virtual environment. As a result of this thesis, NPSNET human entities can mount ship vehicles, move about the ship, and interact with the ship's internal objects (i.e doors, valves, etc.) all while the ship moves within the virtual environment. This technology opens a new paradigm for simulation designers, where users of virtual environment

systems can participate as human entities and interact (i.e. mount, control, and maneuver) with other inanimate vehicles as we do in the real world.
DE- *Virtual reality; *Distributed interactive simulation; Data bases; Algorithms; Software engineering; Simulators; Image processing; Computer communications; Real time; Training devices; Ship motion; Theses; High resolution; Human factors engineering; Three dimensional; Shipboard; Speech recognition; Systems analysis; Maneuvers; Data displays; Interactive graphics; Computer networks; Man computer interface; Ship models; Hydrodynamics; Remote control; Naval training; Voice communications; Control panels; Fleet exercises
ID- NTISDODXA
SH- 47A (Ocean Technology and Engineering--Marine Engineering); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 62GE (Computers, Control, and Information Theory--General)

AZ- 1960476
AA- <NTIS> AD-A307 857/3
TI- Spatial Disorientation: A Survey of U.S. Army Rotary-Wing Aircrew
TI- <NOTE> Final rept
AU- Durnford, S. J. ; DeRoche, S. L. ; Harper, J. P. ; Trudeau, L. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-96-16
CN- 3M162787A879; OA
PY- Mar 96
PG- 106p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9619
CP- United States
AB- A survey of 299 aircrew in current flying' practice was performed at five U.S. Army airfields within CONUS. Respondents were asked a number of questions about their worst ever episode of spatial disorientation (SD) and their worst episode in the 4 months prior to the survey. They also were asked to classify episodes as minor, significant, or severe according to the threat to flight safety. Opinions also were sought on various aircraft types and flight conditions. In the final part of the questionnaire, they were asked about their experience of break-off and giant hand phenomena. Analysis of the data showed that 78 percent had suffered SD during their flying career (8 percent had suffered severely enough to put flight safety at risk). Twenty-two percent had suffered in the 4 months prior to completing the questionnaire (2 percent severely enough to put flight safety at risk). In 33 percent of worst ever episodes, the event had affected conduct of the mission while flying accuracy had been affected in 64 percent. (The figures for the 4-month data were 35 percent and 68 percent.) Brownout, whiteout, and inadvertent entry to instrument meteorological conditions (IMC) were the most easily identifiable source of severe episodes of SD, but they accounted for 13 percent of the worst ever episodes. The leans accounted for 44 percent of episodes. Few other episodes could be linked to well known problems. Aircrew were not initially aware of being disoriented in 43 percent of worst ever episodes (38 percent of episodes when they were looking out of the aircraft cockpit). Experience had no apparent protective effect against either the incidence or severity of episodes. The following factors did appear to increase the perceived severity of the episode: the respondent having been in command of the aircraft, both pilots being disoriented, poor crew coordination, SD related to an.
DE- *Spatial distribution; *Flight control systems; *Physiological disorientation; Sources; United states; Risk; Cockpits; Flight crews; Threats; Army personnel; Pilots; Terrain; Careers; Meteorology; Protection; Instrumentation; Landing fields; Vision; Aviation safety; Deserts; Linkages; Rotary wing aircraft; Army aircraft; Visual aids; Hands; Whiteout
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 92B (Behavior and Society--Psychology); 57T (Medicine and Biology--Psychiatry); 57A (Medicine and Biology--Anatomy) ; 57S (Medicine and Biology--Physiology)

AZ- 1960258
AA- <NTIS> AD-A307 580/1
TI- Unified Pilot-Induced Oscillation Theory. Volume 1. PIO Analysis with Linear and Nonlinear Effective Vehicle Characteristics, Including Rate Limiting
TI- <NOTE> Final rept. Oct 94-Sep 95
AU- Klyde, D. H. ; McCruer, D. T. ; Myers, T. T.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; 340425

RN- TR-1313-1; WL-TR-96-3028
CN- F33615-94-C-3613; 2403; 05
PY- Dec 95
PG- 300p
NT- ADA307581.
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A03
JA- GRAI9619
CP- United States
AB- This work was conducted as part of a USAF initiative to develop a comprehensive theory to predict pilot-induced oscillation (PIO) tendencies due to the combined effect of all influencing elements. A PIO is a very complicated phenomenon stemming from a dynamic interaction between the pilot and the aircraft. When tight control is required from the pilot, an undesired oscillation can result. However, the adaptive nature of the human pilot makes such oscillations difficult to predict. The independent research of STI included: compilation of available PIO time histories and references as an initial step toward a comprehensive PIO database; refinement of the proposed PIO categories defined in NASA CR-4683; development of PIO theories based on these categories; development of methods to handle the higher frequency and nonlinear aspects of PIO analysis with an emphasis on rate limiting; and a review of existing and proposed linear PIO criteria.
DE- *Aerodynamic stability; *Human factors engineering; Data bases; Aerodynamic configurations; Mathematical models; Computerized simulation; Linear systems; Flight testing; Fighter aircraft; Position(Location); Pitch(Motion); Flight control systems; Dynamic response; Pilots; Case studies; Helicopters; Mathematical prediction; Approximation(Mathematics); Systems analysis; Nonlinear analysis; Man machine systems; Flight maneuvers; Oscillation; Frequency response; Closed loop systems; Attitude(Inclination)
ID- Pio(Pilot induced oscillations); Yf-12 aircraft; NTISDODXA; NTISDODAF
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1960033
AA- <NTIS> AD-A307 308/7
TI- Military and Government Applications of Human-Machine Communication by Voice
AU- Weinstein, C. J.
CS- Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
CS- <CODE> 009875001; 207650
RN- MIT-MS-10259; ESC-TR-96-036
CN- F19628-95-C-0002
PY- Oct 95
PG- 7p
NT- Pub. in Proceedings National Academy of Sciences, v92 p10011-10016, Oct 95. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A02/MF A01
JA- GRAI9619
CP- United States
AB- This paper describes a range of opportunities for military and government applications of human machine communication by voice, based on visits and contacts with numerous user organizations in the United States. The applications include some that appear to be feasible by careful integration of current state of the art technology and others that will require a varying mix of advances in speech technology and in integration of the technology into applications environments. Applications that are described include (1) speech recognition and synthesis for mobile command and control; (2) speech processing for a portable multifunction soldier's computer; (3) speech and language-based technology for naval combat team tactical training; (4) speech technology for command and control on a carrier flight deck; (5) control of auxiliary systems, and alert and warning generation, in fighter aircraft and helicopters; and (6) voice check-in, report entry, and communication for law enforcement agents or special forces. A phased approach for transfer of the technology into applications is advocated, where integration of applications systems is pursued in parallel with advanced research to meet future needs.
DE- *United States government; *Military applications; *Man machine systems ; *Voice communications; *Communication and radio systems; Portable equipment; Fighter aircraft; Control systems; Technology transfer; Army personnel; State of the art; Synthesis; Computers; Helicopters; Integration; Command and control systems; Aircraft carriers; Communication and radio systems; Speech recognition; Speech; Special forces; Law enforcement; Multipurpose; Warning systems; Flight decks; Reprints

ID- NTISDODXR
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45F (Communication--Verbal); 74GE (Military Sciences--General); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1952371
AA- <NTIS> AD-A304 630/7
TI- Performance Assessment of the HGU-84/P Navy Helicopter Pilot Helmet
TI- <NOTE> Final rept
AU- McEntire, B. J. ; Murphy, B. ; Mozo, B. T.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-96-04
CN- 30162787A878; EA
PY- Jan 96
PG- 23p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9616
CP- United States
AB- The U.S. Army Aviation and Troop Command (ATCOM), Program Manager for Aviation Life Support Equipment (PM-ALSE), funded USAARL to procure and evaluate the Navy HGU-84/P against the U.S. Army HGU-56/P performance requirements. The performance areas evaluated included: impact protection, weight, center of mass, chinstrap strength, shell tear resistance, dynamic retention, and sound attenuation. Only the center of mass requirement was met by the HGU-84/P configuration. None of the other HGU-56/P requirements were fully met. The helmet performed equally as well as the HGU-56/P in the dynamic retention evaluation.
DE- *Flight crews; *Retention(General); *Life support systems; *Helmets; *Flight helmets; Test and evaluation; Requirements; Military personnel; Impact; Cockpits; Dynamics; Resistance; Shells(Structural forms); Aeronautics; Strength(General); Protection; Straps; Acoustic attenuation; Army aviation; Tearing
ID- Helmet; Impact protection; Sound attenuation; Center of mass; Hgu-56/p helmet; Hgu-84/p helmet; NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1952222
AA- <NTIS> AD-A304 416/1
TI- Using Virtual Environments for Terrain Familiarization: Validation
TI- <NOTE> Final rept. Mar-Nov 94
AU- Johnson, D. M. ; Wightman, D. C.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RR-1686
CN- A791; 2211
PY- Nov 95
PG- 70p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9616
CP- United States
AB- Can virtual environment (VE) technology be used to familiarize soldiers with a geospecific location that they have never previously visited: This question was asked in a training validation experiment employing a two-group, preset-posttest design. The domain modeled in the VE was the Hanchey Army Heliport (HAH) located at Fort Rucker. Soldiers in the Hanchey Group explored a virtual model of the HAH, while soldiers in the Control Group explored a virtual model of a section of Arizona. Results showed that the group which explored the virtual Hanchey performed significantly better than the Control Group on all measures of knowledge of HAH. Further, on a transfer test performed at the actual HAH, the Hanchey Group was able to move to unseen locations in a minimum of time with no errors. These results support the proposition that VE technology can be used for terrain familiarization training.
DE- *Army training; *Virtual reality; Simulators; Position(Location); Validation; Performance tests; Training devices; Army personnel; Performance(Human); Army facilities; Human factors engineering; Helicopters; Navigation; Man computer interface; Army operations; Learning; Helmet mounted displays; Terrain models; Heliports; Transfer of training; Distributed interactive simulation
ID- NTISDODXA
SH- 62GE (Computers, Control, and Information Theory--General); 74GE

(Military Sciences--General); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1948104
AA- <NTIS> AD-A303 670/4
TI- Portable Vital Signs Monitor For Field Use
TI- <NOTE> Final rept
AU- Dyck, W. R.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
RN- DCIEM-95-50
PY- Dec 95
PG- 27p
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9614
CP- Canada
AB- It may also appear elsewhere in the body of the document itself. It is highly desirable that the abstract of classified documents be unclassified. Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), (R), or (U). It is not necessary to include here abstracts in both official languages unless the text is bilingual. A Canadian Forces requirement exists for a portable, integrated field system for monitoring the vital signs of patients in the field, under adverse, unconventional conditions. A vital signs monitor capable of monitoring heart rate, body temperature, and blood pressure in the field, is described in this report. The design has taken into account the need for future expansion, and ease in reprogramming the software, to reflect changing priorities with respect to which signs are to be monitored. A helicopter used in casualty evacuation, has been identified as a worst case condition for exposure to ambient noise, and preliminary trials have been successful in monitoring the three vital signs in this scenario. The device has also been used external to a modified chemical warfare casualty bag, to monitor the vital signs of a person sealed therein.
DE- *Monitoring; *Chemical warfare casualties; *Heart rate; *Blood pressure ; *Body temperature; Computer programs; Requirements; Portable equipment; Integrated systems; Military forces(Foreign); Exposure(General); Computer programming; Security; Signs and symptoms; Abstracts; Helicopters; Documents; Classification; Casualties; Patients ; Classified materials; Ambient noise; Evacuation; Bags
ID- *Foreign technology; *Vital signs; Monitor; Portable; Field; Medical; Casualty evacuation; Triage; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1948061
AA- <NTIS> AD-A303 619/1
TI- Exploration of Simulator Sickness in the MH-60G Operational Flight Trainer, An Advanced Wide Field-of-View Helicopter Trainer
TI- <NOTE> Final technical rept. Nov 93-Oct 94
AU- Silverman, D. R. ; Slaughter, R. A.
CS- Dayton Univ., OH. Research Inst.
CS- <CODE> 007431003; 105400
RN- AL/HR-TR-1994-0173
CN- F33615-90-C-0005; 1123; 03
PY- Jun 95
PG- 41p
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LA- English
PC- PC A04/MF A01
JA- GRAI9614
CP- United States
AB- A simulator sickness research effort was undertaken as an important addition to the Qualification Operational Test and Evaluation (QOTE) for the MH/60G Operational Flight Trainer (OFT). The primary impetus for the experiment was the configuration of the device (wide field of view and limited motion) and pilot reports of simulator sickness symptoms during device development. The authors assessed (a) post-flight simulator sickness symptoms, (b)prolonged simulator sickness symptoms, and (c) the effects of simulator sickness on the training provided in the MH/60G OFT. Despite limitations of the experimental design and the small sample size, some interesting trends were found. Post-flight simulator sickness symptoms occurred across all

types of missions, with greater frequency on more visually dependent scenarios. Only two crewmembers did not report any symptoms. Pilots consistently changed control inputs to lessen the effects of simulator sickness symptoms. Finally, the occurrence of prolonged simulator sickness symptoms was comparatively infrequent. The authors concluded that increased attention must be channeled toward simulator sickness to better understand its origins and effects on training.
DE- *Helicopters; *Flight simulators; *Motion sickness; Experimental design ; Pilots; Reports; Motion; Signs and symptoms
ID- *Simulator sickness; Mh-60g aircraft; Mh-60 aircraft; Mission scenarios ; Operational flight trainer; Oft; Post-flight simulator sickness symptoms; Prolonged aftereffects; Qualffication operational test and evaluation; Qote; Simulators; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1947818
AA- <NTIS> AD-A303 353/7
TI- Evaluation for Vibrotactile Systems in Helicopter Hover and EVA Environments
TI- <NOTE> Quarterly rept. 1 Sep-30 Nov 95
AU- Newman, D. J.
CS- Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
CS- <CODE> 001450109; 220003
CN- N00014-95-1-1312
PY- 18 Dec 95
PG- 5p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC A01/MF A01
JA- GRAI9614
CP- United States
AB- The vibrotactile (VT) advanced technology demonstration (ATD) introduces a novel human-machine interface, namely, haptic stimulation through a VT suit to improve military personnel performance. The complete vibrotactile (VT) suit system will include three main components: a sensor package to acquire motion and orientation information, a control computer that will condition and convert the sensor information into output drive signals, and the VT suit for the test pilots. Design solutions for a navigation sensor package to be used in helicopter hover and extravehicular activity (EVA) environments is currently being undertaken. Integrating an Inertial Navigation System (INS) with the Global Positioning System (GPS) has provided numerous benefits, and with the recent advances in Kalman filtering techniques, the number continues to grow. In addition to increased navigation accuracy under dynamic conditions, tracking accuracy has improved, CPU time has decreased and crew workload has decreased. The dual IN/GP system has already proven its strength in a variety of capacities such as helicopter flight path control, flight path management, flight testing and helicopter approach. While research efforts continue to establish a portfolio for this dual system, much of the present attention had been given to reducing the development and acquisition costs.
DE- *Bibliographies; *Helicopters; *Global positioning system; *Inertial navigation; *Extravehicular activity; Test and evaluation; Flight testing; Vibration; Military personnel; Integrated systems; Acquisition ; Flight control systems; Kalman filtering; Tracking; Man machine systems; Flight paths; Hovering; Touch
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 88E (Library and Information Sciences--Reference Materials); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1943901
AA- <NTIS> AD-A302 688/7
TI- Evaluation of Night Vision Goggles (NVG)/Laser Illuminator for Maritime Search and Rescue
TI- <NOTE> Final rept. 17 Oct-4 Nov 94
AU- McClay, T. E. ; Robe, R. Q. ; Raunig, D. L. ; Marsee, R. L.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> 093810000; 413536
RN- USCG-D-36-95
CN- DTCG39-89-C-E10G56
PY- May 95
PG- 88p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road,

Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9612
CP- United States
AB- During the period 17 October to 04 November 1994, an experiment was conducted by the U.S. Coast Guard Research and Development (RD) Center to evaluate the effectiveness of a laser illuminator when conducting nighttime searches using night vision goggles (NVGs) onboard HH-60J helicopters. Two helicopters were used to search for 18- and 21-foot small boats, 6- and 10-person life rafts, and simulated persons-in-the-water (PIWs). One of the HH-60J helicopters was fitted with laser illuminator; the other helicopter was used as the experimental control and did not have a illuminator. Both helicopter crews used NVGs. A total of 202 target detection opportunities were generated for laser illuminated targets (all types) and 620 target detection opportunities for nonlaser-illuminated targets. These two data sets were analyzed to determine if the use of an active illumination device with NVGs exerted a statistically significant influence on target detection probability. Lateral range curves and preliminary sweep width estimates are presented, for evaluation purposes only, when the data were sufficient to support the analysis Human factors data are also presented and discussed. The laser illuminator is very effective in enhancing detection capability of the NVGs for small search and rescue targets. The laser provides the greatest advantage in low ambient light conditions and against targets outfitted with retroreflective tape.
DE- *Night vision devices; *Goggles; *Illuminants; Data bases; Flight crews ; Rescues; Probability; Light; Retroreflectors; Illumination; Targets; Lasers; Human factors engineering; Helicopters; Searching; Tapes; Target detection; Search and rescue; Coast guard research; Laser targets
ID- *Laser illuminants; Nvg(Night vision goggles); NTISDODXA; NTISDOTCG
SH- 63F (Detection and Countermeasures--Optical Detection)

AZ- 1943128
AA- <NTIS> PB96-153945
TI- Effects of Visibility on Helicopter Pilot Performance. Part 2
TI- <NOTE> Technical rept
AU- Funabiki, K. ; Tanaka, K. ; Kawahara, H. ; Wakairo, K. ; Watanabe, A.
CS- National Aerospace Lab., Tokyo (Japan).
CS- <CODE> 022054000
RN- NAL-TR-1272
PY- c1995
PG- 10p
NT- Text in Japanese; summary in English. Portions of this document are not fully legible.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Japanese
PC- PC A02/MF A01
JA- GRAI9611
CP- Japan
AB- A piloted flight simulation aiming at quantifying visibility effect on helicopter piloting was carried out. The flight simulation was conducted in the way of varying the visibility of the visual scene and the stability of the aircraft, respectively, so as to determine a critical value of the stability with which the pilot can barely control the aircraft. Eye fixation points data of the pilots were obtained in each visibility condition. The flight simulation results enabled direct evaluation of visibility effect upon pilot control performance in terms of helicopter stability. Some considerations of effectiveness of stability augmentation system and display systems in low visibility condition are also described in this paper.
DE- *Helicopters; *Visibility; *Pilot performance; *Aircraft control; Display devices; Heads-up displays; Eye movements; Man machine systems; Visual perception; Aircraft stability; Pilot induced oscillation; Flight simulation; Human factors engineering
ID- *Foreign technology; NTISTFSOLO
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1941801
AA- <NTIS> AD-A302 133/4
TI- Perception/Action: An Holistic Approach II
TI- <NOTE> Final rept. 15 Sep 92-14 Sep 95
AU- Flach, J. M.
CS- Wright State Univ., Dayton, OH. Dept. of Psychology.
CS- <CODE> 057589009; 408872
RN- WSU-FR-662238; AFOSR-TR-95-0777
CN- F49620-92-J-0511; 2313; CS
PY- Nov 95
PG- 54p

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LA- English
PC- PC A05/MF A01
JA- GRAI9611
CP- United States
AB- This final report reviews three years of research focused on the coordination of perception and action. Human performance has been evaluated within the framework of a closed-loop system where perception and action are intimately coupled. Four problems have been studied: the control of locomotion, dynamic occlusion, depth perception, and minimally invasive surgery. Studies of the control of locomotion have shown that for control of altitude there was an interaction between the flow structure (splay or depression angle) and the event dynamic (hover or forward flight). Results showed that in hover conditions, depression angle specifies altitude changes most reliably; but in forward flight conditions, splay angle specifies altitude changes most reliably. These results are explained as a function of singal-to-noise ratios within the optical flow field. Initial work to evaluate control of collision is also discussed. The dynamic occlusion task was used to evaluate effects of mode of observation (active versus passive) on performance. This task was chosen because of the ability to control for information differences. Results showed that the observation mode had little effect. Previous research that has shown an advantage for active observers appears to be due to information differences, not to the observation mode. Research on depth perception showed that difference that had previously been found for response mode (walking versus matching) could be attributed to the response frame (egocentric versus exocentric). Subjects were generally accurate (little effects due to foreshortening) when using an egocentric response frame. Finally, preliminary work to evaluate performance in minimally invasive surgery is outlined. This work included field observations of surgery as well as laboratory studies.
DE- *Display systems; *Collisions; *Depression angles; *Space perception; Control; Observers; Optical properties; Laboratory tests; Performance(Human); Two dimensional; Observation; Walking; Flow fields; Response; Frames; Level flight; Altitude; Surgery; Video signals; Perception; Closed loop systems; Hovering; Locomotion
ID- Perception of self motion; Altitude contro; L object recognition; Dynamic occlusion; Passive vs active observers; Minimally invasive surgery; NTISDODXA; NTISDODAF
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1939968
AA- <NTIS> AD-A301 713/4
TI- Restructured Development Test (DT II) of Howitzer, Medium, Towed 155-MM, XM198
AU- Whitcraft, J. S.
CS- Aberdeen Proving Ground, MD.
CS- <CODE> 000013000; 001500
PY- May 75
PG- 232p
NT- Document partially illegible. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- GRAI9610
CP- United States
AB- The howitzer test item is a lightweight (15,000 pounds), towed 155-mm howitzer of split-trail design capable of being airlifted by the CH47C helicopter. It employs a high efficiency muzzle brake and, wherever practical, aluminum is used in the structure. To provide stability when firing, the wheels are raised and the weapon lowered onto a firing base hydraulically with hand pumps. The on-carriage traverse is limited to approximately 400 mils right and left of center. A rapid 6400-mil traverse capability is provided by an additional base plate installed behind the firing base. The cannon is designated the XM199 and is similar in design to the M185 cannon used on the M109A1 self-propelled howitzer. The XM45 recoil mechanism is a hydropneumatic variable dependent type which reduces recoil length at high angle fire. The fire control equipment is an improved version of the standard counter-type equipment designed for the bearing method of lay. Self-illumination is provided by means of radioactive materials.
DE- *Howitzers; Functions; Mobility; High rate; Fatigue life; Weapon systems; Firing tests(Ordnance); Efficiency; Human factors engineering; Variables; Maintainability; Reliability; Helicopters; Aluminum; Wear; Radioactive materials; Guns; Pumps; Fire control systems; Hands; Range safety; Towing; Muzzle brakes
ID- 155-mm howitzers; M-198 howitzers; Ch-47c aircraft; H-47 aircraft; Lpn-usatecom-2-we-200-198-010; NTISDODXA

SH- 79G (Ordnance--Guns)

AZ- 1939538
AA- <NTIS> AD-A301 135/0
TI- Utilization of Visual Ports in U.S. Army Rotary-Wing Aircraft
TI- <NOTE> Final rept
AU- Ivey, R. H. ; Rash, C. E. ; Levine, R. R. ; Wentworth, S. L. ; McGowin, E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-34
CN- 3M162787A879
PY- Aug 95
PG- 193p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A03
JA- GRAI9610
CP- United States
AB- This report documents the location and extent of visual ports (windows) in U.S. Army rotary-wing aircraft and assesses utilization and associated problems. The study was conducted in three parts: First, the visual ports of each aircraft type were documented through visual plots and photography. Second, questionnaire data for 334 aviators and crewmen addressing the use of and problems with each visual port were collected and analyzed. Third, a search of the U.S. Army Safety Center accident database was conducted to identify the frequency of accidents in which impaired vision was a possible factor.
DE- *Windshields; *Rotary wing aircraft; Frequency; Aircraft; Crews; Photography; Vision; Wings; Questionnaires; Plotting; Army aircraft; Transparencies; Accidents; Addressing
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1937305
AA- <NTIS> AD-A301 142/6
TI- Aviator's Night Vision Imaging System HUD: An Analysis of It's Applications to Naval Helicopters
TI- <NOTE> Technical memorandum
AU- Peters, D.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
RN- NAWCADPAX--95-100-TM
PY- 16 Oct 95
PG- 25p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9609
CP- United States
AB- Combat Search and Rescue (CSAR) helicopter pilots routinely utilize Night Vision Goggles to enhance visual capabilities during night operations. The Aviator's Night Vision Imaging System (ANVIS) HUD, recently tested on the HH-60H Seahawk, provides the capability to display critical flight parameters to the pilots via goggle-mounted display units, Thus minimizing head-down time in the cockpit. As more and more Naval helicopter missions diversify to include CSAR and CSAR support, devices which effectively enhance night mission performance should be made available to the mission pilots. This report describes the developmental testing results of the ANVIS HUD system and critically analyzes its advantages and limitations for use in Naval helicopters. In addition, ANVIS HUD symbology is examined from a human factors perspective with recommendations for symbology design and placement. AVIATOR'S NIGHT VISION IMAGING SYSTEM HUD.
DE- *Helicopters; *Night vision devices; *Visual acuity; Military operations; Warfare; Cockpits; Navy; Rescues; Pilots; Human factors engineering; Display systems; Time; Naval aircraft; Flight; Missions; Searching; Night; Aviation goggles; Symbols
ID- Hh-60h aircraft; H-60 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 74F (Military Sciences--Military Intelligence)

AZ- 1937003
AA- <NTIS> AD-A300 705/1
TI- Physical Evaluation of the Integrated Helmet and Display Sighting

System (IHADSS) Helmet Display Unit (HDU)
TI- <NOTE> Final rept
AU- Harding, T. H. ; Beasley, H. H. ; Martin, J. S. ; Rash, C. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-32
PY- 14 Aug 95
PG- 42p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9609
CP- United States
AB- The Helmet Display Unit (HDU) of the Integrated Helmet and Display Sighting System (IHADSS) of the AH-64 Apache helicopter was evaluated to establish baseline data for performance figures-of-merit for comparison of future helmet mounted display designs. Measured parameters included physical and optical eye relief, exit pupil size, and position, field-of-view, luminance range, transmittance and reflectance characteristics, and static and temporal response.
DE- *Optical properties; *Helmet mounted displays; Test and evaluation; Attack helicopters; Integrated systems; Sizes(Dimensions); Physical properties; Transmittance; Base lines; Helicopters; Eye; Reflectance; Exits; Luminance
ID- Ah-64 aircraft; H-64 aircraft; Helmet display unit; Testing and evaluation; Optical performance; NTISDODXA
SH- 57E (Medicine and Biology--Clinical Medicine); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1936944
AA- <NTIS> AD-A300 600/4
TI- Effects of Head Supported Devices on Pilot Performance During Simulated Helicopter Rides
TI- <NOTE> Final rept
AU- Alem, N. M. ; Meyer, M. D. ; Albano, J. P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-37
CN- 30162787A878; EB
PY- Sep 95
PG- 16p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9609
CP- United States
AB- Effects of helmet weight moments on helicopter pilot fatigue and performance during extended missions were evaluated in a study in which 12 volunteer subjects were exposed to random vibrations in 4-hour sessions while wearing various helmet configurations. One of the objectives of the study was to investigate an upper limit criterion of 83 N cm for the weight moment of head-worn devices previously proposed by Butler (1992). In this study, four helmet configurations, having weight moments of 20, 110, 200, and 290 N cm, were tested with each subject. Detection and acquisition of visual targets, a task often performed by AH-64 helicopter pilots, were simulated by requiring the subject to aim a light beam, emanating from a helmet-attached source, at light emitting diodes (LED) which were lit at random. Vigilance of the subject was measured by the duration the LED remained lit before it was turned off by the subject. Analysis of this vigilance data did not reveal a consistent relationship between exposure duration and performance. However, the vigilance data clearly demonstrated pilot performance degraded as the weight moment of the helmet increased, and that acquisition times were shortest for weight moments of about 78 N cm.
DE- *Helicopters; *Helmet mounted displays; *Head up displays; Vibration; Detection; Acquisition; Exposure(General); Performance(Human); Vigilance; Pilots; Light; Moments; Consistency; Limitations; Configurations; Missions; Fatigue(Mechanics); Visual targets; Light emitting diodes; Helmets
ID- Helmet mounted; Helmet mass; NTISDODXA
SH- 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1936174
AA- <NTIS> N96-15994/2
TI- Influence of the Helicopter Environment on Patient Care Capabilities:

Flight Crew Perceptions
CS- Bionetics Corp., Cocoa Beach, FL.
CS- <CODE> 088750000; BO812526
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.15:110607; NASA-TM-110607
PY- 21 Jun 94
PG- 9p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9608; STAR3403
CP- United States
AB- Flight crew perceptions of the effect of the rotary wing environment on patient care capabilities have not been subject to statistical analysis. We hypothesized that flight crew perceived significant difficulties in performing patient care tasks during air medical transport. A survey instrument was distributed to a convenience sample of flight crew members from twenty flight programs. Respondents were asked to compare the difficulty of performing patient care tasks in rotary wing and standard (emergency department or intensive care unit) settings. Demographic data collected on respondents included years of flight experience, flights per month, crew duty position, and primary aircraft in which the respondent worked. Statistical analysis was performed as appropriate using Student's t-test, type 111 sum of squares, and analysis of variance. Alpha was defined as p is less than or equal to .05. Fifty-five percent of programs (90 individuals) responded. All tasks were rated significantly more difficult in the rotary wing environment. Ratings were not significantly correlated with flight experience, duty position, flights per month, or aircraft used. We conclude that the performance of patient care tasks are perceived by air medical flight crew to be significantly more difficult during rotary wing air medical transport than in hospital settings.
DE- *Air transportation; *Emergencies; *Flight crews; *Helicopters; *Patients; Analysis of variance; Hospitals; Statistical analysis
ID- NTISNASA
SH- 84GE (Space Technology--General); 57E (Medicine and Biology--Clinical Medicine)

AZ- 1935124
AA- <NTIS> AD-A300 598/0
TI- Physical Evaluation of the Integrated Helmet and Display Sighting System (IHADSS) Helmet Display Unit (HDU)
TI- <NOTE> Final rept
AU- Harding, T. H. ; Beasley, H. H. ; Martin, J. S. ; Rash, C. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-32
PY- 14 Aug 95
PG- 42p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9608
CP- United States
AB- The Helmet Display Unit (HDU) of the Integrated Helmet and Display Sighting System (IHADSS) of the AH-64 Apache helicopter was evaluated to establish baseline data for performance figures-of-merit for comparison of fliture helmet mounted display designs. Measured parameters included physical and optical eye relief, exit pupil size, and position, field-of-view, luminance range, transmittance and reflectance characteristics, and static and temporal response.
DE- *Optical properties; *Helmet mounted displays; Test and evaluation; Integrated systems; Sizes(Dimensions); Physical properties; Transmittance; Eye; Reflectance; Luminance; Helmets
ID- Ah-64 aircraft; H-64 aircraft; Ihadss(Integrated helmet and display signting system); Hdu(Helmet display unit); NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63F (Detection and Countermeasures--Optical Detection); 51E (Aeronautics and Aerodynamics--Avionics); 74GE (Military Sciences--General)

AZ- 1932017
AA- <NTIS> AD-A299 596/7
TI- Neck and Back Strain Profiles of Rotary-Wing Female Pilots
TI- <NOTE> Annual rept
AU- Hodgdon, J. A.
CS- Naval Health Research Center, San Diego, CA.
CS- <CODE> 055017000; 391642
CN- MIPR-95MM5559

PY- 22 Aug 95
PG- 13p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9607
CP- United States
AB- NHRC has an integrated laboratory and field study to document neck/back fatigue profiles in female military helicopter pilots. Subsequent to a 3-hr flight mission, subjects will undergo initial neck and back strength evaluation using the MedEx. Subsequently, an 8-week neck/back strengthening program will be conducted followed by another neck/back evaluation and 3-hr flight mission. Validation of a repeated jolt impact platform at the U.S. Army Aeromedical Research Laboratory, will also be conducted to ascertain if neck/back muscles fatigue at same rate as in helicopter operations. NHRC has evaluated all equipment and software needed for in-flight monitoring of pilots using portable, miniaturized video/EMG recording systems. Initial analyses of laboratory studies indicate neck strength is greater during rotations to the left. It was observed that lumbar muscle activation is associated with neck fatigue. EMG amplitude asymmetry is evident for both cervical and lumbar paraspinals during extension and flexion suggesting there is uneven strength profiles for neck/back muscles. This asymmetry may be the basis for neck/back fatigue reported by military pilots after prolonged flights. Neck/back strengthening programs may minimize uneven strength profiles and enhance pilot performance in helicopter operations.
DE- *Wounds and injuries; *Rotary wing aircraft; *Spinal column; *Neck(Anatomy); Test and evaluation; Computer programs; Rotary wings; Military personnel; Activation; Laboratory tests; Integrated systems; Army research; Military aircraft; Impact; Validation; Monitoring; Performance(Human); Pilots; Strength(Mechanics); Profiles; Helicopters; Platforms; Strength(General); Inflight; Fatigue; Recording systems; Muscles; Video signals; Females; Medical laboratories; Aviation medicine
ID- Cervical and back exercise; Soft tissue injury; Electromyography; Anthropometry; Spectral analysis; NTISDODXA
SH- 74GE (Military Sciences--General); 57W (Medicine and Biology--Stress Physiology); 57E (Medicine and Biology--Clinical Medicine); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1929983
AA- <NTIS> N96-13604/9
TI- In Flight Research with Instrumented Main and Tail Rotor Blades Using the DRA Bedford Aeromechanics Research Lynx Helicopter
AU- Tarttelin, P. C. ; Martyn, A. W.
CS- Defence Research Agency, Bedford (England).
CS- <CODE> 103705000; DH032220
PY- cAug 95
PG- 12p
NT- In AGARD, Aerodynamics and Aeroacoustics of Rotorcraft 12 p.
LA- English
PC- (Order as N96-13582, PC A21/MF A04)
JA- GRAI9606; STAR3402
CP- United Kingdom
AB- This paper serves to inform the reader about in-flight research at DRA Bedford on the DRA's Aeromechanics Lynx Control and Agility Testbed (ALYCAT) using instrumented main and tail rotor blades. The paper describes the instrumentation, data analysis techniques and flight test programs, with the initial results from recent trials using instrumented main rotor blades on ALYCAT presented for the first time, and results from the earlier trials using an instrumented tail rotor blade presented in more detail.
DE- *Applications programs (Computers); *Blade-vortex interaction; *Data reduction; *Flight control; *Flight tests; *Helicopters; *Pressure distribution; *Pressure sensors; *Rotary wings; *Rotor aerodynamics; *Strain gages; Aeroelasticity; Blade tips; Data bases; Flight simulation; Helicopter tail rotors; Horizontal flight; Hovering; Leading edges; Mathematical models; Trailing edges; Yaw
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1929959
AA- <NTIS> N96-13579/3
TI- Acoustic Flight Tests of Rotorcraft Noise-Abatement Approaches Using Local Differential GPS Guidance
AU- Chen, R. T. N. ; Hindson, W. S. ; Mueller, A. W.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.26:110370; A-950102; NASA-TM-110370; NIPS-95-05299
CN- RTOP 505-59-36

PY- 1 Sep 95
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9606; STAR3402
CP- United States
AB- This paper presents the test design, instrumentation set-up, data acquisition, and the results of an acoustic flight experiment to study how noise due to blade-vortex interaction (BVI) may be alleviated. The flight experiment was conducted using the NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) research helicopter. A Local Differential Global Positioning System (LDGPS) was used for precision navigation and cockpit display guidance. A laser-based rotor state measurement system on board the aircraft was used to measure the main rotor tip-path-plane angle-of-attack. Tests were performed at Crows Landing Airfield in northern California with an array of microphones similar to that used in the standard ICAO/FAA noise certification test. The methodology used in the design of a RASCAL-specific, multi-segment, decelerating approach profile for BVI noise abatement is described, and the flight data pertaining to the flight technical errors and the acoustic data for assessing the noise reduction effectiveness are reported.
DE- *Acoustics; *Blade-vortex interaction; *Flight tests; *Global positioning system; *Helicopter design; *Noise reduction; *Rotary wing aircraft; Acoustic properties; Data acquisition; Noise measurement
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1928217
AA- <NTIS> AD-A299 105/7
TI- Sustaining Female UH-60 Helicopter Pilot Performance with Dexedrine During Sustained Operations: A Simulator Study
TI- <NOTE> Final rept
AU- Caldwell, J. ; Crowley, J. ; Caldwell, L. ; Jones, H. ; Darling, S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-27
CN- 3M162787A879; OB
PY- Jul 95
PG- 69p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9606
CP- United States
AB- The efficacy of Dexedrine for sustaining the performance of six female UH-60 pilots under conditions of moderate sleep deprivation was determined. Each subject was exposed to one week of testing which included 2, 40-hour sleep deprivation periods. During both deprivation periods, there were 5 equally-spaced test sessions, each of which included a UH-60 simulator flight, an electroencephalographic (EEG) evaluation, a test on the Microsoft Flight Simulator, a Profile of Mood States questionnaire, and a cognitive evaluation on the Synthetic Work Battery. These testing sessions began at 0100, 0500, 0900, 1300, and 1700. During one of the deprivation periods, subjects were administered a 10-mg dose of Dexedrine one hour prior to each of the first three sessions (for a total of 30 mgs). During the other deprivation period, subjects were administered placebos. A double-blind administration scheme was used. Vital signs were monitored at regular intervals throughout the study.
DE- *Stimulation(Physiology); *Pilots; *Sleep deprivation; *Flight maneuvers; *Electroencephalography; Test and evaluation; Simulators; Cognition; Helicopters; Flight simulators; Placebos; Deprivation
ID- *Dextroamphetamine; Flight performance; Uh-60 aircraft; H-60 aircraft; NTISDODXA
SH- 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry); 57W (Medicine and Biology--Stress Physiology)

AZ- 1928214
AA- <NTIS> AD-A299 102/4
TI- Novel Aircraft Instrument Display to Minimize the Risks of Spatial Disorientation
TI- <NOTE> Final rept
AU- Durnford, S. J. ; DeRoche, S. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578

RN- USAARL-95-24
CN- 3M162787A879; OA
PY- Jun 95
PG- 42p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9606
CP- United States
AB- A novel instrument display designed to reduce cognitive workload was tested against a standard instrument panel using a helicopter mockup linked to a computer flight simulator. Both pilots and nonpilots were used as subjects and tests involved recovery from unusual aircraft attitudes as well as flight maneuvering instruments. The novel display incorporates heading, speed, roll, and pitch into a single tracking task. Users set the desired heading and the desired speed (and the desired altitude and glide path). The display then guides control movements to achieve and maintain the desired parameters. Results from the unusual attitudes experiment showed significant benefits from the novel display, evident in improved performance on a secondary task (noise identification) and reduced control input errors. Results from the flying portion of the study showed significantly improved performance at the secondary task together with improved speed control when using the new display, although heading control was reduced. Further modifications to the new display have been introduced since these initial experiments, and further testing should be carried out using dynamic displays during unusual attitudes and continual data collection during flight.
DE- *Aircraft; *Pilots; *Human factors engineering; *Rotary wing aircraft; *Physiological disorientation; Computerized simulation; Spatial distribution; Attitudes(Psychology); Cognition; Tracking; Display systems; Identification; Helicopters; Errors; Flight instruments; Noise ; Flight simulators; Flight maneuvers; Workload; Linkages; Speed regulators; Instrument panels; Glide path systems
ID- Spatial disorientation; Rotary-wing; Instruments; Displays; Novel aircraft; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1927589
AA- <NTIS> AD-A259 369/7
TI- Flight Helmets: How They Work and Why You Should Wear One. (Reannouncement with New Availability Information)
TI- <NOTE> Final rept
AU- Crowley, J. S. ; Licina, J. R. ; Bruckart, J. E.
CS- Army Medical Research and Development Command, Fort Detrick, MD.
CS- <CODE> 055061000; 039550
RN- USAARL-93-2
CN- 3M162787A875; AF
PY- 1992
PG- 15p
NT- Pub. in Jnl. of Air Medical Transport, v2 p19-26 1992. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI9606
CP- United States
AB- Flight helmets have been in use since the early days of aviation, yet, debate continues regarding their benefit. The most common cause of death in aircraft accidents is head injury, and several studies have concluded that helmets can provide significant protection. This review chronicles the development of the modern helicopter crew helmet, and presents arguments and data supporting their use. Throughout history, man has worn head protection in response to the threat of head injury. Such armor has limitations and drawbacks, but in helicopter aviation, it is effective and worthwhile.... Helmets, flight safety, head injury, aviation medicine.
DE- *Aviation accidents; *Flight helmets; *Aviation safety; Aviation medicine; Benefits; Death; Head(Anatomy); Helicopters; Limitations; Protection; Wounds and injuries; Protective equipment; Flight crews; Safety equipment; Reprints; Crash injuries
ID- NTISDODXR
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57U (Medicine and Biology--Public Health and Industrial Medicine); 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 1925548

AA- <NTIS> AD-A298 780/8
TI- Video Method of Measuring Field-of-View of Electro-Optical Devices Versus Eye Clearances
TI- <NOTE> Final rept
AU- McLean, W. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-30
CN- 3M162787A879; PE
PY- Jul 95
PG- 24p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9605
CP- United States
AB- A miniature charged couple device (CCD) video camera was used to determine the fields-of-view (FOV) with changes in viewing distances (vertex distance) for the standard 18-mm eyepiece ANVIS, a 25-mm eyepiece ANVIS, and two different diameter nonoptical apertures. The data were graphed and compared with theoretical and subjective values (Kotulak, 1992) for FOVs vs eye clearance for the standard 18-mm eyepiece ANVIS. The results indicate that the video camera used in this study approximates both the theoretical and subjectively measured FOV vs eye clearance functions with slight deviation. Computer generated ray traces and subjective assessment with the 25-mm eyepiece confirmed that the marginal rays for the maximum viewable FOVs were blocked at the designed eye position by the aperture on the back plate in front of the fiber optic twist of the intensifier tube. (MM).
DE- *Electrooptics; *Human factors engineering; *Night vision devices; *Optical detectors; *Optical lenses; Fiber optics; Line of sight; Optical images; Helicopters; Cameras; Video signals; Ray tracing; Viewers; Optical countermeasures; Video recording; Helmet mounted displays; Clearances; Binoculars; Image intensifiers(Electronics); Eye movements; Positioning reactions; Charge coupled devices
ID- *Field of view; Anvis(Aviator night vision imaging system); Aviation goggles; 18-mm lenses; 25-mm lenses; An/avs-6(V)1; An/avs-6(V)2; NTISDODXA
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1916693
AA- <NTIS> DE95627722
TI- Schnelle Bestimmung der Bodenkontamination mit gammaspektrometrischen Messungen vom Hubschrauber aus. (Rapid determination of soil contamination by helicopter gamma ray spectroscopy)
AU- Winkelmann, I.
CS- Bundesamt fuer Strahlenschutz, Berlin (Germany). Fachbereich Strahlenschutz.
CS- <CODE> 105614001; 9204570
RN- INIS-MF-14524; CONF-9410338
PY- 1994
PG- 12p
NT- German. Environmental Radioactivity: national seminar with international participation, Sofia (Bulgaria), 11-13 Oct 1994.
NT- U.S. Sales Only. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9602
CP- Germany
AB- Specific aerial nuclide measurements of surface soil contamination were performed after the Chernobyl accident in the southern part of Germany. A helicopter equipped with a gamma ray spectroscopic system including a HPGe detector (50% relative efficiency) and 3 NaI(Tl)-detectors (volume 12 l) was used. A detailed description is given of the complete measuring system which can also be used for detection of gamma sources, e.g. radioactive fragments of nuclear powered satellites. At an altitude of 100 m, a soil contamination of several kBq/sq m for Cs-134 and Cs-137 can be measured for 60 s at a helicopter speed of 100 km/h. For detection of point gamma sources, the NaI(Tl)-detector was used. Assuming a line spacing of 300 m and a speed of 100 km/h, an area of about 30 sq km can be surveyed per hour. Thus, Co-60 sources of some GBq activity can be detected. The system was practically applied for the first time for measuring the man-made radionuclides. The chosen distance between the routes was 10 km, and measuring time - 60 s for each spectrum corresponding to a flight path distance of about 2.2 km

over which the average soil contamination was determined. The measured Cs-137 values of up to 25 kBq/sq m are in good agreement with the results obtained by other methods (in-situ-spectrometry, measurements of soil samples). The aerial measuring system was also tested in the former USSR, in a region north of Chernobyl, with nuclide deposition values of up to 2 MBq/sq m. 7 figs., 2 refs. (orig.). (Atomindex citation 26:044444)
DE- *Gamma Spectroscopy; *Surface Contamination; *Aerial surveys; Cesium 134; Cesium 137; Chernobylsk-4 Reactor; Experimental Data; Federal Republic of Germany; Helicopters; Measuring Methods; Soils; Transfrontier Contamination; Tables(data)
ID- *Foreign technology; EDB/540230; EDB/440103; NTISINIS
SH- 68F (Environmental Pollution and Control--Radiation Pollution and Control); 77E (Nuclear Science and Technology--Nuclear Instrumentation) ; 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity)

AZ- 1915676
AA- <NTIS> AD-A297 285/9
TI- Helicopter Simulator Sickness: A State-of-the-Art Review of Its Incidence, Causes, and Treatment
TI- <NOTE> Final rept. Nov 93-Nov 94
AU- Wright, R. H.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RR-1680
CN- 2O262785A791; 791
PY- Jun 95
PG- 39p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9602
CP- United States
AB- For this report, helicopter simulator sickness literature was reviewed and analyzed to estimate the scope of the problem in the Army. The author concluded that pilot reluctance to divulge symptoms, in combination with the survey methods used, leads to underestimation of the incidence and severity of symptoms. Lack of truly anonymous survey procedures and potential adverse flying career consequences are suggested as reasons that the more severe symptoms and aftereffects may not be reported in surveys. Potential adverse career impact is also suggested as a probable reason for failure to find any relationship between simulator sickness aftereffects and accidents or safety incidents. Guidelines are suggested for minimizing the development of simulator sickness and the safety consequences of its aftereffects.
DE- *Pilots; *Flight simulators; *Motion sickness; State of the art; Signs and symptoms; Careers; Flight; Surveys; Safety; Adverse conditions; Accidents
ID- *Simulator sickness; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 1915421
AA- <NTIS> AD-A297 026/7
TI- Laser Range Evaluation for the Smoky Hill Air National Guard Range, Salina, Kansas
TI- <NOTE> Final technical rept. 7-9 Nov 94
AU- Baker, B. C.
CS- Analytic Sciences Corp., San Antonio, TX.
CS- <CODE> 109445000; 426716
RN- AL/OE-TR-1995-0075
CN- F33615-92-C-0017; 7757; 02
PY- Jul 95
PG- 129p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9602
CP- United States
AB- The primary objectives of this range visit were: (1) To evaluate laser target footprints for safe, effective range use during ground-to-ground and air-to-ground, fixed-wing and helicopter operations. Presently, very few laser missions are conducted at the range. (2) To provide laser information which may assist the rewriting of the SHANGR laser procedures. (MM).

DE- *Laser target designators; *Protective equipment; *Lasers; *Health hazards; *Ranges(Facilities); National guard; Pulsed lasers; Reflection ; Helicopters; Air to surface; Safety; Goggles; Exposure; Fixed wing aircraft; Manportable equipment; Surface to surface; Kansas
ID- Smokey Hill Air National Guard(Kansas); Air National Guard; LANTIRN(Low altitude navigation and targeting indicator); Laser safety; Eye safety; Pave tack project; Pave spike project; Footprints; NTISDODXA
SH- 46C (Physics--Optics and Lasers); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1915371
AA- <NTIS> AD-A296 958/2
TI- U.S. Civil Airmen Statistics, Calendar Year 1994
TI- <NOTE> Annual rept
CS- Federal Aviation Administration, Washington, DC. Office of Aviation Policy and Plans.
CS- <CODE> 009020027; 406648
RN- FAA-APO-95-7
PY- 1994
PG- 145p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9602
CP- United States
AB- This report contains calendar year statistics on pilots and nonpilots and the number of certificates issued. It also contains counts of pilots and nonpilots by state and county. Certificates held, nonpilot, private, commercial, student, airline transport, glider, helicopter, lighter than-air, instrument rating, flight instructors, pilot certificates issued.
DE- *Pilots; *Statistics; *Civil aviation; Counting methods; Commercial aviation; Helicopters; Flight; Instrumentation; Ratings; Instructors; Air transportation; Aviation personnel; Gliders
ID- NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development); 74GE (Military Sciences--General)

AZ- 1914401
AA- <NTIS> N95-34776/1
TI- Does Human Cognition Allow Human Factors (HF) Certification of Advanced Aircrew Systems
AU- Macleod, I. S. ; Taylor, R. M.
CS- Aerosystems International, Yeovil (England).
CS- <CODE> 103414000; AG959266
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 1994
PG- 24p
NT- In Embry-Riddle Aeronautical Univ., Daytona Beach,Fl, Human Factors Certification of Advanced Aviation Technologies p 163-186.
LA- English
PC- (Order as N95-34764, PC A17/MF A04)
JA- GRAI9601; STAR3312
CP- United Kingdom
AB- This paper has examined the requirements of HF specification and certification within advanced or complex aircrew systems. It suggests reasons for current inadequacies in the use of HF in the design process, giving some examples in support, and suggesting an avenue towards the improvement of the HF certification process. The importance of human cognition to the operation and performance of advanced aircrew systems has been stressed. Many of the shortfalls of advanced aircrew systems must be attributed to over automated designs that show little consideration on either the mental limits or the cognitive capabilities of the human system component. Traditional approaches to system design and HF certification are set within an over physicalistic foundation. Also, traditionally it was assumed that physicalistic system functions could be attributed to either the human or the machine on a one to one basis. Moreover, any problems associated with the parallel needs, or promoting human understanding alongside system operation and direction, were generally equated in reality by the natural flexibility and adaptability of human skills. The consideration of the human component of a complex system is seen as being primarily based on manifestations of human behavior to the almost total exclusion of any appreciation of unobservable human mental and cognitive processes. The argument of this paper is that the considered functionality of any complex human-machine system must contain functions that are purely human and purely cognitive. Human-machine system reliability ultimately depends on human reliability and dependability and, therefore, on the form and frequency of cognitive processes that have to be conducted to support system performance. The greater the demand placed by an advanced aircraft

system on the human component's basic knowledge processes or cognition, rather than on skill, the more insiduous the effects the human may have on that system. This paper discusses one example of an attempt to devise an improved method of specificaiton and certification with relation to the advanced aircrew system, that of the RN Merlin helicopter. The method is realized to have limitations in practice, these mainly associated with the late production of the system specification in relation to the system development process. The need for a careful appreciation of the capabilities and support needs of human cognition within the design process of a complex man machine system has been argued, especially with relation to the concept of system functionality. Unlike the physicalistic Fitts list, a new classification of system functionality is proposed, namely: (1) equipment - system equipment related; (2) cognitive - human cognition related; and (3) associated - necessary combinatin of equipment and cognitive. This paper has not proposed a method for a fuller consideration of cognition within systems design, but has suggested the need for such a method and indicated an avenue towards its development. Finally, the HF certification of advanced aircrew systems is seen as only being possible in a qualified sense until the important functions of human cognition are considered within the system design process. (This paper contains the opinions of its authors and does not necessarily refledt the standpoint of their respective organizations).
DE- *Aircraft pilots; *Certification; *Cognition; *Complex systems; *Flight crews; *Human factors engineering; *Man machine systems; Human behavior ; Mental performance; Systems engineering
ID- *Foreign technology; NTISNASA
SH- 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1914397
AA- <NTIS> N95-34772/0
TI- User Type Certification for Advanced Flight Control Systems
AU- Gilson, R. D. ; Abbott, D. W.
CS- University of Central Florida, Orlando. Dept. of Mechanical and Aerospace Engineering.
CS- <CODE> 057117018; U5750488
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 1994
PG- 5p
NT- In Embry-Riddle Aeronautical Univ., Daytona Beach,Fl, Human Factors Certification of Advanced Aviation Technologies p 119-123.
LA- English
PC- (Order as N95-34764, PC A17/MF A04)
JA- GRAI9601; STAR3312
CP- United States
AB- Advanced avionics through flight management systems (FMS) coupled with autopilots can now precisely control aircraft from takeoff to landing. Clearly, this has been the most important improvement in aircraft since the jet engine. Regardless of the eventual capabilities of this technology, it is doubtful that society will soon accept pilotless airliners with the same aplomb they accept driverless passenger trains. Flight crews are still needed to deal with inputing clearances, taxiing, in-flight rerouting, unexpected weather decisions, and emergencies; yet it is well known that the contribution of human errors far exceed those of current hardware or software systems. Thus human errors remain, and are even increasing in percentage as the largest contributor to total system error. Currently, the flight crew is regulated by a layered system of certification: by operation, e.g., airline transport pilot versus private pilot; by category, e.g., airplane versus helicopter; by class, e.g., single engine land versus multi-engine land; and by type (for larger aircraft and jet powered aircraft), e.g., Boeing 767 or Airbus A320. Nothing in the certification process now requires an in-depth proficiency with specific types of avionics systems despite their prominent role in aircraft control and guidance.
DE- *Aircraft safety; *Certification; *Flight control; *Flight crews; *Man machine systems; Air traffic control; Aircraft pilots; Errors; Flight management systems; Human factors engineering; Pilot performance
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1914396
AA- <NTIS> N95-34771/2
TI- Quality Assurance and Risk Management: Perspectives on Human Factors Certification of Advanced Aviation Systems
AU- Taylor, R. M. ; Macleod, I. S.
CS- Royal Air Force, Farnborough (England). Inst. of Aviation Medicine.
CS- <CODE> 024586001; R1455517
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 1994
PG- 22p
NT- In Embry-Riddle Aeronautical Univ., Daytona Beach,Fl, Human Factors

Certification of Advanced Aviation Technologies p 97-118.
LA- English
PC- (Order as N95-34764, PC A17/MF A04)
JA- GRAI9601; STAR3312
CP- United Kingdom
AB- This paper is based on the experience of engineering psychologists advising the U.K. Ministry of Defense (MoD) on the procurement of advanced aviation systems that conform to good human engineering (HE) practice. Traditional approaches to HE in systems procurement focus on the physical nature of the human-machine interface. Advanced aviation systems present increasingly complex design requirements for human functional integration, information processing, and cognitive task performance effectiveness. These developing requirements present new challenges for HE quality assurance (QA) and risk management, requiring focus on design processes as well as on design content or product. A new approach to the application of HE, recently adopted by NATO, provides more systematic ordering and control of HE processes and activities to meet the challenges of advanced aircrew systems design. This systematic approach to HE has been applied by MoD to the procurement of mission systems for the Royal Navy Merlin helicopter. In MoD procurement, certification is a judicial function, essentially independent of the service customer and industry contractor. Certification decisions are based on advice from MoD's appointed Acceptance Agency. Test and evaluation (T&E) conducted by the contractor and by the Acceptance Agency provide evidence for certification. Certification identifies limitations of systems upon release to the service. Evidence of compliance with HE standards traditionally forms the main basis of HE certification and significant non-compliance could restrict release. The systems HE approach shows concern for the quality of processes as well as for the content of the product. Human factors certification should be concerned with the quality of HE processes as well as products. Certification should require proof of process as well as proof of content and performance. QA criteria such as completeness, consistency, timeliness, and compatibility provide generic guidelines for progressive acceptance and certification of HE processes. Threats to the validity of certification arise from problems and assumptions in T&E methods. T&E should seek to reduce the risk of specification non-compliance and certification failure.
DE- *Certification; *Complex systems; *Human factors engineering; *Human performance; *Man machine systems; *Quality control; *Systems engineering; Aeronautical engineering; Aircraft pilots; Flight crews; Mental performance; Risk; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASA
SH- 85A (Transportation--Air Transportation); 92D (Behavior and Society--Education, Law, and Humanities)

AZ- 1914170
AA- <NTIS> MIC-95-06526
TI- Notes to prospectors, Jakes Corner: Dighem survey interpretation
TI- <NOTE> Open file no. 1995-12(G)
AU- Power, M. A.
CS- Northern Affairs Program (Canada). Yukon Region, Whitehorse (Yukon).
CS- <CODE> 999999999; 9999999;
SP- Yukon Territory (Canada).
PY- c1995
PG- 53p
NT- Fold. maps not filmed. At head of title: Canada/Yukon Economic Development Agreement.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E07/MF E01
JA- GRAI9601
CP- Canada
AB- In early 1994, Dighem Surveys flew a large helicopter multicoil electromagnetic and magnetic field survey over an area of the southern Yukon. This report is intended as a practical guide to understanding and using the results of that survey in prospecting. It includes a description of the possible types of deposits that could be found in the study area along with predicted responses from the survey instrumentation. These deposits include ultramafic-hosted massive sulfide and chromite deposits, replacement deposits in limestones, quartz-carbonate precious metal deposits in or near ultramafics, and structurally controlled epithermal vein deposits. The report also includes description of 34 conductors which merit further investigation and which are shown on the accompanying anomaly maps.
DE- *Prospecting; Geological surveys; Maps
ID- Yukon Territory; NTISTFCAN
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries); 48C (Natural Resources and Earth Sciences--Natural Resource Surveys)

AZ- 1912381
AA- <NTIS> AD-A296 871/7

TI- Sound Attenuation Evaluation of the Navy's HGU-84/P Helicopter Helmet
TI- <NOTE> Technical memo
AU- Maxwell, D. W. ; Williams, C. E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> 065612000; 406061
RN- NAMRL-TM-95-1
PY- Jan 95
PG- 18p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9601
CP- United States
AB- First article sound attenuation tests were conducted on samples of the HGU-84/P helicopter helmet, candidate replacement for the SPH-3C series of helmets, supplied for evaluation by the Naval Air Warfare Center Aircralt Division, Warminster, Pennsylvania. The tests were conducted in accordance with American National Standard ANSI 512.6-1984, Method for the Measurement of Real-Ear Attenuation of Hearing Protectors. Objective measurements of attenuation, microphone-in-real-ear (MIRE), were also obtained for database and record purposes. Ten Marine Corps student aviators in the Naval Aviation Flight Training Program served as volunteer test subjects. Real-ear attenuation values calculated from measurements made at the nine, one-third octave test frequencies met or exceeded the required minimum real-ear attenuation specifications for the newly developed helmet. This technical memorandum documents the results of the sound attenuation tests. The HGU-84/P helmet is currently being fielded as a replacement for the SPH-3C helmet. (AN).
DE- *Acoustic attenuation; *Flight helmets; Test and evaluation; Data bases ; Frequency; Military requirements; Pilots; Helicopters; Acoustic measurement; Microphones; Hearing; Aircraft noise; Ear protectors
ID- NTISDODXA
SH- 46A (Physics--Acoustics); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1907626
AA- <NTIS> N95-32505/6
TI- Covert Night/Day Operations for Rotorcraft (CONDOR) Programme
AU- Southam, T. H.
CS- Defence Research Agency, Farnborough (England).
CS- <CODE> 103387000; DH034640
PY- cJan 95
PG- 16p
NT- In AGARD, Low-Level and Nap-of-the-Earth (Noe) Night Operations 16 p.
LA- English
PC- (Order as N95-32486, PC A10/MF A03)
JA- GRAI9523; STAR3312
CP- United Kingdom
AB- CONDOR is a major joint US-UK project that will support a comprehensive demonstration of the functionality of current and future attack helicopters under day/night adverse weather conditions in a nap of the Earth environment. The aim of the program is to investigate the integration of a suite of avionics, sensors and displays for battlefield helicopters and to assess their effectiveness during ingress, egress and attack phases of the mission. The concept features a precision navigation system which together with a steerable sensor coupled visually, via a helmet-position sensing system, to an advanced helmet mounted display with a wide FOV, full colour and laser eye protection enables a virtual outside world overlaid with appropriate flight and mission information to the pilot. The program includes development and building of the advanced hardware, research into the human factors issues connected with their exploitation, symbology development coupled to a detailed application in a full mission scenario. Flight demonstrations are scheduled to take place in both the Lynx at DRA and, with subsequent testing in the U.S., to exploit a new full-authority FBW flight control system with mission configurable control laws.
DE- *Attack aircraft; *Helmet mounted displays; *Human factors engineering; *Military helicopters; *Military operations; *Nap-of-the-earth navigation; *Radar detection; *Research projects; *Rotary wing aircraft ; *United kingdom; *United states; Control theory; Daytime; Earth environment; Egress; Eye protection; Flight conditions; Flight control; Flight tests; International cooperation; Night vision
ID- *Foreign technology; NTISNASAE
SH- 72GE (Mathematical Sciences--General)

AZ- 1907625
AA- <NTIS> N95-32504/9
TI- SIRPH: Steerable Infrared Picture on Helmet Mounted Display
AU- Balzarotti, G. ; Fiori, L. ; Midollini, B.
CS- Fabrica Italiana Apparecchi Radio S.p.A., Milan.
CS- <CODE> 070167000; FA546958

PY- cJan 95
PG- 10p
NT- In AGARD, Low-Level and Nap-of-the-Earth (Noe) Night Operations 10 p.
LA- English
PC- (Order as N95-32486, PC A10/MF A03)
JA- GRAI9523; STAR3312
CP- Italy
AB- Helmet Mounted Displays (HMD's) are being paid remarkable attention as an essential aid to pilots of both fixed and rotary wing aircraft: The technological improvements such equipment are experiencing place them in an outstanding position among avionics. A very important role in the success of HMD's is played by the management of man-machine-interface aspects: The way to make the information available, in a useful format, to the pilot must be considered with particular care. A smart example is the presentation of images from steerable sensors: The head tracking systems have actually achieved a high degree of accuracy, thus allowing a precise control of the Line Of Sight (LOS) of electrooptical vision systems. Therefore, pictures generated by a steerable infrared sensor slaved to the pilot's head movements can be displayed onto the helmet visor, in order to provide the pilot with a substantial aid in day and night, adverse weather conditions, high altitudes down to low level and nap of the earth flight operations. The paper describes the results of a technical analysis performed on a system based on a steerable IR sensor integrated with an advanced HMD for navigation aid purposes. The parameters which lead to an imperfect static or dynamic overlay of the generated IR picture with the external world, as seen by the pilot through the helmet visors, and the effects of such misalignment are analyzed in detail, together with integration aspects and human engineering factors. The analysis has also taken into account the finite angular excursion of the IR sensor LOS, originated by gimbals limits, and the consequent necessary transition to and from the LLTV's integrated within the helmet, suitable to cover all possible head motions, has been investigated. An approach to the problem of the fusion of information generated by the IR sensor and the LLTV's is also reported. Finally, the paper highlights the limits and the constraints of navigation using a steerable IR sensor, with respect to safety aspects.
DE- *Air navigation; *Daytime; *Electro-optics; *Flir detectors; *Helmet mounted displays; *Holography; *Human factors engineering; *Infrared imagery; *Infrared radar; *Navigation aids; *Night vision; Aircraft configurations; Flight conditions; Flight operations; Gimbals; Head movement; High altitude; Line of sight; Misalignment; Rotary wing aircraft
ID- *Foreign technology; NTISNASAE
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1907617
AA- <NTIS> N95-32496/8
TI- Application of Helicopter Mission Simulation to Nap-of-the-Earth Operations
AU- Birkett, P. R. ; Roden, D. W.
CS- Defence Research Agency, Farnborough (England).
CS- <CODE> 103387000; DH034640
PY- cJan 95
PG- 5p
NT- In AGARD, Low-Level and Nap-of-the-Earth (Noe) Night Operations 5 p.
LA- English
PC- (Order as N95-32486, PC A10/MF A03)
JA- GRAI9523; STAR3312
CP- United Kingdom
AB- This paper describes some of the system trade-offs and integration issues associated with the next generation of battlefield helicopters operating in the NOE environment. The interactions between weapons, sensors, aircrew and the platform itself are discussed and their influence on the effectiveness of the helicopter as a total system is considered. Finally, an approach to the study of helicopter system integration is presented. The 'multipleman-in-the-loop' mission simulator, HOVERS, is described and its application to a typical trade-off issue discussed.
DE- *Computerized simulation; *Flight simulation; *Helicopters; *Human factors engineering; *Man machine systems; *Nap-of-the-earth navigation ; *Systems integration; *Tradeoffs; Flight crews; Flight simulators; Information management; Mission planning; Subroutines; Weapons
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 75D (Missile Technology--Missile Tracking Systems); 74GE (Military Sciences--General)

AZ- 1905333
AA- <NTIS> AD-A294 895/8
TI- Evaluation of a Retrofit OH-58 Pilot's Seat to Prevent Back Injury
TI- <NOTE> Final rept
AU- Haley, J. L. ; Palmer, R. W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578

RN- USAARL-95-9
CN- 30162787A878; EA
PY- Dec 94
PG- 87p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9523
CP- United States
AB- This report documents the development of pilot and copilot retrofit seats, flight tests and evaluation of the seats based on crash tests, flight tests, and a 5-year usage test in the USAARL OH-58, serial no. 71-207781. The Bell Helicopter Textron (BHT) designed seat consists of a new seat pan, hinged at the forward edge, and attached to load-limit devices at the rear edge. The seat will rotate about its forward edge mount and move downward approximately 5 inches at the rear edge when the impact sink speed of the helicopter is excessive. The 5-inch stroke of the seat occurs while sustaining approximately 12 G on a 50th percentile pilot (1500-lb maximum in the lower lumbar spine). The seats, mounted in a standard OH-58 fuselage, were subjected to simulated sink speeds of 26.5, 29.6, and 32.2 fps. The seats easily prevented injury to the dummy pilots at 26.5 fps, but the seats bottomed against the cyclic control yoke at greater sink speed.
DE- *Helicopters; *Wounds and injuries; *Retrofitting; *Aircraft seats; *Pilot seats; Test and evaluation; Control; Flight testing; Forward areas; Edges; Pilots; Cycles; Mounts; Crashes; Spinal column; Seats
ID- Oh-58 aircraft; H-58 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1902194
AA- <NTIS> AD-A294 342/1
TI- ANVIS Head-Up Display: An Analysis of its Application to Naval Helicopters
TI- <NOTE> Professional paper
AU- Peters, D.
CS- Naval Air Warfare Center Aircraft Div., Patuxent River, MD.
CS- <CODE> 104822000; 424295
PY- 28 Feb 95
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9522
CP- United States
AB- Combat Search and Rescue (CSAR) helicopter pilots routinely utilize Night Vision Goggles to enhance visual capabilities during night operations. The Aviator's Night Vision Imaging System (ANVIS) Head-Up Display (HUD), recently tested on the HH-60H Seahawk, provides the capability to display critical flight parameters to the pilots via goggle-mounted display units, thus minimizing headdown time in the cockpit. As more and more naval helicopter missions diversify to include CSAR and CSAR support' devices which effectively enhance night mission pilots. This HUE system and critically analyzes its advantages and limitations for use in Naval helicopters. In addition, ANVIS HUD symbology is examined from a human factors perspective with recommendations for symbology design and placement.
DE- *Night vision devices; *Aviation goggles; *Head up displays; Military operations; Warfare; Cockpits; Navy; Rescues; Pilots; Human factors engineering; Display systems; Helicopters; Naval aircraft; Flight; Missions; Searching; Night; Symbols; Goggles; Search and rescue; Visual acuity
ID- *Night vision goggles; Avnis(Aviator night vision imaging system); Nvg(Night vision goggles); NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51E (Aeronautics and Aerodynamics--Avionics); 74GE (Military Sciences--General); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 1901912
AA- <NTIS> AD-A294 049/2
TI- OH-58 Pilot Display Unit (PDU) Simulated Crash Tests
TI- <NOTE> Final rept
AU- Haley, J. L. ; McEntire, B. J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-10
CN- 30162787A878; EA

PY- Dec 94
PG- 54p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9522
CP- United States
AB- The pilot display unit (PDU) is designed to be placed directly in front of the pilot's eyes in the OH-58 helicopter to provide targeting and a missile status display. The location and the 7-pound mass of the unit creates a potentially hazardous head impact surface. In order to determine the degree of the hazard, a damaged OH-58 cockpit section was exposed to five survivable simulated crashes of moderate to severe impact vectors with an instrumented dummy pilot in the right seat behind the PDU. The cockpit floor was exposed to crash force up to 8 G in the vertical (z) axis and 19 G along the longitudinal (x) axis with velocity changes of 24 fps and 36 fps, respectively. These exposures did not exceed acceptable levels of human tolerance for neck and head forces when a properly fitted flight helmet was worn so that impact occurred on the helmet and not the head.
DE- *Wounds and injuries; *Head(Anatomy); Test and evaluation; Velocity; Guided missiles; Simulation; Impact; Hazards; Survivability; Cockpits; Humans; Floors; Pilots; Display systems; Surfaces; Instrumentation; Targeting; Eye; Tolerances(Physiology); Helmets; Flight helmets; Crashes; Pilot plants; Seats; Neck(Anatomy)
ID- Oh-58 aircraft; H-58 aircraft; Pdu(Pilot display unit); NTISDODXA
SH- 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology); 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1901910
AA- <NTIS> AD-A294 047/6
TI- User Acceptability and Comfort of the Communications Earplug (CEP) When Used in the UH-1 Helicopter
AU- Mozo, B. T. ; Murphy, B. A. ; Ribera, J. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-17
CN- 3016287A878; OF
PY- Feb 95
PG- 39p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9522
CP- United States
AB- Aviators and crewmembers assigned to the crash rescue (FLATIRON) unit at Fort Rucker, Alabama participated in an evaluation of the communications earplug (CEP) in the aviation environment. They were asked to wear the two CEP configurations in combination with their personal SPH-4 helmet for three flights of at least 1 hour duration. One CEP configuration included a foam tip and the other included a premolded triple flange tip. Comments and responses provided by the volunteers showed the CEP, with some modifications, is acceptable for use in the aviation environment. Speech clarity of the CEP was judged to be an improvement over normal helmet/ear protection by 85 percent of the respondents. The CEP with foam tip was judged to be more comfortable than CEP with the triple flange tip. Comfort was judged to be between comfortable and mildly uncomfortable for the CEP with foam earplug tip. The volunteers rated the CEP as being helpful in achieving their mission. The results of this study show the CEP is comfortable and acceptable to the aviation crewmember.
DE- *Exposure(Physiology); *Ear protectors; Environments; Rescues; Pilots; Aeronautics; Crews; User needs; Speech; Alabama; Acceptability; Helmets ; Crashes
ID- Uh-1 aircraft; H-1 aircraft; NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology)

AZ- 1901904
AA- <NTIS> AD-A294 041/9
TI- Evaluating the Potential for Rotation and Loss of Flight Helmets From Inertia and Impact Loads
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Haley, J. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-20

CN- 30162787A878; EA
PY- Mar 95
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9522
CP- United States
AB- In severe helicopter accidents, flight helmets rotate or sometimes come off the head, triggering wearer injury. This study evaluates rotation potential for new flight helmets. Current and prototype flight helmets (SPH-4B and two versions of the HGU-56) were subjected to three tests. First, rotation was measured with up to a 50-pound upward pull at the rear edge of the helmet on a medium-size headform. Second, angular displacement was measured with a 30-pound force at the side of the helmet. Third, the helmet was placed on a Hybrid II headform and Hybrid III neck, then mounted on a pendulum test device. The freefalling pendulum was decelerated to produce 16 to 20 G peak acceleration at the neck. Angular displacement of the helmet versus time was measured with high-speed video. The upward pull tests produced 18 to 33 degrees of helmet rotation. Sideward loads produced 13 to 21 degrees of rotation. The pendulum test produced up to 45 degrees forward and up to 25 degrees rearward displacement.
DE- *Inertia; *Losses; *Aviation safety; *Flight helmets; Test and evaluation; Angles; Impact; Edges; Loads(Forces); Displacement; Pilots; Prototypes; Test equipment; Helicopters; Wounds and injuries; Video signals; Rotation; Pull tests; Helmets; Accidents; Pendulums; Neck(Anatomy)
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1901758
AA- <NTIS> AD-A293 891/8
TI- Preparation of S-70A-9 Black Hawk Helicopter for Flight Tests to Investigate Cause of Cracking of Inner Fuselage Panel
AU- Lombardo, D. C. ; Patterson, A. K. ; Ferrarotto, P. ; Dutton, S. A. ; Powlesland, I. G.
CS- Defence Science and Technology Organisation, Canberra (Australia).
CS- <CODE> 057314000; 394805
RN- DSTO-TN-0004; DODA-AR-009-205
PY- Feb 95
PG- 50p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9522
CP- Australia
AB- An Australian Army Black Hawk helicopter has been fitted with suitable flight test instrumentation at the Aeronautical and Maritime Research Laboratory to enable an investigation of the cause of cracking in an internal fuselage skin panel. Nine accelerometer channels and 46 strain gauge channels have been provided. Reasons for the choice of measurement type and location are provided together with details of the measuring system installed. Plans for the conduct of suitable flight tests and for the evaluation of the collected data are provided. (MM).
DE- *Cracking(Fracturing); *Helicopters; *Fuselages; Data processing; Flight testing; Accelerometers; Aerodynamic forces; Strain gages; External stores; Fuel tanks; Skin(Structural)
ID- *Foreign technology; S-70a-9 helicopters; Black hawk aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94J (Industrial and Mechanical Engineering--Nondestructive Testing)

AZ- 1898022
AA- <NTIS> AD-A293 311/7
TI- Small Letter Contrast Sensitivity: An Alternative Measure of Visual Resolution for Aviation Candidates
AU- Rabin, J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-15
CN- 30162787A879; PE
PY- Jan 95
PG- 15p
NT- Pub. in Aviation, Space and Environmental Medicine, p56-58 Jan 95. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI9521
CP- United States
AB- Exceptional vision is needed to maintain high levels of aviation performance. Current standards for helicopter pilot training include superior visual acuity with minimal refractive error. Despite these demanding criteria, it is likely that visual ability varies among those who meet the standards for pilot training. A more complete knowledge of visual capabilities in these individuals will allow us to better correlate vision with performance and to develop more criteria for selection. The purpose of this study was to investigate an alternative test of visual resolution for aviation candidates using small letter contrast sensitivity (SLCS). Computer-generated letter charts were used to measure visual acuity (VA) and SLCS in 16 candidates who had satisfied military vision standards for pilot training. The acuity and contrast charts varied, by line, in equal log steps such that the letter recognition task was comparable for the two types of measurement. VA and SLCS were highly correlated in these subjects, indicating that the two tests measure similar aspects of visual resolution. Scores were distributed across two lines on the acuity chart, but across four lines on the contrast chart, suggesting that SLCS offers a more (continued) discriminating test of resolution. This assumption was confirmed in that SLOS was more highly correlated with small amounts of refractive error in the candidates tested. SLOS offers a sensitive, adjunctive measure of visual resolution which may be useful for identifying the unique visual abilities required for aviation.
DE- *Contrast; *Sensitivity; *Vision; *Visual acuity; Test and evaluation; Measurement; Skills; Training; Military standards; Acuity; Pilots; Resolution; Aeronautics; Helicopters; Errors; Standards; Charts; Refraction; Discrimination; Reprints
ID- Slcs(Small letter contrast sensitivity); NTISDODXR
SH- 57A (Medicine and Biology--Anatomy); 57S (Medicine and Biology--Physiology); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1898020
AA- <NTIS> AD-A293 309/1
TI- Novel Instrumentation System for Measurement of Helicopter Rotor Motions and Loads Data. Phase 1
TI- <NOTE> Final rept. 10 Aug 94-10 Mar 95
AU- McKillip, R.
CS- Continuum Dynamics, Inc., Princeton, NJ.
CS- <CODE> 073078000; 397958
RN- CDI-95-03
CN- N00600-94-C-3087
PY- Apr 95
PG- 61p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9521
CP- United States
AB- Results of a Phase-I SBIR study directed at a novel instrumentation system for the measurement of helicopter rotor motion and loads are described. Background into the requirements and needs of the measurement system are provided, along with a summary of past activities in this area. Consideration is then given to a novel scheme that incorporates blade-mounted accelerometer sensors with a simplified signal processing scheme to extract both rotor motion measurements, and to a limited extent, blade loading information. Issues regarding sensitivity of the system to modeling errors, nonlinearities and sensor bias errors are examined through detailed simulation and analysis. Also, a demonstration of the system performance for reconstructing flapping motion measurements is provided using Froude-scaled model rotor test results. Finally, implementation issues are discussed, and a plan for continued work leading to prototype development for this system is outlined.
DE- *Motion; *Helicopter rotors; *Flight loads; Signal processing; Simulation; Measurement; Detectors; Models; Prototypes; Blades; Errors; Instrumentation; Rotors; Bias; Simplification
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1897151
AA- <NTIS> AD-A292 426/4
TI- Low-Level and Nap-of-the-Earth (N.O.E.) Night Operations (Operation de Nuit a Basse Altitude et en Rase Mottes)
CS- Advisory Group for Aerospace Research and Development,

Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-563
PY- Jan 95
PG- 203p
NT- Presented at the Mission Systems Panel Symposium, 25-27 Oct 94.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A10/MF A03
JA- GRAI9521
CP- Other
AB- Tactical rotary wing aircraft and low-level, fixed wing aircraft operating in high threat areas require improvements in night and adverse weather conditions in order to increase survivability, improve operational performance, and to reduce pilot workload. Recent developments and the results of on-going programs suggest that increased automation and optimized integration of sensors, guidance/navigation, control and display systems, and weapons provide approaches to greatly enhanced capability in night operation. Operations/missions of concern include fire- support, attack, reconnaissance, and special operations. Automated positioning, precision tracking, communications and mission planning, and data entry will also be available. Recent developments in integration of multi-spectral sensors, smart weapons, architectures, and processor and data distribution systems will permit different approaches to core structures. The purpose of the symposium is to support the evolutions and development of alternative core structures which will lead to the fielding of effective low-level and N.O.E. night operations systems for fixed and rotary wing aircraft.
DE- *Attitude control systems; *Fixed wing aircraft; *Rotary wing aircraft; *Navigational aids; Weapons; Data processing; Input; Military operations; Position(Location); Symposia; Optimization; Automation; Detectors; Cores; Weather; Data transmission systems; Survivability; Threats; Mission profiles; Night warfare; Pilots; Structures; Tracking; Display systems; Integration; Position finding; Missions; Precision; Operation; Adverse conditions; Low level; Guidance; Night; Workload; Reconnaissance; Tactical aircraft; Multispectral
ID- *Foreign technology; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 76D (Navigation, Guidance, and Control--Navigation Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1893269
AA- <NTIS> AD-A244 124/4
TI- Rapid Onset of Severe Heat Illness: A Case Report. (Reannouncement with New Availability Information)
TI- <NOTE> Technical rept
AU- Mitchell, G. W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-1
PY- 1991
PG- 13p
NT- Pub. in Aviation, Space, and Environmental Medicine, v62 p779-782 1991. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI9520
CP- United States
AB- Aviators flying extended periods in hot environments are known to be at risk for heat related illness. The risk when wearing chemical individual protective equipment (IPE) is increased even at relatively warm temperatures and light workloads. In this paper, we report the physiological responses of an aviator who had been flying a UH-1H helicopter up to 6 h/d clothed in full IPE on 6 consecutive days prior to the sudden onset of heat illness. His performance during the study was normal, and no clear physiological derangements were noted prior to his symptoms. The rapid evolution of his symptoms after voicing no complaints provides a graphic illustration of the difficult predictability and initial central nervous system effects of this condition.
DE- Central nervous system; Evolution(General); Flight; Heat; High temperature; Hot regions; Illness; Light; Physiological effects; Pilots ; Protective equipment; Response(Biology); Risk; Signs and symptoms; Workload; Reprints
ID- *Heat stress(Physiology); *Heat tolerance(Physiology); *Aviation personnel; Helicopters; IPE(Individual Protective Equipment); Chemical warfare; Protective clothing; NTISDODXR
SH- 57W (Medicine and Biology--Stress Physiology); 95G (Biomedical

Technology and Human Factors Engineering--Protective Equipment)

AZ- 1892827
AA- <NTIS> TIB/B95-04330
TI- Study of touchless sensors for the measurement of control surface positions onboard an aircraft
AU- Murthy, N.N.
CS- Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V., Braunschweig (Germany). Inst. fuer Flugmechanik.
CS- <CODE> 109288001; 9203836
RN- DLR-IB-111--94/45
PY- 21 Nov 94
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09
JA- GRAI9519
CP- Germany
AB- The Flight Test Instrumentation branch of the Institute of Flight Mechanics at the DLR Braunschweig has been involved in the development of instrumentation and data acquisition systems of several aircraft and helicopters. The data acquired during the flight tests have been very gainfully used to analyse the performance of the aircraft and helicopters. One of the problems faced by the engineers has been in the measurement of the positions of various control surfaces of a non-instrumented aircraft. This is because of the problems in installing the potentiometric sensors and its subsequent calibration. The installation requires the dismantling of all control surfaces, fabrication of proper fixtures for mounting the potentiometers and reassembly of the surfaces. The potentiometric sensors require frequent replacements and recalibration due to a number of factors such as wear and tear, noise due to the improper positioning of wiper arm and vibration. These drawbacks provided the much needed impetus to search for alternative solutions to overcome the above problems. The objective of the present work was to make a study of various techniques that are currently being used for position measurement and to identify methods or sensors that would suit touchless measurement of control surface positions onboard an aircraft. This report discusses the existing techniques in brief and identifies some new techniques for measurement of the position of control surfaces such as ailerons, flaps, rudder and elevator. The measuring ranges of these types of instruments vary from less than a millimeter to several hundreds of mm for linear displacement and from less than 1 degree to about 350 for angular measurements. An alternative to the potentiometers could be the non-contact type of sensors using the variation in capacitance and inductance due to displacement. These type of sensors are being extensively used in aerospace applications because of their performance. The main advantages of the non-contact sensors are that they are free from any physical contact with the measured and also do not load the structure. A significant amount of work has been done at various locations in research and development of techniques for non contact distance gauging though not necessarily for aeronautical applications. Optical, acoustic, X-rays and magnetic sensors have been considered. (orig./AKF). (Copyright (c) 1995 by FIZ. Citation no. 95:004330.)
DE- *Control surfaces; *Position (location); *Sensors; *Distance measuring equipment; Flight tests; Aircraft control; Helicopter control; Figure of merit
ID- *Foreign technology; NTISTFFIZ
SH- 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1890148
AA- <NTIS> AD-A289 830/2
TI- Proceedings of the AIAA/FAA Joint Symposium on General Aviation Systems (1994), Held at Starkville, Mississipi on May 24-25, 1994
TI- <NOTE> Final rept
AU- Ferrara, G. ; DiMichele, R.
CS- American Inst. of Aeronautics and Astronautics, Washington, DC.
CS- <CODE> 096254000; 419090
RN- DOT/FAA/CT-94/63
PY- Sep 94
PG- 627p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A99/MF A06
JA- GRAI9519
CP- United States
AB- The 1994 AIAA/FAA Joint Symposium on General Aviation Systems was the

result of the combined efforts of the AIAA General Aviation Systems Technical Committee and the Federal Aviation Administration Technical Center. This symposium offered the opportunity to present and review the current state of the art in research that is being conducted in support of general aviation . All told, the papers presented covered the entire spectrum of research, and the participants had the opportunity to hear presentations on everything from alternate fuels to developments in air traffic control. (AN).
DE- *Aviation safety; *Meetings; State of the art; Air traffic control systems; Flight testing; Fighter aircraft; Aging(Materials); Aircraft maintenance; Flight control systems; Cockpits; Jet engines; Human factors engineering; Helicopters; Global positioning system; Aerodynamic characteristics; Wind tunnel tests; Aviation fuels; Design criteria; Wing body configurations; Research aircraft; General aviation aircraft; Crashworthiness; Aviation gasoline
ID- NTISDODXA; NTISDOTFAA
SH- 85A (Transportation--Air Transportation); 51C (Aeronautics and Aerodynamics--Aircraft); 97K (Energy--Fuels)

AZ- 1889736
AA- <NTIS> AD-A240 130/5
TI- Effect of Information Display Formats on Helicopter Pilots' Target Acquisition and Flying Performance. (Reannouncement with New Availability Information)
TI- <NOTE> Final rept
AU- Dominessy, M. E. ; Lukas, J. H. ; Malkin, F. J. ; Monty, R. A. ; Oatman, L. C.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-15-91
CN- 1L162716AH70
PY- Jul 91
PG- 16p
NT- Pub. in Military Psychology, v3(3) p163-176 1991. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI9519
CP- United States
AB- No abstract available.
DE- *Data displays; *Attack helicopters; Formats; Cockpits; Target acquisition; Reprints
ID- *Human factors engineering; NTISDODXR
SH- 74GE (Military Sciences--General); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1888317
AA- <NTIS> N95-26955/1
TI- Experimental Investigation of Helicopter Downwash and Tailboom Interaction at the Wichita State University 7X10 Foot Wind Tunnel
AU- Kruse, S. ; Leigh, J. E. ; Moore, K. A. ; Randle, S.
CS- Wichita State Univ., KS.
CS- <CODE> 017540000; W0802171
PY- 1994
PG- 12p
NT- In Its Aiaa Techfest 20 Proceedings 12 p.
LA- English
PC- (Order as N95-26941, PC A12/MF A03)
JA- GRAI9518; STAR3309
CP- United States
AB- The two goals of this experiment were: (1) to study the unsteady aerodynamics of a helicopter main rotor in hovering flight; and (2) test the wind tunnel's instrumentation speed for velocity and pressure measurement.
DE- *Helicopter wakes; *Hovering; *Rotary wings; *Unsteady aerodynamics; *Wind tunnel tests; Downwash; Flow distribution; Pressure measurement; Velocity measurement
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1886736
AA- <NTIS> AD-A289 457/4
TI- Effects of UH-1 Experience on UH-6O Simulator Performance: A Preliminary Study
TI- <NOTE> Final rept
AU- Salter, C. A. ; Caldwell, J. A. ; Crowley, J. S. ; Smith, R. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-95-4
CN- 3M162787A879; OD

PY- Nov 94
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9518
CP- United States
AB- Efforts to expand the pool of volunteers for research in the UH-60 simulator prompted USAARL to determine whether UH-1 pilots could be used as an alternative to UH-60 subjects. In this quasi-experimental preliminary study, eight UH-1 pilots were provided with training in the UH-60 simulator. Afterwards, they were required to fly a standardized profile, parts of which had been used in an earlier investigation with UH-60 pilots. The performance accuracy of the groups (UN-1 versus UH-60) were compared on equivalent maneuvers. Results showed that the UH-1 pilots used in this initial study actually performed better on most maneuvers than did the UH-60 pilots who were used in an earlier investigation. Thus, it appears that UH-1 pilots, who are easier to recruit than rated UH-60 pilots, may be suitable as subjects in future simulator studies involving basic instrument pilotage skills. However, before drawing definitive conclusions, these results should be replicated in a controlled study where the pilots are randomly assigned to training and testing conditions during a more limited time frame.
DE- *Simulators; *Skills; *Helicopters; Control; Aircraft; Pilots; Performance tests; Accuracy; Time; Profiles; Standardization; Instrumentation; Maneuvers; Sleep deprivation; Nerve agents
ID- Uh-1 aircraft; H-1 aircraft; Uh-60 aircraft; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1857058
AA- <NTIS> DE94019207
TI- Emergency radiological monitoring and analysis United States Federal Radiological Monitoring and Assessment Center
AU- Thome, D. J.
CS- EG and G Energy Measurements, Inc., Las Vegas, NV.
CS- <CODE> 082175000; 9518164
SP- Department of Energy, Washington, DC.
RN- EGG-11265-1076; CONF-9408145-2
CN- AC08-93NV11265
PY- 1994
PG- 20p
NT- International workshop on scientific bases for decision making after a radioactive contamination of an urban environment, Rio de Janeiro (Brazil), 29 Aug - 2 Sep 1994. Sponsored by Department of Energy, Washington, DC.
NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9508; ERA9508
CP- United States
AB- The United States Federal Radiological Emergency Response Plan (FRERP) provides the framework for integrating the various Federal agencies responding to a major radiological emergency. Following a major radiological incident the FRERP authorizes the creation of the Federal Radiological Monitoring and Assessment Center (FRMAC). The FRMAC is established to coordinate all Federal agencies involved in the monitoring and assessment of the off-site radiological conditions in support of the impacted states and the Lead Federal Agency (LFA). Within the FRMAC, the Monitoring and Analysis Division is responsible for coordinating all FRMAC assets involved in conducting a comprehensive program of environmental monitoring, sampling, radioanalysis and quality assurance. This program includes: (1) Aerial Radiological Monitoring - Fixed Wing and Helicopter, (2) Field Monitoring and Sampling, (3) Radioanalysis - Mobile and Fixed Laboratories, (4) Radiation Detection Instrumentation - Calibration and Maintenance, (5) Environmental Dosimetry, and (6) An integrated program of Quality Assurance. To assure consistency, completeness and the quality of the data produced, a methodology and procedures handbook is being developed. This paper discusses the structure, assets and operations of FRMAC monitoring and analysis and the content and preparation of this handbook.
DE- *Radiation Accidents; *Radiation monitoring; Dosimetry; Emergency Plans ; Quality Assurance; Radiation Detection
ID- EDB/054000; EDB/560101; NTISDE
SH- 68F (Environmental Pollution and Control--Radiation Pollution and Control); 77GE (Nuclear Science and Technology--General); 57V (Medicine and Biology--Radiobiology); 91I (Urban and Regional Technology and

Development--Emergency Services and Planning); 91A (Urban and Regional Technology and Development--Environmental Management and Planning)

AZ- 1851861
AA- <NTIS> DE94019132
TI- Aerial radiological survey of the Argonne National Laboratory and surrounding area, Argonne, Illinois
AU- Hoover, R. A.
CS- EG and G Energy Measurements, Inc., Las Vegas, NV. Remote Sensing Lab.
CS- <CODE> 082175003; 9527913
SP- Department of Energy, Washington, DC.
RN- EGG-11265-1005
CN- AC08-93NV11265
PY- May 94
PG- 20p
NT- Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9506; ERA9505
CP- United States
AB- An aerial radiological survey was conducted during the period May 17 through May 26, 1989, over a 32-square-mile (83-square-kilometer) area surrounding the Argonne National Laboratory (ANL) facilities located near Argonne, Illinois. The survey was conducted at a nominal altitude of 150 feet (46 meters) with line spacings of 200 feet (61 meters). A contour map of the terrestrial gamma exposure rate extrapolated to 1 meter above ground level was prepared and overlaid on an aerial photograph and a set of United States Geological Survey topographic maps of the area. The terrestrial exposure rates varied from 7 to 15 microroentgens per hour ((mu)R/h). The highest observed level over the ANL facility buildings was in the contour range of 247 to 512 (mu)R/h. A search of the data for man-made sources of radiation indicated the presence of cobalt-60 and/or cesium-137 over most of the buildings with elevated count rates. Manganese-54 was detected over one of the sites where cobalt-60 was also seen. A comparison of the contour plots from the present survey and the previous surveys was made. How- ever, due to changes in instrumentation since the last survey, a direct comparison is not possible. Soil samples and pressurized ion chamber measurements were obtained at five locations within the survey boundaries to support the aerial data. These data were found to agree with the aerial data.
DE- *ANL; *Radioactivity; *Radiation Monitoring; Aerial Surveying; Cesium 137; Cobalt 60; Gamma Radiation; Helicopters; Manganese 54; Mapping; Multi-Channel Analyzers; Radiometric Surveys; Remote Sensing
ID- EDB/540230; EDB/440101; EDB/560101; NTISDE
SH- 68F (Environmental Pollution and Control--Radiation Pollution and Control); 77GE (Nuclear Science and Technology--General); 48C (Natural Resources and Earth Sciences--Natural Resource Surveys)

AZ- 1849991
AA- <NTIS> N95-14102/4
TI- L'Identification des Systemes Dynamiques: Applications aux Aeronefs. Titre 2: L'Analyse Non-Lineaire et la Conception de la Manoeuvre (Identification of Dynamic Systems. Volume 3: Applications to Aircraft. Part 2: Nonlinear Analysis and Manoeuvre Design)
AU- Mulder, J. A. ; Sridhar, J. K. ; Breeman, J. H.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; AD455458
RN- AGARD-AG-300-V-3-PT-2; ISBN-92-835-0748-7
PY- cMay 94
PG- 213p
NT- Flight Test Techniques Series.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9505; STAR3303
CP- Other
AB- This AGARDograph is a sequel to the previous AGARDographs published in the AGARD Flight Test Techniques Series, Volume 2 on 'Identification of Dynamic Systems' and Volume 3 on 'Identification of Dynamic Systems - Applications to Aircraft - Part 1: The Output Error Approach' both written by R.E. Maine and K.W. Iliff. The intention of the present document is to cover some of those areas which were either absent or only briefly mentioned in those volumes. These areas are Flight Path Reconstruction, Nonlinear Model Identification, Optimal Input Design and Flight Test Instrumentation. The present approach to identification is rather different from that presented in the earlier AGARDographs in the sense that the identification problem is decomposed into a state estimation and a parameter identification part. This approach is

referred to as the Two-Step Method (TSM), although one will find other names like Estimation Before Modelling (EBM) in the literature. It will be shown in the present AGARDograph that this approach has significant practical advantages over methods which no attempt is made to decompose the joint parameter-state estimation problem. The two-step method is generally applicable to flight vehicles such as fixed wing aircraft and rotorcraft which are equipped with state of the art inertial reference systems. The theoretical developments in the present AGARDograph will be illustrated with examples of a flight test program with the De Havilland DHC-2 Beaver aircraft, the experimental aircraft of the Delft University of Technology which has been used for almost two decades to test new ideas in the science of aircraft parameter identification.
DE- *Aircraft design; *Dynamical systems; *Flight paths; *Flight test instruments; *Flight tests; *Nonlinear systems; *Parameter identification; Aircraft configurations; Aircraft control; Aircraft instruments; Aircraft stability; Dhc 2 aircraft; State estimation
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1848901
AA- <NTIS> AD-A286 290/2
TI- Effects of Dextroamphetamine on Helicopter Pilot Performance: A UH-60 Simulator Study
TI- <NOTE> Final rept
AU- Caldwell, J. A. ; Caldwell, J. L. ; Crowley, J. S. ; Jones, H. D. ; Darling, S. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-43
CN- 3M162787A879; OC
PY- Aug 94
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9505
CP- United States
AB- To determine the efficacy and safety of using Dexedrine to sustain aviator performance during periods of sleep deprivation, a placebo-controlled study was conducted. Six U.S. Army helicopter pilots completed five, 1-hour flights in a specially-instrumented UH-60 simulator while their performance was evaluated via a computerized scoring system. Immediately following each flight, data were collected on electroencephalographic (EEG) activity, cognitive/psychomotor performance, and subjective mood ratings. The testing sessions began with flights at 0100, 0500, 0900, 1300, and 1700. One hour prior to each of the first three sessions on the drug-administration days, the aviators were given 10 mg of Dexedrine or placebo. Statistical analyses of the flight maneuvers revealed that Dexedrine improved aviator control on every maneuver with the exception of the hovering turns and the formation flight. Performance on the stationary hovers, the low level navigation, the climbs and descents, straight-and-level segments, standard-rate turns, and the left-descending turn all manifested at least one Dexedrine-related enhancement. Stimulants, Aviators, Flight performance, EEG, Mood.
DE- *Pilots; *Sleep deprivation; *Stimulation(Physiology); *Amphetamines; *Army; Flight maneuvers; Cognition; Descent; Drugs; Formation flight; Hovering; Navigation; Placebos; Ratings; Safety; Simulators; Standards; Stationary; Electroencephalography; Performance(Human)
ID- *Dextroamphetamine; UH-60 Helicopters; H-60 Helicopters; NTISDODXA
SH- 74GE (Military Sciences--General); 57W (Medicine and Biology--Stress Physiology); 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry)

AZ- 1847589
AA- <NTIS> N95-14050/5
TI- Implementation Issues for a Compact 6 Degree of Freedom Force Reflecting Handcontroller with Cueing of Modes
TI- <NOTE> Abstract Only
AU- Jacobus, H. ; Riggs, A. J. ; Jacobus, C. ; Weinstein, Y.
CS- Cybernet Systems Corp., Ann Arbor, MI.
CS- <CODE> 107543000; C9650296
SP- National Aeronautics and Space Administration, Washington, DC.
CN- NAS9-18094
PY- Jun 91
PG- 1p
NT- In NASA. Ames Research Center, Human Machine Interfaces for Teleoperators and Virtual Environments p 126.
LA- English
PC- (Order as N95-14013/3, PC A08/MF A02)
JA- GRAI9504; STAR3303
CP- United States

AB- Teleoperated control requires a master human interface device that can provide haptic input and output which reflect the responses of a slave robotic system. The effort reported in this paper addresses the design and prototyping of a six degree-of-freedom (DOF) Cartesian coordinate hand controller for this purpose. The device design recommended is an XYZ stage attached to a three-roll wrist which positions a flight-type handgrip. Six degrees of freedom are transduced and control brushless DC motor servo electronics similar in design to those used in computer controlled robotic manipulators. This general approach supports scaled force, velocity, and position feedback to aid an operator in achieving telepresence. The generality of the device and control system characteristics allow the use of inverse dynamics robotic control methodology to project slave robot system forces and inertias to the operator (in scaled form) and at the same time to reduce the apparent inertia of the robotic handcontroller itself. The current control design, which is not multiple fault tolerant, can be extended to make flight control or space use possible. The proposed handcontroller will have advantages in space-based applications where an operator must control several robot arms in a simultaneous and coordinated fashion. It will also have applications in intravehicular activities (within the Space Station) such as microgravity experiments in metallurgy and biological experiments that require isolation from the astronauts' environment. For ground applications, the handcontroller will be useful in underwater activities where the generality of the proposed handcontroller becomes an asset for operation of many different manipulator types. Also applications will emerge in the Military, Construction, and Maintenance/Manufacturing areas including ordnance handling, mine removal, NBC (Nuclear, Chemical, Biological) operations, control of vehicles, and operating strength and agility enhanced machines. Future avionics applications including advanced helicopter and aircraft control may also become important.
DE- *Control sticks; *Controllers; *Degrees of freedom; *Man machine systems; *Teleoperators; Aircraft control; Cues; Electronic control; Flight control; Intravehicular activity; Servomechanisms; Space stations; Telerobotics
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1847582
AA- <NTIS> N95-14043/0
TI- Perceptual and Performance Consequences of Flight in Virtual Worlds
TI- <NOTE> Abstract Only
AU- Bennett, C. T. ; Schwirzke, M. ; Tittle, J. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jun 91
PG- 1p
NT- In Its Human Machine Interfaces for Teleoperators and Virtual Environments p 114.
LA- English
PC- (Order as N95-14013/3, PC A08/MF A02)
JA- GRAI9504; STAR3303
CP- United States
AB- There are two primary purposes for head-mounted systems in aeronautical settings. One is for helmet-mounted sights and teleoperated (head-slaved) weapons systems. Bennett, Johnson, Perrone, and Phatak (1988) evaluated head tracking performance during passive and controlled flight. In that study, comparisons were also made of head tracking performance in sterile and relatively complex virtual worlds. That study confirmed the robustness of head tracking performance across a wide variety of visual scenes. A second use of virtual world displays is for aircraft control. Aircraft controllability using head-mounted, panel-mounted, or simulated out-the-window scenes has been systematically examined. Those studies reported the range of rotorcraft flight tasks in which head-mounted virtual worlds provided some advantages. Two studies will be reported that examine the perceptual/performance effects of virtual worlds. The first examines head tracking performance with roll-stabilized versus non-roll stabilized virtual worlds. The purpose of the study was to (1) examine display strategies used in current display systems and (2) study the adaptability of observers to estimated glide slope angles using head-slaved versus head-stabilized imagery. The purpose of this study was to examine the usefulness of wide field-of-regards during final approaches to a runway.
DE- *Aircraft control; *Aircraft landing; *Flight control; *Helmet mounted displays; *Lateral stability; *Teleoperators; *Virtual reality; Computer graphics; Controllability; Flight crews; Landing aids; Roll; Weapon systems
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1843596

AA- <NTIS> AD-A285 654/0
TI- Laboratory and Flight Tests of Medical Equipment for Use in US Army MEDEVAC Helicopters
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Quattlebaum, M. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-45
CN- 30162787A878; EC
PY- Aug 94
PG- 15p
LA- English
DT- Journal article
PC- Not available NTIS
JA- GRAI9503
CP- United States
AB- When used in an air medical setting, medical equipment designed for use in hospitals can fail from the stresses of in-flight use, or they interfere with critical rotor-wing aircraft systems. From January 1989 to June 1992, 34 medical devices, including monitor/defibrillators, infusion pumps, vital-signs monitors, ventilators and infant transport incubators, were tested under extreme conditions of temperature, humidity, altitude and vibration (MIL-STD 810D). Electromagnetic emissions and susceptibility were measured (MIL-STD 461C and 462), and human factors were evaluated. The devices were flight tested in a UH-60 MEDEVAC helicopter. Thirty-two percent of the medical devices failed at least one environmental test, and 91% of the devices failed to meet electromagnetic interference standards. Failures included excess conducted and radiated emissions and susceptibility to radiated emissions. Five (15%) of the devices were judged unsuitable for use in the UH-60 MEDEVAC helicopter. Testing is critical to discover the ability of a medical device to perform in the harsh rotor-wing MEDEVAC environment. Failure of a device or interference with aircraft systems can result in loss of a patient or aircrew. Medical equipment, MEDEVAC, Air medical transport, Electromagnetic interference, Safety.
DE- *Electromagnetic compatibility; *Helicopters; *Medical equipment; Altitude; Electromagnetic interference; Flight testing; Emission; Environmental tests; Failure; Transport aircraft; Flight crews; Hospitals; Humans; Humidity; Infants; Infusions; Monitors; Patients; Pumps; Rotors; Safety; Standards; Stresses; Temperature; Test and evaluation; Transport; Ventilators; Vibration; Wings; Reprints
ID- UH-60 aircraft; H-60 aircraft; MEDEVAC(Medical Evacuation); NTISDODXR
SH- 74GE (Military Sciences--General); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1840789
AA- <NTIS> AD-A284 971/9
TI- Assessment of the AH-64D, Longbow, Mast-Mounted Assembly Noise Hazard for Maintenance Personnel
TI- <NOTE> Final rept
AU- Mozo, B. T. ; Gordon, E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-37
PY- Jul 94
PG- 40p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9502
CP- United States
AB- Noise levels around the AH-64 helicopter exceed safe limits. Maintenance personnel are required to wear hearing protection to reduce hazard to hearing while performing maintenance procedures. This evaluation was directed at determining the contribution to noise levels by the auxiliary power unit (APU), auxiliary ground power unit (AGPU), environmental control system (ECS), and mast mounted assembly (MMA) at a variety of maintenance positions and establish protection capabilities of standard protectors for those noise levels. Noise levels, AH-64 Helicopter, Hearing protection, Noise hazards.
DE- *Helicopters; *Maintenance personnel; *Noise(Sound); *Exposure(physiology); Control systems; Hearing; Hazards; Masts; Standards; Stress(Physiology)
ID- *Protective equipment; *Aircraft maintenance; *Noise hazards; MMA(Mast Mounted Assembly); AH64 Helicopter; APU(Auxiliary Powr Unit); AGPU(Auxiliary Ground Power Unit); ECS(Environmental Control System); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57U (Medicine and Biology--Public Health and Industrial Medicine); 41I (Manufacturing Technology--Job Environment); 49H (Electrotechnology--Semiconductor Devices); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1840431
AA- <NTIS> TIB/B94-02895
TI- Experimental results of the European HELINOISE aeroacoustic rotor test in the DNW
AU- Niesl, G. ; Splettstoesser, W.R. ; Papanikas, D.G. ; Cenedese, F. ; Nitti, F.
CS- Deutsche Aerospace AG (Dasa), Muenchen (DE).
CS- <CODE> 888888888
RN- ECD--0028-93-PUB; OTN--034530
PY- 14 Sep 93
PG- 16p
NT- 19. European rotorcraft forum, Cernobbio (IT), 14-16 Sep 1993.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09
JA- GRAI9501
CP- Germany
AB- In a major cooperative research program between 8 European partners, a 40%-geometrically and dynamically scaled and highly instrumented model of the ECD (formerly MBB) BO 105 helicopter main rotor was tested in the open jet anechoic test section of the German-Dutch Wind Tunnel, DNW, in the Netherlands. A comprehensive set of simultaneous acoustic and aerodynamic blade surface pressure data as well as blade dynamic and performance data were measured for the standard rotor with rectangular blade tips. The primary objective of this experimental study was to generate an extensive airload and acoustic data base and to examine the relation between the blade pressure characteristics and the acoustic radiation. Initial quantitative information on blade-tip vortex trajectories and blade positions during blade-vortex interactions was obtained. The blade pressure instrumentation, the experimental equipment used, the test procedures applied, and the scope of the test matrix conducted are briefly explained. Typical test results are presented in this report verifying the expected high data quality and consistency. The data is expected to improve the understanding of rotor aeroacoustics and to further the validation of various aerodynamic and acoustic codes developed or improved by the partners of this joint European venture. (orig.). (Copyright (c) 1994 by FIZ. Citation no. 94:002895.)
DE- *Blade slap noise; *Rotary wing aircraft; *Wind tunnel tests; *Anechoic chambers; *Blade-vortex interaction; Bo-105 helicopter; Blade tips; Configurations; Aerodynamics; International cooperation; Europe
ID- *Foreign technology; NTISTFFIZ
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1840413
AA- <NTIS> TIB/B94-02857
TI- Flight state recognition with neural networks - a step to an overall usage monitoring system
AU- Brand, E. ; Krumme, B.
CS- Deutsche Aerospace AG (Dasa), Muenchen (DE).
CS- <CODE> 888888888
RN- ECD--0022-93-PUB; OTN--034521
PY- 1993
PG- 9p
NT- 19. European rotorcraft forum, Cernobbio (IT), 14-16 Sep 1993.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09
JA- GRAI9501
CP- Germany
AB- Global practice in helicopter life time calculation is to use measured flight test data and a predetermined mission profile which is set up once for each helicopter type to cover all the different operator missions. In reality, the operators fly unknown profiles and the design profile has to be chosen very conservatively. This means that manoeuvres have to be included which are more severe than those normally flown by the operator. To establish more realistic mission profiles, neural networks were applied to do flight state recognition in the operator's helicopter. A HUMS is sampling and calculating the data and delivers it to a ground station which enables the operator to calculate individual life times for each helicopter and each component in service. Several selected input values (usually used values in common helicopter) have been investigated to get the correlation to the flight profile. In addition, different types of neural networks were considered. The paper presents first results showing that the neural network was able to identify steady flight states without any problem and gives an outlook on further investigations which are necessary for more reliable recognition of transient flight conditions (manoeuvres) and also for the record of weight and centre of gravity influencing the

structural loads. (orig.). (Copyright (c) 1994 by FIZ. Citation no. 94:002857.)
DE- *Helicopter design; *Life (durability); *Neural nets; Flight tests; Flight paths; Loads (forces); Mission planning; Operating costs; Flight load recorders
ID- *Foreign technology; NTISTFFIZ
SH- 95F (Biomedical Technology and Human Factors Engineering--Bionics and Artificial Intelligence); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1839221
AA- <NTIS> N95-10861/9
TI- Crew Factors in Flight Operations 6: Psychophysiological Responses to Helicopter Operations
AU- Gander, P. H. ; Barnes, R. M. ; Gregory, K. B. ; Connell, L. J. ; Miller, D. L.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:108838; A-94113; NASA-TM-108838
CN- RTOP 505-64-53
PY- Jul 94
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9501; STAR3301
CP- United States
AB- Thirty-two helicopter pilots were studied before, during, and after 4-5 day trips providing support services from Aberdeen, Scotland, to rigs in the North Sea oil fields. Early on-duty times obliged subjects to wake up 1.5 hours earlier on trip days than on pretrip days. Consequently, they slept nearly an hour less per night on trips. They reported more fatigue on post-trip days than on pretrip days, suggesting a cumulative effect of duty-related activities and sleep loss. Fatigue and negative affect were higher, and activation lower, by the end of trip days than by the end of pretrip days. The earlier a subject went on duty, the lower his activation by the end of the day. Caffeine consumption increased 42 percent on trip days. The incidence of headache doubled, of back pain increased twelve fold, and of burning eyes quadrupled. In the aircraft studied, thermal discomfort and high vibration levels were common. The longer pilots remained on duty, the more negative their mood became.
DE- *Aircraft pilots; *Flight operations; *Helicopters; *Physiological responses; *Pilot performance; *Psychophysiology; Caffeine; Comfort; Headache; Moods; Pain; Sleep; Support systems
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology)

AZ- 1838985
AA- <NTIS> N94-37741/3
TI- Civil Use of Night Vision Devices: Evaluation Pilot's Guide, Part 1
TI- <NOTE> Final Report
AU- Green, D. L.
CS- Starmark Corp., Arlington, VA.
CS- <CODE> 097310000; S0527066
RN- SCT-91RR-43; DOT/FAA/RD-94/18
PY- Jul 94
PG- 60p
NT- Prepared for Systems Control Technology, Inc., Arlington, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9501; STAR3212
CP- United States
AB- This document was developed to aid in the evaluation of the use of night vision goggles by civil helicopter pilots. This report was used to prepare pilots to participate in the flight test program. The principal task was to determine if there are any unresolved safety issues that would preclude pilot's use of NVG's during helicopter operations under Federal Aviation Regulations Parts 91 or 135. Certainly NVG's can enable a pilot to 'see better' at night and to accomplish certain flight objectives. However, the question is whether safety is degraded during any phase of the flight operation if pilots use these devices. Even if the use of NVG's dramatically improves operational effectiveness, current safety margins must be maintained or improved during all phases of flight.
DE- *Civil aviation; *Flight tests; *Goggles; *Helicopters; *Night flights (Aircraft); *Night vision; *Performance tests; Flight operations;

Flight safety; Pilot performance; System effectiveness; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1837408
AA- <NTIS> AD-A284 725/9
TI- Design and Development of an Enhanced Biodynamic Manikin. Phase 1
TI- <NOTE> Final rept
AU- Frisch, P. H. ; Boulay, W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-CR-94-1
CN- 3O162787A878; ED
PY- Aug 94
PG- 106p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A02
JA- GRAI9501
CP- United States
AB- Manikins have been used as substitutes for human subject in biodynamic testing since 1944. The original manikin was a simple wooden form to provide an equivalent weight to body mass for testing an ejection seat in a German DO335 aircraft. Since then, manikins have undergone a gradual evolution trying to achieve the goal of a biofidelic human analog. Standard Hybrid III-type manikins have a rigid thoracic and lumbar spine, limiting the response of the manikin's back in a dynamic environment. The predominant injury in survivable U.S. Army rotary-wing mishaps often is spinal injury. The U.S. Army wants to procure a manikin with an enhanced spinal biofidelity with self-contained data acquisition and storage capabilities. The proposed evolution in manikin design to meet the needs of the Army is discussed. A standard Hybrid III-type manikin will be modified. A standard DOT part 572 head and Hybrid III flexible neck will be used. The spinal column includes a flexible spine with multiple vertebral segments, adjustment blocks, biodynamic load cells and sensors, and mountings for the neck and shoulder. Manikin, Biodynamic testing, Survivable injury, Rotary-wing mishaps, Spinal injury, Spinal biofidelity.
DE- *Biodynamics; *Spinal column; *Wounds and injuries; *Army research laboratories; Acquisition; Aircraft; Army; Bodies; Cells; Data acquisition; Dynamics; Ejection seats; Head(Anatomy); Humans; Load cells; Mass; Response; Rotary wings; Seats; Self contained; Standards; Storage; Weight; Medical laboratories
ID- *Manikins; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1837120
AA- <NTIS> AD-A284 433/0
TI- Vibration Testing of Helicopter Equipment
TI- <NOTE> Final rept. on test operations procedure
CS- Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
CS- <CODE> 003024000; 041750
RN- TOP-7-3-531
PY- 26 Aug 94
PG- 42p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9501
CP- United States
AB- This TOP provides guidelines and procedures for helicopter vibration calibration and measurements. Guides are provided for vibration frequencies and magnitudes to be expected. Procedures are developed for transducer selection and placement, instrumentation system design, and data collection. Emphasis is placed on use of piezoelectric accelerometers for vibration measurement, and tape recorders for data storage. Step-by-step procedures are provided for accelerometer sensitivity measurement and calibration, instrumentation system adjustments and calibrations, and data collection and handling. Accelerometer, Modulation, Spectrum, Sinusoid, Frequency, Piezoelectric, Subcarrier, Helicopter, Piezoresistive, Vibration.
DE- *Helicopters; *Test and evaluation; *Vibration; Accelerometers; Calibration; Frequency; Measurement; Modulation; Sensitivity; Tape recorders; Aircraft maintenance; Operational effectiveness; Piezoelectric transducers; Systems analysis
ID- *TOP(Test Operation Procedures); NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46E (Physics--Structural Mechanics)

AZ- 1836991
AA- <NTIS> AD-A284 300/1
TI- Apache Helicopter Seat Cushion Evaluation
TI- <NOTE> Final rept
AU- Butler, B. P. ; Alem, N. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-32
PY- Jul 94
PG- 61p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9501
CP- United States
AB- Two prototypes of the AH-64 pilot seat cushions were evaluated against the standard cushion set by each of a group of 12 AH-64 instructor pilots after being exposed to simulated AH-64 vibration signatures for a period of 1 hour. Objective indications of vibration attenuation were obtained by measuring transfer functions across each cushion. Subjective pilot preferences also were obtained after each ride using a questionnaire. Results of the objective measurements indicate both the air-filled and the foam-filled prototypes reduced low-frequency transmission of vibration better than the standard cushions. Subjective responses indicate significant improvement in comfort and vibration absorption for the seat back and bottom cushions of both prototypes over the standard cushion set. Seat cushion, Apache, Helicopter pilots, Crew comfort.
DE- *Helicopters; *Pilot seats; *Human factors engineering; *Aircraft seats ; Absorption; Air; Attenuation; Bottom; Crews; Foam; Frequency; Functions; Instructors; Low frequency; Measurement; Prototypes; Questionnaires; Response; Seats; Signatures; Standards; Transfer; Transfer functions; Vibration
ID- *APACHE Helicopters; AH-64 Helicopters; H-64 Helicopters; Pilot seat Cushions; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1836948
AA- <NTIS> AD-A284 256/5
TI- Enhancing Soldier Performance: A Nonlinear Model of Performance to Improve Selection Testing and Training
TI- <NOTE> Final rept
AU- O'Donnell, R. ; Moise, S. ; Warner, D. A. ; Secrist, G.
CS- NTI, Inc., Dayton, OH.
CS- <CODE> 092125000; 421987
CN- MDA903-92-C-0099
PY- Jul 94
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9501
CP- United States
AB- Advanced U.S. Army technology and hardware systems place a higher cognitive demand on the individual soldier than ever before. Sophisticated weaponry and hostile mission environments of modern conflict threaten to overwhelm the capacities of the human operator. New selection and training instruments are being developed to (a) select people most likely to perform well under high cognitive demands, (b) identify weaknesses in people, and (c) alter or train the person to improve response to the increased cognitive work load. The primary goals of this Phase I SBIR effort were to develop a new conceptual model and to suggest new testing and training approaches to handle the cognitive complexity of many Army tasks. Such approaches may enhance the identification and training of people to perform cognitive tasks efficiently during conditions of extremely high work load. To begin this process, a general nonlinear model of performance was first developed by exploring performance theory; this theoretical orientation was then translated into practical assessment and training tools to select and enhance people likely to excel at tasks demanding particular combinations of skills. A nonlinear approach to combining these procedures into a practical test battery and a specific training approach based on this model were proposed. AH-64 Aircraft, Function analysis, Modeling, Task analysis, Aviator work load, Longbow Apache, NASA-TLX, Work load prediction, Crew station design, Mission analysis,

Pilot-vehicle interface.
DE- *Human factors engineering; *Decision making; *Stress(Psychology); *Army training; *Performance tests; Aircraft; Army personnel; Cognition ; Conflict; Environments; Identification; Interfaces; Pilots; Predictions; Response; Selection; Skills; Test and evaluation; Theory; Tools; Training; Functional analysis; Advanced weapons; Workload; Performance(Human); Theory; Test construction(Psychology); Aptitude tests; Psychological tests; Attack helicopters; Flight crews
ID- Aviator work load; Crew station design; Functional design; Mission analysis; Modeling; Pilot vehicle interface; Task analysis; Work load prediction; Nonlinear models; Cognitive functioning; AH-64 Aircraft; NTISDODXA
SH- 74GE (Military Sciences--General); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92B (Behavior and Society--Psychology)

AZ- 1830775
AA- <NTIS> TIB/B94-02434
TI- Erprobung von Airborne Gammaspektrometrie zur Kartierung von radioaktivem Fallout. (Testing of airborne gamma spectrometry for mapping of radioactive fallout)
AU- Wendt, I.
CS- Bundesministerium fuer Umwelt, Naturschutz und Reaktorsicherheit, Bonn (Germany, F.R.).
CS- <CODE> 088412000; 9202276;
SP- Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (DE).
RN- BMU--1992-359; ISSN 0724-3316
CN- BMU ST.SCH.01063
PY- 1992
PG- 36p
NT- In German. Schriftenreihe Reaktorsicherheit und Strahlenschutz.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC E09
JA- GRAI9422
CP- Germany, Federal Republic of
AB- The structure, calibration, sensitivity, data acquisition and processing of a 32L NaI spectrometer are described. Preliminary measuring results obtained by helicopter covering are represented. The established radioactivity profiles and maps for Th, U, K, Cs-137 and Cs-134 agree, in terms of order of magnitude, with measured soil smaples so that this method is appropriate for surveying within a short time large areas in the case of emergencies. Several improvements of measurement technology are suggested. (orig.). 9 tabs. (Copyright (c) 1994 by FIZ. Citation no. 94:002434.)
DE- *Aerial monitoring; *Nai detectors; *Airborne equipment; *Gamma ray spectrometers; *Radioactive isotopes; *Fallout; *Radiation dosage; Soils; Aerial surveying; Helicopters; Calibration; Gamma spectrometers; Data acquisition; Data processing; Topological mapping; Maps; Sensitivity; Scintillation counting; Fallout deposits; Calibrating
ID- *Foreign technology; NTISTFFIZ
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 68F (Environmental Pollution and Control--Radiation Pollution and Control)

AZ- 1828897
AA- <NTIS> N94-34994/1
TI- YAV-8B Reaction Control System Bleed and Control Power Usage in Hover and Transition
AU- Borchers, P. F. ; Moralez, E. ; Merrick, V. K. ; Stortz, M. W.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:104021; A-93080; NASA-TM-104021
CN- RTOP 533-02-37
PY- Apr 94
PG- 47p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9422; STAR3210
CP- United States
AB- Using a calibrated Rolls-Royce Pegasus engine and existing aircraft instrumentation and pressure taps, total and individual nozzle reaction control system (RCS) bleed flow rates have been measured on a YAV-8B Harrier during typical short takeoff, transition, hover, and vertical landing maneuvers. RCS thrust forces were calculated from RCS nozzle total pressure measurements, and control power was determined from the moments produced by these thrusts and the aircraft's moments of inertia. These data document the characteristics of the YAV-8B RCS with

its basic stability augmentation system (SAS) engaged. Advanced control system designs for the YAV-8B can be compared to the original SAS based on the total bleed use and the percentage of available bleed used. In addition, the peak and mean values of the bleed and control power data can be used for sizing the reaction controls for a future short takeoff and vertical landing (STOVL) aircraft.
DE- *Flight control; *Harrier aircraft; *Hovering; *Stability augmentation; *Stovl aircraft; *Transition flight; Aircraft control; Directional control; Bristol-siddeley bs 53 engine; Flow velocity; Jet thrust; Pressure measurement; Stagnation pressure; Vertical landing
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1828813
AA- <NTIS> N94-34624/4
TI- Study Findings on the Influence of Maneuverability and Agility on Helicopter Handling Qualities
AU- Whalley, M. S.
CS- Army Aviation Research and Technology Activity, Moffett Field, CA. Aeroflightdynamics Directorate.
CS- <CODE> 084182001; AZ153632
PY- cMar 94
PG- 10p
NT- In AGARD, Technologies for Highly Manoeuvrable Aircraft 10 p.
LA- English
PC- (Order as N94-34605/3, PC A15/MF A03)
JA- GRAI9422; STAR3210
CP- United States
AB- Three piloted simulation studies were performed by the U.S. Army Aeroflightdynamics Directorate to examine the influence of maneuverability and agility on helicopter handling qualities and to provide an expanded basis for the dynamic response requirements in Aeronautical Design Standard 33C, Handling Qualities Requirements for Military Rotorcraft. The experiments focused on aggressive tasks such as air-to-air combat and target acquisition and tracking. The first experiment focused on yaw agility requirements in the form of attitude quickness and bandwidth. The second experiment focused on pitch and roll agility and maneuverability requirements in the form of bandwidth, angular rate, and attitude quickness. The third experiment focused on maneuverability requirements in the form of normal and longitudinal load factor envelope for both conventional and compound helicopters. Findings from the three studies are presented in the form of Cooper-Harper handling qualities ratings, pilot commentary, and task performance.
DE- *Helicopter control; *Helicopter performance; *Maneuverability; *Military helicopters; *Roll; *Yaw; Attitude (Inclination); Controllability; Dynamic response; Angular velocity; Combat; Loads (Forces); Pilot performance; Ratings; Target acquisition
ID- NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1828812
AA- <NTIS> N94-34623/6
TI- Flying Qualities Evaluation Maneuvers
AU- Cord, T. J. ; Leggett, D. B. ; Wilson, D. J. ; Riley, D. R. ; Citurs, K. D.
CS- Wright Lab., Wright-Patterson AFB, OH. Materials Directorate.
CS- <CODE> 101228006; W8021944
PY- cMar 94
PG- 8p
NT- In AGARD, Technologies for Highly Manoeuvrable Aircraft 8 p.
LA- English
PC- (Order as N94-34605/3, PC A15/MF A03)
JA- GRAI9422; STAR3210
CP- United States
AB- An initial set of aircraft maneuvers has been defined to augment the evaluation methods currently used by the flying qualities and flight test communities. These maneuvers are meant to employ the full range of available aircraft dynamics and to be applied over the full aircraft flight envelope. They include several closed-loop tasks and are the start of a set of demonstration maneuvers (of the type now used in the rotorcraft flying quality specification) for aircraft requirements. A primary goal was to establish a tie between design parameters, aircraft attributes, and the operational usage environment while maintaining control of the evaluation process. The approach was to concentrate on aircraft dynamics which occur in daily operations and to create pilot tasks which use those conditions to relate to important aircraft characteristics. Existing evaluation methods concentrate on comparing quantitative data to charts in MIL-Standards which predict flying qualities. The maneuvers discussed here directly measure the ability of the pilot to perform the tasks of interest and at the same time maintain a tie to the design community.
DE- *Aerodynamic characteristics; *Aircraft maneuvers; *Flight

characteristics; *Flight envelopes; *Flight tests; *Highly maneuverable aircraft; Design analysis; Feedback control; Pilot performance
ID- NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1827243
AA- <NTIS> AD-A282 808/5
TI- ADST, Version Description Document for the BDS-D PVD 1.0.0
AU- Swanson, C. ; Bright, R. ; Thompson, L. ; Peterson, P.
CS- Loral Systems Co., Orlando, FL. ADST Program Office.
CS- <CODE> 104989000; 425539
CN- N61339-91-D-0001
PY- 2 Apr 93
PG- 152p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A02
JA- GRAI9422
CP- United States
AB- This Version Description Document (VDD) contains a functional description of the Planned View Display (PVD) software, all modules in this release are identified by version number, a set of build instructions, installation procedures, identification of any known problems, release notes and any essential data relationships that are part of this 2 April 1993 release of the BDS-D PVD 1.0.0. Soldier in the loop simulators exist at the Aviation Test Bed (AVTB) located at Ft. Rucker, Alabama and the Close Combat Test Bed (MWTB) located at Ft. Knox, Kentucky. The simulators include Rotary Wing Aircraft (RWA, only at Ft. Rucker), M1 tanks, Bradley Fighting Vehicles, Fixed Wing Aircraft (FWA), a Management, Command and Control system (MCC), Non Line of Sight Vehicle (NLOS, located at Ft. Knox only), and, finally, a Semi-Automated Forces system (SAFOR). The PVD is a stand-alone system which is connected to the Simulation Network (SIMNET). It's function is to provide a map based 'Gods eye view' of one or more distributed simulation exercises. The PVD can display the entire terrain database or selected regions via menu selection. Vehicles in the distributed simulation are represented by small icons that show that vehicle location and hull/turret orientation. Intervisibility between vehicles on the terrain can be displayed. The PVD can remotely control the datalogger and stealth vehicle.
DE- *Data displays; *Terrain models; *Computerized simulation; Computer files; Libraries; Instructions; Rotary wing aircraft; Fixed wing aircraft; Modules(Electronics)
ID- *War games; AVTD(Aviation Test Bed); MCC(Management Command and Control); BDS-D(Ballistic Distributed Simulation-Developmental); CCTB(Close Combat Test Bed); ADST(Advanced Distributed Simulation Technology); NTISDODXA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 48I (Natural Resources and Earth Sciences--Cartography); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1825078
AA- <NTIS> N94-34264/9
TI- Vision-Based Aircraft Guidance
TI- <NOTE> Final Report, 1 Feb. 1993 - 14 Dec. 1993
AU- Menon, P. K.
CS- Santa Clara Univ., CA.
CS- <CODE> 023276000; SC188052
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:195937; NASA-CR-195937
CN- NCC2-793
PY- Dec 93
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9421; STAR3210
CP- United States
AB- Early research on the development of machine vision algorithms to serve as pilot aids in aircraft flight operations is discussed. The research is useful for synthesizing new cockpit instrumentation that can enhance flight safety and efficiency. With the present work as the basis, future research will produce low-cost instrument by integrating a conventional TV camera together with off-the=shelf digitizing hardware for flight test verification. Initial focus of the research will be on developing pilot aids for clear-night operations. Latter part of the research will examine synthetic vision issues for poor visibility

flight operations. Both research efforts will contribute towards the high-speed civil transport aircraft program. It is anticipated that the research reported here will also produce pilot aids for conducting helicopter flight operations during emergency search and rescue. The primary emphasis of the present research effort is on near-term, flight demonstrable technologies. This report discusses pilot aids for night landing and takeoff and synthetic vision as an aid to low visibility landing.

DE- *Aircraft guidance; *Aircraft instruments; *Computer vision; *Flight safety; Low visibility; Night vision; Visibility; Cockpits; Flight operations; Takeoff; Television cameras; Transport aircraft

ID- NTISNASA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 1824902

AA- <NTIS> N94-33875/3

TI- La Maniabilite Operationnelle (Operational Agility)

CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).

CS- <CODE> 056102000; AD455458

RN- AGARD-AR-314; ISBN-92-835-0743-6

PY- cApr 94

PG- 222p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A10/MF A03

JA- GRAI9421; STAR3210

CP- Other

AB- From previous AGARD activities, it was recognized that flying qualities and traditional aircraft performance parameters did not characterize the capability or effectiveness of combat aircraft, although they do offer a guide. Other expert groups had reached a similar conclusion. The subject that arose from these realizations was 'agility'. Recognizing that this was an incomplete or immature concept and that a wide variety of sometimes disparate views existed, the Flight Mechanics Panel formed a further Working Group, WG 19, consisting of specialists from AGARD member countries, to study the subject under the title of 'Operational Agility'. Working sessions were held at places of special interest to the group, between 1991 and 1993. The specific aims of the Working Group were to provide definitions, which are universally acceptable, of the terminologies involved in agility; to collate the results of lessons learned from experiments on agility; to define metrics or figures of merit for use in design and evaluation; to explore and document the theoretical foundations; to explore the operational pay-off of balanced capabilities between the airframe, systems and weapons; to highlight any specialized aspects applicable to rotorcraft; to indicate possible means of evaluation in flight; and to recommend areas for further research and development activities, including possible collaborative projects. The Group has completed its study of operational agility with this report. In undertaking the study, a greater understanding has been reached of those subjects which influence operational agility and how these subjects, via the use of operational agility concepts, may be related to the combat effectiveness of the weapon systems. In reaching this understanding, the Group has proposed definitions of the agility terminology which should prove universally acceptable; it has arrived at the methodology for assessment of the various component systems which contribute to the operational agility or combat effectiveness of a Weapon System; and has listed a number of major conclusions and recommendations.

DE- *Aircraft maneuvers; *Aircraft performance; *Fighter aircraft; *Flight control; *System effectiveness; Flight characteristics; Flight mechanics; Weapon systems; Active control; Airframes; Combat; Flight operations; Helicopters; Pilot performance

ID- *Foreign technology; NTISNASAE

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1824812

AA- <NTIS> N94-33628/6

TI- Human Factors Evaluation Using Tools for Automated Knowledge Engineering

AU- Gomes, M. E. ; Lind, S.

CS- Harry G. Armstrong Aerospace Medical Research Lab., Wright-Patterson AFB, OH.

CS- <CODE> 084124000; AG749748

SP- National Aeronautics and Space Administration, Washington, DC.

PY- Jan 94

PG- 5p

NT- In NASA. Johnson Space Center, Seventh Annual Workshop on Space Operations Applications and Research (Soar 1993), Volume 2 p 437-441.

LA- English

PC- (Order as N94-33612/0, PC A16/MF A03)
JA- GRAI9421; STAR3210
CP- United States
AB- A human factors evaluation of the MH-53J helicopter cockpit is described. This evaluation was an application and futher development of Tools for Automated Knowledge Engineering (TAKE). TAKE is used to acquire and analyze knowledge from domain experts (aircrew members, system designers, maintenance personnel, human factors engineers, or others). TAKE was successfully utilized for the purpose of recommending improvements for the man-machine interfaces (MMI) in the MH-53J cockpit.
DE- *Cockpits; *Computer aided design; *Expert systems; *H-53 helicopter; *Helicopter design; *Human factors engineering; *Knowledge bases (Artificial intelligence); *Knowledge representation; *Man machine systems; *Performance tests; Data bases; Evaluation; Systems engineering
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1824806
AA- <NTIS> N94-33622/9
TI- Autogenic-Feedback Training Improves Pilot Performance during Emergency Flying Conditions
AU- Kellar, M. A. ; Folen, R. A. ; Cowings, P. S. ; Toscano, W. B. ; Hisert, G. L.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jan 94
PG- 9p
NT- In NASA. Johnson Space Center, Seventh Annual Workshop on Space Operations Applications and Research (Soar 1993), Volume 2 p 395-403. See Also N93-27076.
LA- English
PC- (Order as N94-33612/0, PC A16/MF A03)
JA- GRAI9421; STAR3210
CP- United States
AB- Studies have shown that autonomous mode behavior is one cause of aircraft fatalities due to pilot error. In such cases, the pilot is in a high state of psychological and physiological arousal and tends to focus on one problem, while ignoring more critical information. This study examined the effect of training in physiological self-recognition and regulation, as a means of improving crew cockpit performance. Seventeen pilots were assigned to the treatment and control groups matched for accumulated flight hours. The treatment group comprised three pilots of HC-130 Hercules aircraft and four HH-65 Dolphin helicopter pilots; the control group comprised three pilots of HC-130's and six Dolphin helicopter pilots. During an initial flight, physiological data were recorded for each crew member and individual crew performance was rated by an instructor pilot. Eight crewmembers were then taught to regulate their own physiological response levels using Autogenic-Feedback Training (AFT). The remaining subjects received no training. During a second flight, treatment subjects showed significant improvement in performance, while controls did not improve. The results indicate that AFT management of high states of physiological arousal may improve pilot performance during emergency flying conditions.
DE- *Aviation psychology; *Emergencies; *Flight crews; *Physiological responses; *Pilot error; *Pilot performance; *Pilot training; *Psychological tests; Autonomy; C-130 aircraft; Helicopters
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1823401
AA- <NTIS> AD-A282 114/8
TI- Bird Corporation Avian Portable Ventilator, Model 15300, TE Identification Number 42
TI- <NOTE> Laboratory test rept
AU- Quattlebaum, M. D. ; Bruckart, J. E. ; Licina, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-24
PY- May 94
PG- 45p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9421
CP- United States
AB- The Bird Avian portable ventilator, Model 15300, was tested for

environmental and electromagnetic interference/compatibility under the U.S. Army Program for Testing and evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures. The Bird Avian ventilator was found compatible with the environmental tests after configuration changes. The unit may produce some electromagnetic emissions in excess of the military specification. Electromagnetic compatibility, Test and evaluation, Aeromedical equipment.
DE- *Ventilators; *Medical equipment; Configurations; Electromagnetic compatibility; Electromagnetic interference; Emission; Environmental tests; Specifications; Standards; Test and evaluation; Portable equipment; Aviation medicine; Helicopters; Flight testing; Army operations
ID- UH-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1819308
AA- <NTIS> AD-A280 771/7
TI- Visual Meteorological Conditions (VMC) Right Turn Curved Approaches
TI- <NOTE> Technical note Jul-Aug 92
AU- Weiss, R. M. ; Plotka, M.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN93/24
PY- May 94
PG- 225p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9420
CP- United States
AB- Flight tests using left turns to final were conducted in 1989 and 1990 at the Federal Aviation Administration (FAA) Technical Center to aid in answering questions concerning curved approaches to a heliport under visual meteorological conditions (VMC). Those questions included protected airspace within the curved segment, the most feasible angle of turn, and minimum final approach segment. Additional tests using the FAA's Sikorsky S-76, were conducted at the FAA Technical Center in 1992 using right turn to final. Results will be used to help refine the airspace requirements for curved approaches. Three turn angles were examined, 45, 90 and 180 degrees each with three different final segment lengths, 800, 1200 and 1600 feet. A groundbased tracking system was used to track all maneuvers. This report documents the results of these flights. The test procedures, evaluation methodology, and technical and operational issues are discussed. Analysis of pilot performance, as well as pilot subjective input, are provided. Conclusions are drawn that address the airspace, turn angle, and final segment issues. The results will be considered in future modifications to the FAA Heliport Design Advisory Circular, AC 150/5390-2. Curved approaches, Approach surface, Final segment, Heliport.
DE- *Helicopters; *Aircraft landings; *Turning(Maneuvering); Angles; Heliports; Pilots; Test and evaluation; Tracking; Flight testing; Air space; Flight maneuvers; Visual flight rules; Radar tracking; Skewness; Standard deviation
ID- *Curved approach; Visual meteorological conditions; S-76A Aircraft; Right turns; Kurtosis; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1816477
AA- <NTIS> AD-A280 239/5
TI- Advanced Distributed Simulation Technology Advanced Rotary Wing Aircraft. System/Segment Specification. Volume 3. Visual System Module
AU- Branson, R. ; Anschuetz, R.
CS- Loral Systems Co., Orlando, FL. ADST Program Office.
CS- <CODE> 104989000; 425539
RN- ADST/TR94-003276-VOL-3
CN- N61339-91-D-0001
PY- 31 Mar 94
PG- 35p
NT- See also Volume 1, AD-A280 238.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9419
CP- United States
AB- The ADST ARWA System/Segment Specification establishes the functional requirements for the Advanced Rotary Wing Aircraft (ARWA) Simulator System (SS). Volume III describes the requirements for the Visual

System Module (VSM). The VSM component provides functions of global bus communication interfaces to the other segments, visual system controller, display device control, head tracker function control, and data base storage control.
DE- *Rotary wing aircraft; *Flight simulators; Data bases; Functions; Computerized simulation; Interfaces; Requirements; Specifications; Wings
ID- *Display devices; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1812808
AA- <NTIS> N94-29862/7
TI- Potential Hazards of Magnetic Resonance Imagers to Emergency Medical Service Helicopter Operations
TI- <NOTE> Final Report
AU- Newman, R. B.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; S9210736
RN- DOT/FAA/RD-92/15; SCT-92RR-14
CN- DTFA01-87-C-00014
PY- Jan 93
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9417; STAR3208
CP- United States
AB- In recent years, there have been several incidents with helicopters where magnetic resonance imagers (MRI's) have interferred with the operation of magnetic sensors such as compasses and directional gyroscopes. The magnetic fields generated by the MRI magnet causes magnetic sensors to give aberrant readings. This report documents the characteristics of MIR's and how they operate. It discusses relevant federal regulations of MRI and all magnetic effects and hazards involved with operating helicopters in a strong static magnetic field for both personnel and equipment. Finally, the report makes recommendations for safe helicopter operations in and around MRI's.
DE- *Flight hazards; *Helicopters; *Magnetic effects; *Magnetic fields; Electromagnetic fields; Imaging techniques; Compasses; Gyroscopes; Regulations
ID- *Magnetic resonance imaging; *Emergency medical services; NTISNASA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 1807931
AA- <NTIS> AD-A278 777/8
TI- Rotorcraft Night Vision Goggle Evaluation
TI- <NOTE> Final rept
AU- Hawley, R. J. ; Anoll, R. K. ; Green, D.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
SP- Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
RN- SCT-91RR-29; DOT/FAA/RD-91/11
CN- DTFA01-87-C-00014
PY- Jul 91
PG- 65p
NT- Prepared in cooperation with Starmark Corp.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9416
CP- United States
AB- This document addresses the potential use of night vision goggles (NVG's) by the civilian rotorcraft community. Key issues analyzed are the advantages and limitations of using NVG's in civilian rotorcraft operations, safety factors surrounding NVG use, and pilot qualification/training requirements. Background information on NVG equipment design, characteristics, types, and associated aircraft requirements/modifications are also presented in the context of civilian use. These issues are then related to the existing FAA regulations concerning night flying operations. Pilots, engineers, and aeromedical experts from the uniformed services, as well as several civil proponents who have had extensive experience with NVG's were interviewed. Their experiences, insights, and recommendations are incorporated into the text. All those with previous NVG experience

agreed that despite the limitations, they would prefer flying at night with NVG's available and that NVG's reduce stress and increase situational awareness in the cockpit at night. This investigation concludes that the civil use of NVG's as an aid during en route and certain terminal operations can increase safety, enhance situational awareness, and significantly reduce the pilot workload and stress normally associated with flying at night. At the same time this investigation highlights that a number of key safety issues, unique to the civilian pilot community, still need to be resolved. A follow-on flight evaluation and simulation effort are envisioned to address these issues. Rotorcraft, Visionics, Night vision goggles, Image intensification, Night flying.
DE- *Night vision; *Pilots; *Night vision devices; Cockpits; Flight; Image intensification; Images; Limitations; Modification; Qualifications; Regulations; Requirements; Safety; Simulation; Terminals; Time; Training; Visionics; Workload; Military publications; Cost effectiveness
ID- *Rotorcraft; NTISDODXA; NTISDOTFAA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1807405
AA- <NTIS> PB94-167491
TI- Joint Acoustic Propagation Experiment. JAPE 91 Meeting Organized by NATO. Held in Hampton, Virginia on April 26-28, 1993. Contribution of ISL
AU- Naz, P. ; Parmentier, G.
CS- Institut Franco-Allemand de Recherches, Saint-Louis (France).
CS- <CODE> 012819000
SP- Direction des Recherches, Etudes et Techniques, Paris (France). Centre de Documentation de l'Armement.
PY- 1994
PG- 13p
NT- See also N94-24207. Sponsored by Direction des Recherches, Etudes et Techniques, Paris (France). Centre de Documentation de l'Armement.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E05/MF E05
JA- GRAI9415
CP- Other
AB- In this paper a brief description of French-German Research Institute of Saint Louis (ISL) instrumentation used during the Joint Acoustic Propagation Experiment (JAPE) experiments and an overview of the first analysis of the data collected during this measurement campaign is presented. The acoustic data have been analyzed first to allow the characterization of the acoustic sources used (speakers, guns, helicopters, etc.), and secondly to study the propagation characteristics of these different sources according to the local meteorological situation. Some tests have been made with a helicopter flying behind a small hill in order to measure the effect of terrain obstruction on sound propagation, as well as to evaluate non line-of-sight helicopter detection.
DE- *Acoustic detection; *Aircraft noise; *Terrain masking; *Atmospheric attenuation; *Gunfire; Helicopters; Microphones; Wave propagation; Acoustic measurement; Target discrimination; Sound pressure
ID- *Foreign technology; NTISTFCDA
SH- 63A (Detection and Countermeasures--Acoustic Detection); 55E (Atmospheric Sciences--Physical Meteorology); 46A (Physics--Acoustics)

AZ- 1802900
AA- <NTIS> DE94005651
TI- Air-depolyable geophysics package
AU- Hunter, S. L. ; Harben, P. E.
CS- Lawrence Livermore National Lab., CA.
CS- <CODE> 068147000; 9513035
SP- Department of Energy, Washington, DC.
RN- UCRL-ID-115370
CN- W-7405-ENG-48
PY- Nov 93
PG- 13p
NT- Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9414; ERA9426
CP- United States
AB- We are using Lawrence Livermore National Laboratory's (LLNL's) diverse expertise to develop a geophysical monitoring system that can survive

being dropped into place by a helicopter or airplane. Such an air-deployable system could significantly decrease the time and effort needed to set up such instruments in remote locations following a major earthquake or volcanic eruption. Most currently available geophysical monitoring and survey systems, such as seismic monitoring stations, use sensitive, fragile instrumentation that requires personnel trained and experienced in data acquisition and field setup. Rapid deployment of such equipment can be difficult or impossible. Recent developments in low-power electronics, new materials, and sensors that are resistant to severe impacts have made it possible to develop low-cost geophysical monitoring packages for rapid deployment missions. Our strategy was to focus on low-cost battery-powered systems that would have a relatively long (several months) operational lifetime. We concentrated on the conceptual design and engineering of a single-component seismic system that could survive an air-deployment into an earth material, such as alluvium. Actual implementation of such a system is a goal of future work on this concept. For this project, we drew on LLNL's Earth Sciences Department, Radio Shop, Plastics Shop, and Weapons Program. The military has had several programs to develop air-deployed and cannon-deployed seismometers. Recently, a sonobuoy manufacturer has offered an air-deployable geophone designed to make relatively soft landings.

DE- *Geophysical Surveys; Monitors; Design; Electronic Equipment; Encapsulation; Impact Tests

ID- EDB/440800; EDB/420500; NTISDE

SH- 48F (Natural Resources and Earth Sciences--Geology and Geophysics); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 1802248

AA- <NTIS> AD-A277 806/6

TI- Recent Advances in Long Range and Long Endurance Operation of Aircraft (Les Progres Recents dans le Domaine des Operations Aeriennes a Longue Distance et de Longdue Duree)

CS- California Assembly Public Employees and Retirement Committee, Sacramento.

CS- <CODE> 056132000; 400043

RN- AGARD-CP-547

PY- Nov 93

PG- 324p

NT- Presented at Flight Mechanics Panel Symposium, Kijkduin (The Hague) The Netherlands, 24-27 May 93.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

DT- Conference proceeding

PC- PC A14/MF A03

JA- GRAI9414

CP- Other

AB- Over the past few years, the use of aircraft in what can be termed long range and/or long endurance operations has proved to be a successful use of military resources. Operations such as tactical strikes mounted from bases thousands of miles away, to the use of long endurance patrol aircraft over either the battlefield or the maritime environment demonstrate the ability now contained in the NATO operational forces. The use of military airlift to position forces where they are most needed clearly is another operation where the range and endurance of the aircraft are pivotal to the success of the operation. Technologies which improve the range and endurance of aircraft have seen considerable advances over the past ten years. Aircraft design for these features has matured considerably while the procedure of air-to-air refueling has made global deployment and 24+ hour operations a reality. When not generally perceived as long range aircraft, the possible range and endurance of fighters (both subsonically and supersonically), V/STOL aircraft and even rotorcraft have improved considerably over the last generation of vehicle design. With the current requirements to fly farther and longer, this Symposium was conceived to summarize the latest technological advances in the various fields which in a combined manner define the range and endurance of airborne vehicles. The Symposium was divided into four specific elements: (1) airframe design technologies, including aerodynamics and structures, (2) propulsion technology, (3) the human factors problems associated with these types of missions and, (4) air-to-air refueling technologies and procedures.

DE- *Military aircraft; *Aerodynamic characteristics; *Endurance(General); Aeronautical engineering; Airframes; Propulsion systems; Human factors engineering; Refueling in flight

ID- *Foreign technology; *Military operations; *Meetings; NATO Furnished; Flight mechanics; NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 1802115
AA- <NTIS> AD-A277 668/0
TI- Integration of the Molecular Sieve Oxygen Generating System (MSOGS) into the UH-60Q Medevac Blackhawk
TI- <NOTE> Final rept. 24 Aug 92-30 May 93
AU- Hight, J. ; Cordero-Montalvo, O.
CS- Serv-Air, Inc., Lexington, KY.
CS- <CODE> 108668000; 427796
CN- MIPR-92MM2594; 3O463807D836; JC
PY- 11 Mar 94
PG- 54p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9414
CP- United States
AB- A Molecular Sieve Oxygen Generated System (MSOGS) was integrated in the UH-60Q Medevac Helicopter as part of the requirements of this program. Support equipment for the system operation was also integrated in this effort. Problems such as intake air flow cooling and moisture build-up were addressed. Functional and performance tests were conducted by personnel from United States Army Aeromedical Research Laboratory. As a result of the integration effort a more simple and efficient method of installing the MSOGS unit and its supporting systems will be developed. Emphasis will be on the servicing of the oxygen lines on the field to make the system user friendly.
DE- *Medical equipment; *Helicopters; Oxygen; Medical evacuation; Airworthiness; Ambulances; Medical personnel; Aircraft equipment
ID- *Army; UH-600 Aircraft; H-60 Aircraft; NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1801963
AA- <NTIS> AD-A277 516/1
TI- Experimental Study of Pilot/Vehicle Dynamics Using a Tilt Rotor Flying Machine
TI- <NOTE> Final rept. May 92-Jun 93
AU- Doman, D. B.
CS- Wright Lab., Wright-Patterson AFB, OH.
CS- <CODE> 101228000; 422730
RN- WL-TR-93-3063
PY- Jun 93
PG- 291p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A13/MF A03
JA- GRAI9414
CP- United States
AB- A laboratory Tilt Rotor Flying Machine (TROFM) is designed and built for the purpose of conducting an experimental study of the effects of command systems on human pilot behavior. The aircraft is mounted on a two-axis pivot stand which gives the fuselage 2 degrees of freedom; pitch and yaw. Analytical models are derived using Lagrangian and Newtonian techniques. Identification of the aircraft characteristics is based on a nonparametric Discrete Fourier Transform technique and a maximum likelihood parameter estimation scheme. Attitude command, rate command and unaugmented systems are designed and implemented in real time using a digital computer. An investigation of the effects of command systems, displays and tasks on human pilot behavior is conducted. Pilot and pilot-vehicle describing functions are obtained from time histories of dynamic tracking tasks where the pilot attempts to track a random appearing input. Correlations between Cooper-Harper ratings and quantitative descriptions of pilot behavior are made. The experimental results compare favorably to the classical theory of man-machine system dynamics which is based on the cross-over model. The results of this study indicate that desirable controlled elements in man-machine systems have the characteristics of a simple tracker. Pilot Models, Manual Control, Vehicle Dynamics, Human Pilot Dynamics, Handling Qualities, Pilot Dynamics, System Identification.
DE- *Behavior; *Pilots; *Tilt rotor aircraft; *Performance(Human); *Man machine systems; Correlation; Degrees of freedom; Digital computers; Discrete fourier transforms; Functions; Fuselages; Handling; Laboratories; Models; Parameters; Ratings; Real time; Rotors; Time; Tracking; Yaw
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92B (Behavior and Society--Psychology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1798993
AA- <NTIS> AD-A277 002/2
TI- Technical Evaluation of the UH-60Q: Medical Suction System
AU- Bruckart, J. E. ; Licina, J. R. ; Quattlebaum, M. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-8
PY- Jan 94
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9413
CP- United States
AB- The UH-60Q prototype MEDEVAC Black Hawk in configured to provide day/night, adverse weather, emergency movement of patients. The objective of this report is to describe the results of performance test on the medical suction system installed on the prototype aircraft. The medical suction system in the aircraft consists of two independent suction pumps capable of producing from 0 to 250 mmHg continuous or intermittent vacuum through any of six 1/2-inch ports. Each port accommodated an air flow of 17 to 18 liters per minute and was not affected by operation of other ports on the same pump. The redundant design of the system will provide some backup capability if a single suction pump fails. Labeling of the controls requires modification. Medical aidmen operating the unit recommended the pressure controls and outlets be moved to the control panel by the head of the patient. UH-60Q, MEDEVAC Black Hawk, Medical equipment, Testing.
DE- *Aircraft; *Medical equipment; *Suction pumps; Air flow; Control panels ; Emergencies; Head(Anatomy); Operation; Patients; Performance tests; Prototypes; Test and evaluation; Vacuum; Helicopters
ID- UH-60Q Aircraft; H-60 Aircraft; NTISDODXA
SH- 74GE (Military Sciences--General); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1798974
AA- <NTIS> AD-A276 983/4
TI- Technical Evaluation of the UH-60Q: Medical Oxygen System
AU- Bruckart, J. E. ; Licina, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-94-9
PY- Jan 94
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9413
CP- United States
AB- The UH-600 prototype MEDEVAC Black Hawk is configured to provide day/night, adverse weather, emergency movement of patients. The objective of this report is to describe the results of performance tests on the medical oxygen system installed on the prototype aircraft. The medical oxygen system in the aircraft consists of a molecular sieve oxygen generating system (MSOGS) and support equipment. The MSOGS uses bleed air to produce high concentration oxygen. The MSOGS in the prototype aircraft is capable of producing 15 to 20 lpm of 94% oxygen and storing 163 1 of oxygen in the backup oxygen supply (BOS). Lower bleed air pressures in ground tests may account for some decrement in performance of the MSOGS when compared to laboratory testing. Inflight testing is required. The support equipment, including oxygen concentration analyzer, BOS pressure monitor, and oxygen flowmeter do not function properly. The regulated oxygen pressure to too low to allow proper operation of the oxygen flow selectors. The oxygen analyzer is redundant and can be eliminated; the flowmeter could be eliminated if the oxygen flow selectors function properly. UH-600, MEDEVAC black hawk, Oxygen system, Medical equipment testing.
DE- *Aircraft; *Medical equipment; *Oxygen; Air pressure; Emergencies; Flowmeters; Inflight; Laboratories; Molecular sieves; Monitors; Operation; Patients; Performance tests; Prototypes; Supplies; Test and evaluation; Helicopters; Operational effectiveness
ID- UH-60Q Aircraft; H-60 Aircraft; Medical oxygen systems; NTISDODXA
SH- 74GE (Military Sciences--General); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1792932

AA- <NTIS> AD-A275 887/8
TI- Vision Impairment and Corrective Considerations of Civil Airmen
TI- <NOTE> Final rept
AU- Nakagawara, V. B. ; Wood, K. J. ; Montgomery, R. W.
CS- Federal Aviation Administration, Washington, DC. Office of Aviation Medicine.
CS- <CODE> 009020006; 264320
PY- Dec 93
PG- 10p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9411
CP- United States
AB- Civil aviation is a major commercial and technological industry in the United States. The two major components of civil aviation activities are air carrier and general aviation. An estimated 278,000 people/day rely on air carriers for business and personal travel. As of 1991, there were approximately 6,054 air carrier aircraft, which include commercial air carrier operators, commuter air carriers, and air taxis. Aircraft types include jet, turboprop, piston, and rotary wing aircraft (helicopters), which flew an estimated 13.5 million flight hours. Besides the flight crew members, many aviation-related professionals (maintenance, flight line, airport support staff, etc.), who may never pilot an aircraft, depend on the air transport industry for supporting themselves and their families.
DE- *Aviation medicine; *Vision; *Visual defects; *Lens(Eye); Aviation technicians; Costs; Population; Turboprop engines; Pistons; Rotary wing aircraft; Surgical implantation; Aviation personnel; Environments; Ophthalmology; Aviation safety; Eye safety; Flight crews; Air traffic controllers; Civil aviation
ID- Vision impairment; NTISDODXA
SH- 85A (Transportation--Air Transportation); 57E (Medicine and Biology--Clinical Medicine)

AZ- 1791440
AA- <NTIS> N94-21490/5
TI- Modern Rotor Aerodynamic Limits Survey: A Report and Data Survey
AU- Cross, J. ; Brilla, J. ; Kufeld, R. ; Balough, D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:4446; A-91183; NASA-TM-4446
CN- RTOP 505-59-36
PY- Oct 93
PG- 261p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A03
JA- GRAI9410; STAR3205
CP- United States
AB- The first phase of the Modern Technology Rotor Program, the Modern Rotor Aerodynamic Limits Survey, was a flight test conducted by the United States Army Aviation Engineering Flight Activity for NASA Ames Research Center. The test was performed using a United States Army UH-60A Black Hawk aircraft and the United States Air Force HH-60A Night Hawk instrumented main-rotor blade. The primary purpose of this test was to gather high-speed, steady-state, and maneuvering data suitable for correlation purposes with analytical prediction tools. All aspects of the data base, flight-test instrumentation, and test procedures are presented and analyzed. Because of the high volume of data, only select data points are presented. However, access to the entire data set is available upon request.
DE- *Flight test instruments; *Flight tests; *Rotary wings; *Structural vibration; *Uh-60a helicopter; Aeronautical engineering; Data bases; High speed; Maneuvers
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1790194
AA- <NTIS> AD-A275 332/5
TI- Investigation of Stereopsis with AN/AVS-6 Night Vision Goggles at Varying Levels of Illuminance and Contrast
TI- <NOTE> Master's thesis
AU- Armentrout, J. J.
CS- Air Force Inst. of Tech., Wright-Patterson AFB, OH.
CS- <CODE> 000805000; 012200
RN- AFIT/CI/CIA-93-160
PY- 1993

PG- 81p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A05/MF A01
JA- GRAI9410
CP- United States
AB- The increased reliance on night operations by the military over the last few decades has led to the development of various night imaging devices. Night vision goggles (NVGs) are one device which have gained widespread use in nighttime helicopter operations. However, rotorcraft accident data have indicated an increased occurrence of 'pilot error' type accidents when NVGs are in use. NVG related accidents often can be linked to extremely poor ambient lighting and contrast conditions during nighttime operations as well as the imaging limitations of the NvGs. Research has shown that NVGs reduce visual acuity and depth perception when compared to unaided daylight viewing conditions. In this study the effects of illumination and contrast on stereoscopic vision with and without AN/AVS-6 goggles were investigated. Stereoacuity was measured using a modified Howard-Dolman apparatus with four levels of illumination and three levels of contrast.
DE- *Helicopters; *Night vision devices; *Visual perception; *Aviation accidents; *Night flight; Contrast; Errors; Goggles; Illumination; Pilots; Visual acuity; Aviation safety; Stereoscopes; Theses; Least squares method
ID- *Night vision goggles; AN/AVS-6; Depth perception; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1784155
AA- <NTIS> AD-A274 572/7
TI- S-76 High Intensity Radiated Fields. Volume 2
TI- <NOTE> Final rept
AU- Blair, J.
CS- SCIENTECH, Inc., Idaho Falls, ID.
CS- <CODE> 096987000; 421493
SP- Federal Aviation Administration Technical Center, Atlantic City, NJ.
RN- DOT/FAA/CT-93/5-II
PY- Oct 93
PG- 169p
NT- See also Volume 3, AD-A274 416.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A02
JA- GRAI9408
CP- United States
AB- The Federal Aviation Administration (FAA) Technical Center sponsored a series of High Intensity Radiated Fields (HIRF) test on a Sikorsky S-76 rotorcraft. The project was conducted to evaluate the practically of performing aircraft level HIRF tests, determine the effects of HIRF on a specific rotrocraft with the potential to obtain information on rotorcraft in general, and evaluate the effects of exposure to real world HIRF emitters. HIRF ground and flight tests were conducted to achieve the objective of the project. Site calibration (SCAL) measurements were made in the test area to determine the levels at which the S-76 would be irradiated when placed in the test area. Ground tests consisted of Low Level Swept Coupling (LLSC) and Low Level Swept Fields (LLSF) tests. The flight tests were flown directly into the main beam of a variety of pulsed and continuous wave (CW) transmitters including the Over the Horizon Back Scatter (OTHB), PAVE PAWS, ASR-9, FPS-65, and FPS-16 radars. Results of the S-76 tests added credibility to the existence of HIRF as a flight safety hazard. In the evaluation of the emitters, the flight tests showed repeatable instances where exposure resulted in instrumentation disruptions. It should however be noted that all the observed disruptions were of a non-critical nature. HIRF, Electromagnetic fields, LLSC, Helicopter.
DE- *Electromagnetic fields; *Helicopters; *Flight testing; Aircraft; Calibration; Continuous waves; Couplings; Emitters; Hazards; Horizon; Instrumentation; Low level; Measurement; Radar; Safety; Sites; Test and evaluation; Transmitters; Backscattering; Attenuation; Background noise ; Data acquisition; Electromagnetic radiation
ID- *S-76 Aircraft; *HIRF(High Intensity Radiated Fields); NTISDODXA; NTISDOTFAA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 49GE (Electrotechnology--General)

AZ- 1784154
AA- <NTIS> AD-A274 571/9
TI- S-76 High Intensity Radiated Fields. Volume 1
TI- <NOTE> Final rept

AU- Blair, J.
CS- SCIENTECH, Inc., Idaho Falls, ID.
CS- <CODE> 096987000; 421493
SP- Federal Aviation Administration Technical Center, Atlantic City, NJ.
RN- DOT/FAA/CT-93/5-I
PY- Oct 93
PG- 88p
NT- See also Volume 2, AD-A274 572.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9408
CP- United States
AB- The Federal Aviation Administration (FAA) Technical Center sponsored a series of High Intensity Radiated Fields (HIRF) test on a Sikorsky S-76 rotorcraft. The project was conducted to evaluate the practically of performing aircraft level HIRF tests, determine the effects of HIRF on a specific rotorcraft with the potential to obtain information on rotorcraft in general, and evaluate the effects of exposure to real world HIRF emitters. HIRF ground and flight tests were conducted to achieve the objective of the project. Site calibration (SCAL) measurements were made in the test area to determine the levels at which the S-76 would be irradiated when placed in the test area. Ground tests consisted of Low Level Swept Coupling (LLSC) and Low Level Swept Fields (LLSF) tests. The flight tests were flown directly into the main beam of a variety of pulsed and continuous wave (CW) transmitters including the Over the Horizon Back Scatter (OTHB), PAVE PAWS, ASR-9, FPS-65, and FPS-16 radars. Results of the S-76 tests added credibility to the existence of HIRF as a flight safety hazard. In the evaluation of the emitters, the flight tests showed repeatable instances where exposure resulted in instrumentation disruptions. It should however be noted that all the observed disruptions were of a non-critical nature. HIRF, Electromagnetic fields, LLSC, Helicopter.
DE- *Electromagnetic fields; *Helicopters; *Over the horizon radar; Aircraft; Calibration; Continuous waves; Couplings; Emitters; Flight testing; Hazards; High intensity; Instrumentation; Low level; Measurement; Safety; Sites; Test and evaluation; Transmitters
ID- NTISDODXA; NTISDOTFAA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 63H (Detection and Countermeasures--Radiofrequency Detection)

AZ- 1784000
AA- <NTIS> AD-A274 416/7
TI- S-76 High Intensity Radiated Fields. Volume 3
TI- <NOTE> Final rept
AU- Blair, J.
CS- SCIENTECH, Inc., Idaho Falls, ID.
CS- <CODE> 096987000; 421493
SP- Federal Aviation Administration Technical Center, Atlantic City, NJ.
RN- DOT/FAA/CT-93/5-VOL-3
PY- Oct 93
PG- 211p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9408
CP- United States
AB- The Federal Aviation Administration (FAA) Technical Center sponsored a series of High Intensity Radiated Fields (HIRF) test on a Sikorsky S-76 rotorcraft. The project was conducted to evaluate the practically of performing aircraft level HIRF tests, determine the effects of HIRF on a specific rotorcraft with the potential to obtain information on rotorcraft in general, and evaluate the effects of exposure to 'real world' HIRF emitters. HIRF ground and flight tests were conducted to achieve the objective of the project. Site calibration (SCAL) measurements were made in the test area to determine the levels at which the S-76 would be irradiated when placed in the test area. Ground tests consisted of Low Level Swept Coupling (LLSC) and Low Level Swept Fields (LLSF) tests. The flight tests were flown directly into the main beam of a variety of pulsed and continuous wave (CW) transmitters including the Over the Horizon Back Scatter (OTHB), PAVE PAWS, ASR-9, FPS-65, and FPS-16 radars. Results of the S-76 tests added credibility to the existence of HIRF as a flight safety hazard. In the evaluation of the emitters, the flight tests showed repeatable instances where exposure resulted in instrumentation disruptions. It should however be noted that all the observed disruptions were of a non-critical nature. HIRF, Electromagnetic Fields, LLSC, Helicopter.
DE- *Electromagnetic fields; *Helicopters; *Flight testing; *Electromagnetic pulses; Aircraft; Calibration; Continuous waves; Couplings; Emitters; Hazards; Instrumentation; Low level; Measurement; Radar; Safety; Test and evaluation; Transmitters; Backscattering;

Attenuation; Background noise; Data acquisition; Electromagnetic radiation
ID- *S-76 Aircraft; *HIRF(High Intensity Radiated Fields); NTISDODXA; NTISDOTFAA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 49GE (Electrotechnology--General)

AZ- 1783090
AA- <NTIS> PB94-123205
TI- Human Performance Models for Computer-Aided Engineering
AU- Elkind, J. I. ; Card, S. K. ; Hochberg, J. ; Huey, B. M.
CS- National Research Council, Washington, DC. Commission on Behavioral and Social Sciences and Education.
CS- <CODE> 019026500
SP- National Aeronautics and Space Administration, Washington, DC.
CN- NASA-NAG-2-407
PY- 1989
PG- 323p
NT- Sponsored by National Aeronautics and Space Administration, Washington, DC.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A03
JA- GRAI9407
CP- United States
AB- This report discusses a topic important to the field of computational human factors: models of human performance and their use in computer-based engineering facilities for the design of complex systems. It focuses on a particular human factors design problem -- the design of cockpit systems for advanced helicopters -- and on a particular aspect of human performance -- vision and related cognitive functions. By focusing in this way, the authors were able to address the selected topics in some depth and develop findings and recommendations that they believe have application to many other aspects of human performance and to other design domains.
DE- *Computer aided design; *Human factors engineering; Data processing; Helicopters; Cockpits; Models; Computer vision; Visual perception; Image processing; Cognition; Resource management; Memory; Training; Costs; Decision making; Knowledge representation
ID- NTISNASNRC; NTISDODA; NTISNASA
SH- 41A (Manufacturing Technology--Computer Aided Design (CAD)); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1779101
AA- <NTIS> AD-A273 550/4
TI- Combined 1991 and 1992 Robinson - 22B (R-22) Parking Test Results
TI- <NOTE> Technical rept. Sep 91-Oct 92
AU- Weiss, R. M.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN93/6
PY- Sep 93
PG- 71p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9406
CP- United States
AB- Tests were conducted in the fall of 1991 and 1992 at the Federal Aviation Administration (FAA) Technical Center to examine issues regarding rotor tip clearances for parking areas at heliports. These tests were initiated as a follow-on to previous parking tests documented in DOT/FAA/CT-TN88/30, 'Heliport Surface Maneuvering Test Results,' and DOT/FAA/CT-TN/92/1, 'Helicopter Nighttime Parking Test Results-UH-l.' Since those tests utilized a medium-size helicopter with a rotor diameter of 48 feet, similar tests were requested using a smaller helicopter with a rotor diameter of less than 30 feet. This report documents the results of these follow-on parking tests which used a Robinson-22B (R-22) helicopter. Over 480 maneuvers were conducted at the FAA Technical Center's National Concepts Development and Demonstration Heliport/Vertiport, Atlantic City International Airport, NJ. All were conducted under head, tail, and crosswind conditions, both with and without an obstacle on the helipad. Pilot subjective data, in reference to these maneuvers, were collected via post-maneuver and post-flight questions. Data collection and analysis methodology and objective, as well as subjective issues, are discussed. Statistical and graphical analysis of pilot performance and perception data are provided. Conclusions are drawn about considerations that must

be given to parking clearance criteria at heliports. Heliport, Heliport parking, Rotor tip clearance.
DE- *Heliports; *Parking facilities; Airports; Clearances; Crosswinds; Demonstrations; Helicopters; Helipads; International airports; Management; Maneuvers; Methodology; Perception; Pilots; Rotors; Surfaces; Test and evaluation; Daylight; Night; Visual flight rules; Visual perception
ID- FAA(Federal Aviation Adminsitration); UH-1H Aircraft; H-1 Aircraft; NTISDODXA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1778699
AA- <NTIS> AD-A273 145/3
TI- Evaluation of the UH-1N Instrument Panel
TI- <NOTE> Master's thesis
AU- Miccolis, L. E.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Sep 93
PG- 72p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A04/MF A01
JA- GRAI9406
CP- United States
AB- This study evaluates the current configuration of the U.S. Marine Corps LJH-IN helicopter instrument panel. Additionally, the alternatives for proposed multifunction display (MFD) symbologies associated with the COMM/NAV Block Upgrade for the UH-IN were evaluated. A survey was administered to 43 LJH-IN operational pilots from both east and west coast squadrons. Pilots were asked to rate instruments and devices currently included on the instrument panel on three factors: Criticality, Frequency of Use, and Satisfaction with Display. The top ten and bottom ten instruments were identified for each of these three factors; 20 instruments rated high on all three factors while 10 rated low on all three. Several candidates for redesign were identified. Proposed multifunction display symbol sets from the Naval Air Warfare Center Aircraft Division, Warminster (NAWCADWAR), and MIL-STD-1295 (Proposed) were also assessed. Respondents rated symbols for (1) heading scale, present heading, and NAV steering bug (a pointer); (2) airspeed and present airspeed; (3) vertical velocity; (4) attitude, horizon, pitch angle, and aircraft reference; (5) altitude scale, present altitude, and high/low altitude warning; (6) torque; and (7) bank of roll scale, and slip. In general, the NAWCADWAR symbol set was referred. Helicopter, UH- 1N, Multifunction display, Instrument panel layouts, Human factors.
DE- *Helicopters; *Instrument panels; *Human factors engineering; Aircraft; Airspeed; Configurations; Frequency; Horizon; Low altitude; Marine Corps; Pilots; Rates; Roll; Scale; Squadrons; Steering; Surveys; Symbols; Torque; Velocity; Warfare; Marine Corps aircraft
ID- LJH-IN Aircraft; H-1 Aircraft; Theses; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1777375
AA- <NTIS> N94-15950/6
TI- Lift-Fan Aircraft: Lessons Learned-the Pilot's Perspective
AU- Gerdes, R. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.26:177620; A-93114; NASA-CR-177620
CN- NASA ORDER A-24364-D
PY- Aug 93
PG- 33p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9405; STAR3203
CP- United States
AB- This paper is written from an engineering test pilot's point of view. Its purpose is to present lift-fan 'lessons learned' from the perspective of first-hand experience accumulated during the period 1962 through 1988 while flight testing vertical/short take-off and landing (V/STOL) experimental aircraft and evaluating piloted engineering simulations of promising V/STOL concepts. Specifically, the scope of the discussions to follow is primarily based upon a critical review of

the writer's personal accounts of 30 hours of XV-5A/B and 2 hours of X-14A flight testing as well as a limited simulator evaluation of the Grumman Design 755 lift-fan aircraft. Opinions of other test pilots who flew these aircraft and the aircraft simulator are also included and supplement the writer's comments. Furthermore, the lessons learned are presented from the perspective of the writer's flying experience: 10,000 hours in 100 fixed- and rotary-wing aircraft including 330 hours in 5 experimental V/STOL research aircraft. The paper is organized to present to the reader a clear picture of lift-fan lessons learned from three distinct points of view in order to facilitate application of the lesson principles to future designs. Lessons learned are first discussed with respect to case histories of specific flight and simulator investigations. These principles are then organized and restated with respect to four selected design criteria categories in Appendix I. Lastly, Appendix II is a discussion of the design of a hypothetical supersonic short take-off vertical landing (STOVL) fighter/attack aircraft.

DE- *Flight tests; *Lift fans; *Stovl aircraft; *V/stol aircraft; *X-14 aircraft; *Xv-5 aircraft; Case histories; Controllability; Design analysis; Experience; Flight simulators; Human factors engineering; Test pilots

ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1777264

AA- <NTIS> N94-15793/0

TI- Fidelity Assessment of a UH-60A Simulation on the NASA Ames Vertical Motion Simulator

AU- Atencio, A.

CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657

RN- NAS 1.15:104016; A-93071; NASA-TM-104016; USAATC-TR-93-A-005

CN- RTOP 505-59-52

PY- Sep 93

PG- 318p

NT- Sponsored by NASA, Washington.

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LA- English

PC- PC A14/MF A03

JA- GRAI9405; STAR3203

CP- United States

AB- Helicopter handling qualities research requires that a ground-based simulation be a high-fidelity representation of the actual helicopter, especially over the frequency range of the investigation. This experiment was performed to assess the current capability to simulate the UH-60A Black Hawk helicopter on the Vertical Motion Simulator (VMS) at NASA Ames, to develop a methodology for assessing the fidelity of a simulation, and to find the causes for lack of fidelity. The approach used was to compare the simulation to the flight vehicle for a series of tasks performed in flight and in the simulator. The results show that subjective handling qualities ratings from flight to simulator overlap, and the mathematical model matches the UH-60A helicopter very well over the range of frequencies critical to handling qualities evaluation. Pilot comments, however, indicate a need for improvement in the perceptual fidelity of the simulation in the areas of motion and visual cuing. The methodology used to make the fidelity assessment proved useful in showing differences in pilot work load and strategy, but additional work is needed to refine objective methods for determining causes of lack of fidelity.

DE- *Flight simulation; *Helicopter control; *Helicopter performance; *Uh-60a helicopter; *Vertical motion simulators; Controllability; Flight characteristics; Computer systems performance; Flight simulators ; Man machine systems; Mathematical models; Pilot performance; Postflight analysis; Visual signals

ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1772222

AA- <NTIS> AD-A271 592/8

TI- Advanced Concepts for Passive Infrared Stand-Off Chemical Sensors

TI- <NOTE> Technical rept. Oct 86-Jul 88

AU- Emory, S. L. ; Kroutil, R. T. ; Ditillo, J. T. ; DeSha, J. T. ; Loerop, W. R.

CS- Chemical Research, Development and Engineering Center, Aberdeen Proving Ground, MD.

CS- <CODE> 086639000; 399010

RN- CRDEC-TR-118

CN- 1C162706A553

PY- Jan 90

PG- 32p

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LA- English
PC- PC A03/MF A01
JA- GRAI9404
CP- United States
AB- Passive stand-off chemical sensing is important to the chemical industry and the military. Instrumentation exists that can warn employees a toxic chemical, such as phosgene, is leaking, which will enable them to take action to protect themselves and the community. A tripod-mounted passive device capable of detecting very low levels of chemical vapors at distances up to 5 km is an example of a military sensor. The U.S. Army is willing to transfer this technology to the civilian sector. In addition, a new generation of stand-off chemical sensors using state-of-the-art detector optics, and microprocessors is possible. These new sensors are being developed at U.S Army Chemical Research, Development and Engineering Center, Aberdeen Proving Ground, MD, and may include a UAV/helicopter mounted device, as well as a much smaller hand-held unit. Fourier transform interferometry, Chemical detector.
DE- *Phosgene; *Chemical detection; *Infrared equipment; Army; Chemical industry; Engineering; Hand held; Helicopters; Instrumentation; Interferometry; Microprocessors; Optics; Transfer; Tripods; Vapors; Military applications; Toxicity
ID- *Chemical sensors; Occupational safety and health; NTISDODXA
SH- 99A (Chemistry--Analytical Chemistry); 68G (Environmental Pollution and Control--Environmental Health and Safety); 68A (Environmental Pollution and Control--Air Pollution and Control); 57U (Medicine and Biology--Public Health and Industrial Medicine); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1771168
AA- <NTIS> N94-13323/8
TI- Evaluation of Two Cockpit Display Concepts for Civil Tiltrotor Instrument Operations on Steep Approaches
AU- Decker, W. A. ; Bray, R. S. ; Simmons, R. C. ; Tucker, G. E.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 93
PG- 20p
NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 433-452.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- A piloted simulation experiment was conducted using the NASA Ames Research Center Vertical Motion Simulator to evaluate two cockpit display formats designed for manual control on steep instrument approaches for a civil transport tiltrotor aircraft. The first display included a four-cue (pitch, roll, power lever position, and nacelle angle movement prompt) flight director. The second display format provided instantaneous flight path angle information together with other symbols for terminal area guidance. Pilots evaluated these display formats for an instrument approach task which required a level flight conversion from airplane-mode flight to helicopter-mode flight while decelerating to the nominal approach airspeed. Pilots tracked glide slopes of 6, 9, 15 and 25 degrees, terminating in a hover for a vertical landing on a 150 feet square vertipad. Approaches were conducted with low visibility and ceilings and with crosswinds and turbulence, with all aircraft systems functioning normally and were carried through to a landing. Desired approach and tracking performance was achieved with generally satisfactory handling qualities using either display format on glide slopes up through 15 degrees. Evaluations with both display formats for a 25 degree glide slope revealed serious problems with glide slope tracking at low airspeeds in crosswinds and the loss of the intended landing spot from the cockpit field of view.
DE- *Aircraft control; *Approach control; *Cockpits; *Display devices; *Flight simulation; *Tilt rotor aircraft; *Transport aircraft; *Vertical landing; Controllability; Glide paths; Instrument approach; Manual control; Aircraft performance; Airspeed; Deceleration; Flight paths; Hovering; Low visibility; Vertical motion simulators
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771166
AA- <NTIS> N94-13321/2
TI- Design and Pilot Evaluation of the RAH-66 Comanche Core AFCS
AU- Fogler, D. L. ; Keller, J. F.
CS- United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.

CS- <CODE> 064899001; SL280853
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 8p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 411-418.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- This paper addresses the design and pilot evaluation of the Core Automatic Flight Control System (AFCS) for the Reconnaissance/Attack Helicopter (RAH-66) Comanche. During the period from November 1991 through February 1992, the RAH-66 Comanche control laws were evaluated through a structured pilot acceptance test using a motion base simulator. Design requirements, descriptions of the control law design, and handling qualities data collected from ADS-33 maneuvers are presented.
DE- *Automatic flight control; *Flight characteristics; *Flight simulation; *Military helicopters; *Reconnaissance aircraft; Controllability; Helicopter design; Aircraft maneuvers; Control boards; Control theory; Pilot performance
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1771165
AA- <NTIS> N94-13320/4
TI- Piloting Considerations for Terminal Area Operations of Civil Tiltwing and Tiltrotor Aircraft
AU- Hindson, W. S. ; Hardy, G. H. ; Tucker, G. E. ; Decker, W. A.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 93
PG- 18p
NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 393-410.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- The existing body of research to investigate airworthiness, performance, handling, and operational requirements for STOL and V/STOL aircraft was reviewed for its applicability to the tiltrotor and tiltwing design concepts. The objective of this study was to help determine the needs for developing civil certification criteria for these aircraft concepts. Piloting tasks that were considered included configuration and thrust vector management, glidepath control, deceleration to hover, and engine failure procedures. Flight control and cockpit display systems that have been found necessary to exploit the low-speed operating characteristics of these aircraft are described, and beneficial future developments are proposed.
DE- *Aircraft control; *Aircraft performance; *Flight characteristics; *Flight control; *Pilot performance; *Tilt rotor aircraft; *Tilt wing aircraft; Civil aviation; Certification; Cockpits; Configuration management; Deceleration; Display devices; Engine failure; Hovering; Tasks; Thrust vector control; V/stol aircraft
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1771164
AA- <NTIS> N94-13319/6
TI- Human Factor Implications of the Eurocopter AS332l-1 Super Puma Cockpit
AU- Padfield, R. R.
CS- Helikopter Service A/S, Oslo (Norway).
CS- <CODE> 888888888; HN749521
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 16p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 377-392. Previously Announced in Aiaa as A91-45400. Presented at the 15TH European Rotorcraft Forum, Amsterdam, the Netherlands, 12-15 Sep. 1989.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- Norway
AB- The purpose of this paper is to identify and describe some of the human factor problems which can occur in the cockpit of a modern civilian helicopter. After examining specific hardware and software problems in the cockpit design of the Eurocopter (Aerospatiale) AS332L-1 Super Puma, the author proposes several principles that can be used to avoid similar human factors problems in the design of future cockpits. These

principles relate to the use and function of warning lights, the design of autopilots in two-pilot aircraft, and the labeling of switches and warning lights, specifically with respect to abbreviations and translations from languages other than English. In the final section of the paper, the author describes current trends in society which he suggests should be taken into consideration when designing future aircraft cockpits.

DE- *Cockpits; *Display devices; *Helicopter control; *Helicopters; *Human factors engineering; Control boards; Pilot performance; Airborne/spaceborne computers; Automatic pilots; Computer programs; Switches

ID- *Foreign technology; NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771162

AA- <NTIS> N94-13317/0

TI- Effects of Simulator Motion and Visual Characteristics on Rotorcraft Handling Qualities Evaluations

AU- Mitchell, D. G. ; Hart, D. C.

CS- Systems Technology, Inc., Hawthorne, CA.

CS- <CODE> 022912000; S9710660

SP- National Aeronautics and Space Administration, Washington, DC.

PY- Jul 93

PG- 19p

NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 341-359.

LA- English

PC- (Order as N94-13294/1, PC A21/MF A04)

JA- GRAI9403; STAR3202

CP- United States

AB- The pilot's perceptions of aircraft handling qualities are influenced by a combination of the aircraft dynamics, the task, and the environment under which the evaluation is performed. When the evaluation is performed in a groundbased simulator, the characteristics of the simulation facility also come into play. Two studies were conducted on NASA Ames Research Center's Vertical Motion Simulator to determine the effects of simulator characteristics on perceived handling qualities. Most evaluations were conducted with a baseline set of rotorcraft dynamics, using a simple transfer-function model of an uncoupled helicopter, under different conditions of visual time delays and motion command washout filters. Differences in pilot opinion were found as the visual and motion parameters were changed, reflecting a change in the pilots' perceptions of handling qualities, rather than changes in the aircraft model itself. The results indicate a need for tailoring the motion washout dynamics to suit the task. Visual-delay data are inconclusive but suggest that it may be better to allow some time delay in the visual path to minimize the mismatch between visual and motion, rather than eliminate the visual delay entirely through lead compensation.

DE- *Flight characteristics; *Flight simulators; *Helicopter performance; *Rotary wing aircraft; *Vertical motion simulators; *Visual fields; Controllability; Flight simulation; Helicopter control; Aircraft models ; Evaluation; Time lag; Transfer functions

ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771160

AA- <NTIS> N94-13315/4

TI- Visual Cueing Considerations in Nap-of-the-Earth Helicopter Flight Head-Slaved Helmet-Mounted Displays

AU- Grunwald, A. J. ; Kohn, S.

CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657

PY- Jul 93

PG- 13p

NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 315-327.

LA- English

PC- (Order as N94-13294/1, PC A21/MF A04)

JA- GRAI9403; STAR3202

CP- United States

AB- The pilot's ability to derive Control-Oriented Visual Field Information from teleoperated Helmet-Mounted displays in Nap-of-the-Earth flight, is investigated. The visual field with these types of displays, commonly used in Apache and Cobra helicopter night operations, originates from a relatively narrow field-of-view Forward Looking Infrared Radiation Camera, gimbal-mounted at the nose of the aircraft and slaved to the pilot's line-of-sight, in order to obtain a wide-angle field-of-regard. Pilots have encountered considerable difficulties in controlling the aircraft by these devices. Experimental

simulator results presented here indicate that part of these difficulties can be attributed to head/camera slaving system phase lags and errors. In the presence of voluntary head rotation, these slaving system imperfections are shown to impair the Control-Oriented Visual Field Information vital in vehicular control, such as the perception of the anticipated flight path or the vehicle yaw rate. Since, in the presence of slaving system imperfections, the pilot will tend to minimize head rotation, the full wide-angle field-of-regard of the line-of-sight slaved Helmet-Mounted Display, is not always fully utilized.
DE- *Cues; *Flight simulation; *Helicopter control; *Helmet mounted displays; *Nap-of-the-earth navigation; *Pilot performance; *Visual fields; Field of view; Visual control; Cameras; Flight paths; Flir detectors; Line of sight; Night vision; Phase error
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771159
AA- <NTIS> N94-13314/7
TI- Visual Information for Judging Temporal Range
AU- Kaiser, M. K. ; Mowafy, L.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 93
PG- 5p
NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 309-313.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- Work in our laboratory suggests that pilots can extract temporal range information (i.e., the time to pass a given waypoint) directly from out-the-window motion information. This extraction does not require the use of velocity or distance, but rather operates solely on a 2-D motion cue. In this paper, we present the mathematical derivation of this information, psychophysical evidence of human observers' sensitivity, and possible advantages and limitations of basing vehicle control on this parameter.
DE- *Cues; *Flight control; *Flight simulation; *Helicopter control; *Pilot performance; *Visual stimuli; Visual control; Psychophysics; Sensitivity; Visual fields
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771158
AA- <NTIS> N94-13313/9
TI- Visual Cueing Aids for Rotorcraft Landings
AU- Johnson, W. W. ; Andre, A. D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 93
PG- 20p
NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 289-308.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- The present study used a rotorcraft simulator to examine descents-to-hover at landing pads with one of three approach lighting configurations. The impact of simulator platform motion upon descents to hover was also examined. The results showed that the configuration with the most useful optical information led to the slowest final approach speeds, and that pilots found this configuration, together with the presence of simulator platform motion, most desirable. The results also showed that platform motion led to higher rates of approach to the landing pad in some cases. Implications of the results for the design of vertiport approach paths are discussed.
DE- *Aircraft landing; *Approach control; *Cues; *Descent trajectories; *Flight simulation; *Helicopter control; *Landing simulation; *Rotary wing aircraft; *Visual aids; Glide paths; Hovering; Flight paths; Illuminating; Landing mats; Vertical landing
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771155
AA- <NTIS> N94-13310/5
TI- Improvements in Hover Display Dynamics for a Combat Helicopter
AU- Schroeder, J. A. ; Eshow, M. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 93
PG- 16p
NT- In Its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 235-250.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- This paper describes a piloted simulation conducted on the NASA Ames Vertical Motion Simulator. The objective of the experiment was to investigate the handling qualities benefits attainable using new display law design methods for hover displays. The new display laws provide improved methods to specify the behavior of the display symbol that predicts the vehicle's ground velocity in the horizontal plane; it is the primary symbol that the pilot uses to control aircraft horizontal position. The display law design was applied to the Apache helmet-mounted display format, using the Apache vehicle dynamics to tailor the dynamics of the velocity predictor symbol. The representations of the Apache vehicle used in the display design process and in the simulation were derived from flight data. During the simulation, the new symbol dynamics were seen to improve the pilots' ability to maneuver about hover in poor visual cuing environments. The improvements were manifested in pilot handling qualities ratings and in measured task performance. The paper details the display design techniques, the experiment design and conduct, and the results.
DE- *Display devices; *Flight characteristics; *Flight simulation; *Helicopter control; *Helmet mounted displays; *Hovering; *Military helicopters; *Pilot performance; Controllability; Helicopter performance; Ah-64 helicopter; Cues; Ratings; Symbols; Tasks; Vertical motion simulators; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771152
AA- <NTIS> N94-13307/1
TI- Compatibility of Information and Mode of Control: The Case for Natural Control Systems
AU- Owen, D. H.
CS- Canterbury Univ., Christchurch (New Zealand). Dept. of Psychology.
CS- <CODE> 888888888; CG092919
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 6p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 199-204.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- New Zealand
AB- The operation of control systems has been determined largely by mechanical constraints. Compatibility with the characteristics of the operator is a secondary consideration, with the result that control may never be optimal, control workload may interfere with performance of secondary tasks, and learning may be more difficult and protracted than necessary. With the introduction of a computer in the control loop, the mode of operation can be adapted to the operator, rather than vice versa. The concept of natural control is introduced to describe a system that supports control of the information used by the operator in achieving an intended goal. As an example, control of speed during simulated approach to a pad by helicopter pilots is used to contrast path-speed control with direct control of global optical flow-pattern information. Differences are evidenced in the performance domains of control activity, speed, and global optical flow velocity.
DE- *Approach control; *Flight control; *Helicopter control; *Man machine systems; *Visual control; Control systems design; Optical flow (Image analysis); Compatibility; Visual tasks; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771150
AA- <NTIS> N94-13305/5
TI- Four-Axis Hand Controller for Helicopter Flight Control

AU- Demaio, J.
CS- McDonnell Douglas Helicopter Co., Mesa, AZ.
CS- <CODE> 088065000; MP627451
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 5p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 171-175.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- A proof-of-concept hand controller for controlling lateral and longitudinal cyclic pitch, collective pitch and tail rotor thrust was developed. The purpose of the work was to address problems of operator fatigue, poor proprioceptive feedback and cross-coupling of axes associated with many four-axis controller designs. The present design is an attempt to reduce cross-coupling to a level that can be controlled with breakout force, rather than to eliminate it entirely. The cascaded design placed lateral and longitudinal cyclic in their normal configuration. Tail rotor thrust was placed atop the cyclic controller. A left/right twisting motion with the wrist made the control input. The axis of rotation was canted outboard (clockwise) to minimize cross-coupling with the cyclic pitch axis. The collective control was a twist grip, like a motorcycle throttle. Measurement of the amount of cross-coupling involved in pure, single-axis inputs showed cross coupling under 10 percent of full deflection for all axes. This small amount of cross-coupling could be further reduced with better damping and force gradient control. Fatigue was not found to be a problem, and proprioceptive feedback was adequate for all flight tasks executed.
DE- *Controllers; *Flight control; *Helicopter control; *Human factors engineering; *Thrust control; Control sticks; Axes of rotation; Cross coupling; Feedback; Flight fatigue; Lateral control; Longitudinal control; Proprioception; Tasks; Twisting
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771147
AA- <NTIS> N94-13302/2
TI- Application of Active Side ARM Controllers in Helicopters
AU- Knorr, R. ; Melz, C. ; Faulkner, A. ; Obermayer, M.
CS- Eurocopter Deutschland G.m.b.H., Munich (Germany).
CS- <CODE> 107757000; E5674258
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 10p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 131-140.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- Germany
AB- Eurocopter Deutschland (ECD) started simulation trials to investigate the particular problems of Side Arm Controllers (SAC) applied to helicopters. Two simulation trials have been performed. In the first trial, the handling characteristics of a 'passive' SAC and the basic requirements for the application of an 'active' SAC were evaluated in pilot-in-the-loop simulations, performing the tasks in a realistic scenario representing typical phases of a transport mission. The second simulation trial investigated the general control characteristics of the 'active' in comparison to the 'passive' control principle. A description of the SACs developed by ECD and the principle of the 'passive' and 'active' control concept is given, as well as specific ratings for the investigated dynamic and ergonomic parameters effecting SAC characteristics. The experimental arrangements, as well as the trials procedures of both simulation phases, are described and the results achieved are discussed emphasizing the advantages of the 'active' as opposed to the 'passive' SAC concept. This also includes the presentation of some critical aspects still to be improved and proposals to solve them.
DE- *Controllers; *Flight control; *Flight simulation; *Helicopter control; *Human factors engineering; Control sticks; Flight characteristics; Helicopter performance; Active control; Steering
ID- *Foreign technology; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771143
AA- <NTIS> N94-13298/2
TI- Perspective on the FAA Approval Process: Integrating Rotorcraft Displays, Controls and Workload

AU- Green, D. L. ; Hart, J. ; Hwoschinsky, P.
CS- Starmark Corp., Arlington, VA.
CS- <CODE> 888888888; S0527066
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 93
PG- 10p
NT- In NASA. Ames Research Center, Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 59-68.
LA- English
PC- (Order as N94-13294/1, PC A21/MF A04)
JA- GRAI9403; STAR3202
CP- United States
AB- The FAA is responsible for making the determination that a helicopter is safe for IFR operations in the National Airspace System (NAS). This involves objective and subjective evaluations of cockpit displays, flying qualities, procedures and human factors as they affect performance and workload. After all of the objective evaluations are completed, and all Federal Regulations have been met, FAA pilots make the final subjective judgement as to suitability for use by civil pilots in the NAS. The paper uses the flying qualities and pilot workload characteristics of a small helicopter to help examine the FAA pilot's involvement in this process. The result highlights the strengths of the process and its importance to the approval of new aircraft and equipments for civil IFR helicopter applications. The paper also identifies opportunities for improvement.
DE- *Display devices; *Helicopter control; *Helicopter performance; *Instrument flight rules; *Pilot performance; *Rotary wing aircraft; *Workloads (Psychophysiology); Flight characteristics; Cockpits; Evaluation; Flight envelopes; Flight instruments; Human factors engineering; National airspace system
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1771139
AA- <NTIS> N94-13294/1
TI- Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors
AU- Blanken, C. L. ; Whalley, M. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.55:3220; A-93074; NASA-CP-3220
CN- RTOP 505-59-52
PY- Jul 93
PG- 488p
NT- Workshop Held at San Francisco, Ca, 20-22 Jan. 1993.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A21/MF A04
JA- GRAI9403; STAR3202
CP- United States
AB- No abstract available.
DE- *Aircraft control; *Flight characteristics; *Flight control; *Helicopter control; *Helicopter performance; *Human factors engineering; *Pilot performance; *Vertical flight; Aircraft performance ; Vertical takeoff aircraft; Aircraft stability; Cockpits; Control systems design; Display devices; Performance prediction; Visual signals

ID- *Meetings; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1764141
AA- <NTIS> DE93799158
TI- Sistema elioportato per la sorveglianza aerea dei metanodotti. (Natural gas pipeline monitoring by helicopters. Session 1, 4th ATIG symposium)
AU- Goglio, A. ; Cattaneo, M. ; Primo, R. ; Viola, S.
CS- Associazione Tecnica Italiana del Gas, Milan.
CS- <CODE> 107494000; 9901976
RN- ETDE-IT-93-116; CONF-9211224-15
PY- 1992
PG- 19p
NT- Italian. ATIG symposium (4th), Naples (Italy), 25-27 Nov 1992.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Italian
DT- Conference proceeding

PC- PC A03/MF A01
JA- GRAI9401; ERA9352
CP- Italy
AB- For maintenance, safety and security purposes, the monitoring of the SNAM (Italy) operated natural gas pipeline is being done by aerial remote sensing since 1977. To improve the monitoring system's reliability, SNAM has developed, in a joint venture with ALENIA, an automatic data acquisition and recording system, called SESAM, which uses produces images of the tracts of land crossed by the gas pipelines. This paper briefly outlines the key design, operation and performance features of SESAM which incorporates an advanced instrumentation package including a satellite navigation system. SESAM is now being used successfully in the monitoring about 8,000 km of gas pipelines.
DE- *Natural Gas Distribution Systems; *Pipelines; *Aerial Monitoring; Data Acquisition Systems; Helicopters; Image Processing; Italy; Maintenance; Remote Sensing; Safety; Security
ID- *Foreign technology; EDB/030500; EDB/032000; NTISDEE
SH- 85E (Transportation--Pipeline Transportation); 97K (Energy--Fuels); 97R (Energy--Environmental Studies); 48B (Natural Resources and Earth Sciences--Natural Resource Management)

AZ- 1762600
AA- <NTIS> AD-A269 476/8
TI- VMC Left Turn Curved Approaches, Test Results
TI- <NOTE> Technical note Sep 89-Jul 90
AU- Weiss, R. M.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN92/46
PY- Jul 93
PG- 45p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9401
CP- United States
AB- Flight tests were conducted at the Federal Aviation Administration (FAA) Technical Center in 1989 and 1990 to aid in answering questions concerning curved approaches to a heliport under visual meteorological conditions (VMC). These questions include protected airspace within the curved segment of the approach, the most feasible angle of turn and minimum final approach segment. The FAA's Sikorsky S-76 and UH-1H were used for these tests. Data were collected from approaches using turn angles of 45-, 90-, and 180-degrees, each with three different final segments, 800, 1200, and 1600 feet (ft). Due to airspace restrictions at the time of these tests, left turns to final were flown. All maneuvers were tracked by ground-based tracking systems. This report documents the results of these flights. The test procedures, evaluation methodology, and technical and operational issues are described. Analysis of pilot performance as well as pilot subjective input are provided. Conclusions are presented that address the airspace, turn angle, and final segment issues. The results will be considered in future modifications of the FAA Heliport Design Advisory Circular, AC 150/5390-2. All appendixes can be found in Research Directorate for Aviation Technology Division Report DOT/FAA/CT-ACD33093/6, Appendixes for TN92/46 VMC Left Turn Curved Approaches, Test Results. Curved approaches, Approach surface, Final approach segment, Heliport, VMC.
DE- *Approach; *Turning(Maneuvering); *Curved profiles; Angles; Flight testing; Ground based; Heliports; Input; Management; Maneuvers; Methodology; Modification; Pilots; Surfaces; Test and evaluation; Time; Tracking; Helicopters; Meteorological data
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1759611
AA- <NTIS> AD-A269 121/0
TI- Laboratory Test and Evaluation of the Litton Model F15E Molecular Sieve Oxygen Generating System
TI- <NOTE> Final rept
AU- Squire, B. E. ; Bruckart, J. E. ; Quattlebaum, M. D. ; Johnston, L. W.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-93-22
CN- 3M463807D836; LC
PY- Jun 93
PG- 60p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A04/MF A01
JA- GRAI9324
CP- United States
AB- The Litton Model F15E Molecular Sieve Oxygen Generating System, was tested for environmental and electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for environmental tests and electromagnetic interference/compatibility and human factors. The Litton Model F15E performed properly in the test environments. It consistently produced high concentration (greater than 90%) oxygen at an output flow of 27 lpm. The unit produces a significant amount of noise while operating. The unit is susceptible to radio frequency interference from 40-41 MHz and some broadband emissions exceeded the test criteria. Electromagnetic compatibility, Test and evaluation, Aeromedical equipment.
DE- *Electromagnetic compatibility; *Molecular sieves; *Oxygen generators; *Medical equipment; Broadband; Electromagnetic interference; Emission; Environmental tests; Environments; Frequency; Helicopters; Interference ; Models; Noise; Operation; Output; Radio equipment; Test and evaluation
ID- *F15E Molecular Sieve Oxygen Generating System; Aeromedical operations; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1759484
AA- <NTIS> AD-A268 990/9
TI- Army Cockpit Delethalization Program (CDP)
TI- <NOTE> Final rept. Oct 89-Dec 92
AU- Greth, R. L. ; Pfaff, M. S. ; Shope, W. B.
CS- LME, Inc., Warminster, PA. Systems Engineering Group.
CS- <CODE> 107616001; 427063
RN- CDP-871-041-A005; USAATCOM-TR-93-D-2
CN- DAAJ02-89-C-0017
PY- Aug 93
PG- 75p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9324
CP- United States
AB- Injury data indicate that secondary cockpit strikes to the head and upper torso account for approximately two-thirds of all major and fatal injuries in potentially survivable Army helicopter mishaps. A two-year program of research, biodynamic simulation, detail design, test and evaluation was performed to examine the head/upper torso strike problem and demonstrate potential solutions. This report describes the investigation and conceptual process leading to the development of crew protection designs, including an advanced harness geometry, a harness tensioner/retractor, and a harness mounted airbag that could be candidates for current as well as year 2000+ helicopter or light aircraft applications. The protective concepts were evaluated in a series of computer simulations and in 15 dynamic tests on a horizontal accelerator using a replication of an advanced attack helicopter crewstation interior with a stroking crewseat. Overall effectiveness and physiological compatibility of the protective concepts were evaluated under varying crash pulses and impact orientations. Results show significant improvement in reduction of head displacement and linear acceleration, torso displacement, inertia reel strap payout, and neck torque compared to a baseline conventional restraint. Crash Protection, Delethalized Cockpit, Crash Physiological Compatibility, Restraint Improvements, Restraint Harness, Strike Hazard Reduction, Air Bags.
DE- *Biodynamics; *Cockpits; *Helicopters; *Crash resistance; *Aircraft seats; *Survivability; Acceleration; Army; Attack helicopters; Compatibility; Computers; Displacement; Dynamic tests; Geometry; Hazards; Head(Anatomy); Impact tests; Inertia; Protection; Pulses; Reduction; Reels; Restraint; Secondary; Simulation; Straps; Test and evaluation; Torque; Wounds and injuries; Flight crews; Harnesses
ID- Air bags; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85D (Transportation--Transportation Safety)

AZ- 1757752
AA- <NTIS> N93-31279/1
TI- Pallet for Helicopter Test Instrumentation
AU- Haehnlein, G. ; Jaensch, P.
CS- Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V., Brunswick

(Germany, F.R.).
CS- <CODE> 008798000; DO744537
PY- Jan 93
PG- 42p
NT- In Esa, Flight Test of Avionic and Air-Traffic Control Systems p 115-156. Trans. into English from Flugerprobung von Avionik und Flugsicherungssystemen (Brunswick, Germany, Dlr) Jul. 1991 p 114-153. Original Language Document Was Announced as N92-25598.
LA- English
DT- Translation
PC- (Order as N93-31271/8, PC A13/MF A03)
JA- GRAI9323; STAR3112
CP- Germany
AB- The system concept, its implementation, and some typical applications of an airworthy helicopter experimental system are described. The BO-105 is used as the test platform. This flight test platform is distinguished from the standard production machine by two substantial modifications: a modified, large capacity experimental cockpit, and a four axis fly by wire/fly by light control system. The items of equipment present in a general survey are presented and are discussed with regard to their functions or selection criteria. The equipment items in the BO-105 are as follows: flight controls (electronic signal pick off from the jogstick or side stick in all four control axes); fly by wire/light control (electro hydraulic actuators in all four control axes); sensors (Doppler ASI, strapdown attitude reference system, radio altimeter, air data computer); navigation (global positioning system, VOR (Very high frequency Omnidirectional Range), distance measuring equipment, instrument landing equipment receiver); data processing (aircraft computer, measurement data conditioning); data save (logging, quick look) (up/down PCM (Pulse Code Modulation) telemetry, data logging in the air and on the ground); and instruments (test cockpit) (electronic 5 inch color displays, multifunctional controls). Ground simulation, used for direct flight test preparation, is discussed. The five years of successful use of the helicopter experimental system is stressed.
DE- *Aircraft instruments; *Flight simulation; *Flight tests; *Helicopters; *Navigation instruments; Research aircraft; Systems engineering; Test facilities; Automatic control; Computer programs; Data processing; Data storage; Flight control; Fly by wire control; Hardware; Measuring instruments; Reliability; Safety
ID- *Foreign technology; Translations; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1757512
AA- <NTIS> N93-30690/0
TI- Bandwidth and SIMDUCE as Simulator Fidelity Criteria
AU- Key, D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Apr 92
PG- 14p
NT- In Its NASA/FAA Helicopter Simulator Workshop p 147-160.
LA- English
PC- (Order as N93-30673/6, PC A09/MF A02)
JA- GRAI9323; STAR3111
CP- United States
AB- The potential application of two concepts from the new Handling Qualities Specification for Military Rotorcraft was discussed. The first concept is bandwidth, a measure of the dynamic response to control. The second is a qualitative technique developed for assessing the visual cue environment the pilot has in bad weather and at night. Simulated Day Usable Cue Environment (SIMDUCE) applies this concept to assessing the day cuing fidelity in the simulator.
DE- *Bandwidth; *Flight simulation; *Flight simulators; *Helicopters; *Rotary wing aircraft; *Cues; *Visual stimuli; Daytime; Dynamic response; Flight conditions; Night
ID- NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1757506
AA- <NTIS> N93-30684/3
TI- Training Effectiveness Assessment: Methodological Problems and Issues
AU- Cross, K. D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Apr 92
PG- 14p
NT- In Its NASA/FAA Helicopter Simulator Workshop p 77-90.

LA- English
PC- (Order as N93-30673/6, PC A09/MF A02)
JA- GRAI9323; STAR3111
CP- United States
AB- The U.S. military uses a large number of simulators to train and sustain the flying skills of helicopter pilots. Despite the enormous resources required to purchase, maintain, and use those simulators, little effort has been expended in assessing their training effectiveness. One reason for this is the lack of an evaluation methodology that yields comprehensive and valid data at a practical cost. Some of these methodological problems and issues that arise in assessing simulator training effectiveness, as well as problems with the classical transfer-of-learning paradigm were discussed.
DE- *Flight simulators; *Helicopters; *Pilot performance; *Pilot training; *Training evaluation; Economic factors; Effectiveness
ID- *Military training; NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 92A (Behavior and Society--Job Training and Career Development); 85A (Transportation--Air Transportation)

AZ- 1751599
AA- <NTIS> N93-28869/4
TI- Flight Evaluation of a Computer Aided Low-Altitude Helicopter Flight Guidance System
AU- Swenson, H. N. ; Jones, R. D. ; Clark, R.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- cApr 93
PG- 11p
NT- In AGARD, Combat Automation for Airborne Weapon Systems: Man/Machine Interface Trends and Technologies 11 p.
LA- English
PC- (Order as N93-28850/4, PC A12/MF A03)
JA- GRAI9321; STAR3111
CP- United States
AB- The Flight Systems Development branch of the U.S. Army's Avionics Research and Development Activity (AVRADA) and NASA Ames Research Center have developed for flight testing a Computer Aided Low-Altitude Helicopter Flight (CALAHF) guidance system. The system includes a trajectory-generation algorithm which uses dynamic programming and a helmet-mounted display (HMD) presentation of a pathway-in-the-sky, a phantom aircraft, and flight-path vector/predictor guidance symbology. The trajectory-generation algorithm uses knowledge of the global mission requirements, a digital terrain map, aircraft performance capabilities, and precision navigation information to determine a trajectory between mission way points that seeks valleys to minimize threat exposure. This system was developed and evaluated through extensive use of piloted simulation and has demonstrated a 'pilot centered' concept of automated and integrated navigation and terrain mission planning flight guidance. This system has shown a significant improvement in pilot situational awareness, and mission effectiveness as well as a decrease in training and proficiency time required for a near terrain, nighttime, adverse weather system. AVRADA's NUH-60A STAR (Systems Testbed for Avionics Research) helicopter was specially modified, in house, for the flight evaluation of the CALAHF system. The near terrain trajectory generation algorithm runs on a multiprocessor flight computer. Global Positioning System (GPS) data are integrated with Inertial Navigation Unit (INU) data in the flight computer to provide a precise navigation solution. The near-terrain trajectory and the aircraft state information are passed to a Silicon Graphics computer to provide the graphical 'pilot centered' guidance, presented on a Honeywell Integrated Helmet And Display Sighting System (IHADSS). The system design, piloted simulation, and initial flight test results are presented.
DE- *Flight tests; *Global positioning system; *Helicopters; *Inertial navigation; *Nap-of-the-earth navigation; *Helmet mounted displays; Computer techniques; Systems engineering; Dynamic programming; Flight paths; Flight simulation; Phantom aircraft
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 76D (Navigation, Guidance, and Control--Navigation Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1751590
AA- <NTIS> N93-28860/3
TI- Quest for an Integrated Flying Helmet
AU- Karavis, A. ; Jarrett, D. N.
CS- Defence Research Agency, Farnborough (England). Flight Systems Dept.
CS- <CODE> 103387002; DH034640
PY- cApr 93
PG- 19p
NT- In AGARD, Combat Automation for Airborne Weapon Systems: Man/Machine Interface Trends and Technologies 19 p.
LA- English
PC- (Order as N93-28850/4, PC A12/MF A03)

JA- GRAI9321; STAR3111
CP- United Kingdom
AB- The addition of vision enhancement, display, and control functions to aviator's headgear is operationally attractive. The jets and helicopters that are currently under development call for headgear with a combination of these novel facilities. This paper reviews the recent history of such helmet systems, which demonstrate admirably the inventiveness of the design teams. However, there are attendant perceptual and operational concerns and the addition of extra components invariably compromises basic ergonomic qualities. A new design philosophy, which emphasizes functional integration rather than the incorporation of compatible sub-systems, is emerging. This will be assisted significantly when key optical and electro-optical technologies become mature.
DE- *Aircraft guidance; *Functional integration; *Helmet mounted displays; *Helmets; *Pilot performance; *Man machine systems; Aircraft pilots; Electro-optics; Fighter aircraft; Helicopters; Human factors engineering
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92B (Behavior and Society--Psychology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1749692
AA- <NTIS> AD-A267 100/6
TI- Test and Evaluation Report of the Medical Data Electronics Escort Patient Monitor Model E300A
TI- <NOTE> Final rept
AU- Quattlebaum, M. D. ; Bruckart, J. E. ; Squire, B. E. ; Johnston, L. W.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-93-18
CN- 3M463807D836; LC
PY- Mar 93
PG- 62p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9321
CP- United States
AB- The Medical Data Electronics escort patient monitor, model E300A, was tested for environmental and electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for environmental tests and electromagnetic interference/compatibility and human factors. The Medical Data Electronics escort patient monitor, model E300A, did not perform properly in the vibration test, high temperature operation test, and low temperature operation test. Excess electromagnetic emissions and electromagnetic susceptibility make it ineligible for an airworthiness release. The unit is not considered compatible with the U.S. Army Medical Evacuation UH-60A Black Hawk.
DE- *Medical equipment; *Electromagnetic compatibility; *Electromagnetic interference; Environmental tests; Test and evaluation; Aeromedical evacuation; Military operations; Military aircraft; Helicopters; Models ; Monitors; High temperature; Operation
ID- Model E300A Monitors; UH/60A Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1749355
AA- <NTIS> AD-A266 760/8
TI- Center for Rotorcraft Education and Research Progress Report 1987-92
TI- <NOTE> Final rept. 1 Jan 88-31 Dec 92
AU- Chopra, I.
CS- Dayton Univ., OH. Dept. of Chemistry.
CS- <CODE> 007431010; 410860
SP- Army Research Office, Research Triangle Park, NC.
RN- ARO-25467.74-EG-RW
CN- DAAL03-88-C-0002
PY- Jun 93
PG- 133p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9321
CP- United States

AB- Established in 1981, the Center for Rotorcraft Education and Research at the University of Maryland has achieved international recognition as a center of excellence in rotorcraft engineering based on the quality and quantity of its research output and advanced-degree recipients. In the process of growth, it has built an integrated team of rotorcraft dedicated research faculty and staff, a pipeline of high quality graduate students, and a group of specialized rotorcraft research facilities and instrumentation unmatched by any other university. The Center carried out interdisciplinary research program built around four interrelated areas that advanced understanding and predictive capability in: Aerodynamics-unsteady aerodynamics, dynamic stall, and rotor/airframe interaction tests and analyses; Dynamics and Aeroelasticity-bearingless and composite rotor tests and analyses, and minimization of rotor/body vibrations by optimization techniques; Flight Dynamics and Control-control of the dynamic behavior of highly coupled rotor-fuselage configurations; Structures and Materials-structural integrity, energy absorption, and modeling of composite blades.
DE- *Aerodynamics; *Rotary wing aircraft; *Helicopters; Aeroelasticity; Airframes; Blades; Configurations; Dynamics; Engineering; Flight; Fuselages; Instrumentation; Interactions; Optimization; Output; Quality ; Recognition; Research facilities; Rotors; Structures; Test and evaluation; Vibration; Aeronautical engineering; Composite materials; Structural properties; Finite element analysis
ID- Unsteady aerodynamics; NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1746014
AA- <NTIS> AD-A266 493/6
TI- Evaluation of Night Vision Goggles (NVG) for Maritime Search and Rescue (HH-3/HH-6) Comparison Report
TI- <NOTE> Final rept. Mar 89-Jan 93
AU- Robe, R. Q. ; Plourde, J. V.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> 093810000; 413536
SP- Coast Guard, Washington, DC.
RN- USCG-D-09-93
CN- DTCG39-89-C-E10G56
PY- Jan 93
PG- 97p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A02
JA- GRAI9320
CP- United States
AB- Eight experiments, including seven involving helicopters, have been conducted by the U.S. Coast Guard Research and Development (R and D) Center to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs have been evaluated. The AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) was evaluated onboard U.S. Coast Guard HH-3F, CH-3E, and HH-60J helicopters, and HU-25C and RG-8A fixed-wing aircraft. The AN/PVS-5C and AN/PVS-7A NVGs were evaluated onboard U.S. and Canadian Coast Guard Search and Rescue Units (SRUs) in the 200-foot size range and onboard U.S. Coast Guard 41-foot utility boats (UTBs). A total of 3029 target detection opportunities were generated during searches from helicopters for all the target types employed during the eight experiments. These data were first analyzed to determine whether a statistically significant difference existed in the detection performance of the HH-3/CH-3 and HH-60 helicopters. The data were then analyzed to determine which of 25 search parameters of interest exerted a statistically significant influence on target detection probability. Lateral range curves and sweep width estimates are presented for SRU/target type combinations that contained sufficient data to support this detailed analysis. Human factors data are presented and discussed.... Search and Rescue, Night Vision, Night Vision Goggles, Sweep Width, Unlighted Targets, Lighted Targets, Search, Life Raft, Lighted, Unlighted.
DE- *Coast guard research; *Goggles; *Night vision; *Search and rescue; Boats; Detection; Estimates; Fixed wing aircraft; Helicopters; Life rafts; Onboard; Parameters; Probability; Target detection
ID- *Night vision goggles; *Human factors engineering; HH-3 Aircraft; HH-60 Aircraft; NTISDODXA; NTISDOTCG
SH- 63F (Detection and Countermeasures--Optical Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1745654
AA- <NTIS> TIB/B93-01446
TI- Meteorologisch-klimatologische Ausruestung eines Forschungsflugzeuges. Turbulente Fluesse ueber Eis und Wasser. Abschlussbericht. (Meteorological-climatological equipment of a research aircraft. Turbulent fluxes over ice and water. Final report)

AU- Roth, R.
CS- Aerodata Flugmesstechnik G.m.b.H., Brunswick (Germany, F.R.)
CS- <CODE> 092997000; 9204742
SP- Bundesministerium fuer Forschung und Technologie, Bonn (Germany).
CN- BMFT KF 4002; BMFT 07KF402.
PY- 30 Mar 90
PG- 7p
NT- In German.
NT- Also available from TIB Hannover: D.Dt.F.AC1000(44,18). Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC E09
JA- GRAI9319
CP- Germany, Federal Republic of
AB- Aircraft-based meteorological measurements, which were very popular weather service vehicles until 1945, have been rediscovered in the recent years as tools of meteorological research. Examples are given of measurements of the mean temperature, wind and humidity fields of mesoscale structures, and of the measurement of turbulent fluxes over larger areas not only in the medium latitudes over land but especially over the seas and in high latitudes where in situ measurements are often difficult. The polar-aircraft instrumentation for meteorological measurements was completed. A helicopter-based system will be developed on the basis of the results obtained. (orig./KW). (Copyright (c) 1993 by FIZ. Citation no. 93:001446.)
DE- *Heat flux; *Aircraft; *Meteorology; Turbulence; Surfaces; Ice; Water; Research programs; Humidity; Ambient temperature; Wind; Measuring instruments; Polar regions
ID- *Foreign technology; NTISTFFIZ
SH- 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

AZ- 1733957
AA- <NTIS> N93-23419/3
TI- Simulation Evaluation of a Low-Altitude Helicopter Flight Guidance System Adapted for a Helmet-Mounted Display
AU- Swenson, H. N. ; Zelenka, R. E. ; Hardy, G. H. ; Dearing, M. G.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:103883; A-91219; NASA-TM-103883
CN- RTOP 505-64-36
PY- Feb 92
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9316; STAR3108
CP- United States
AB- A computer aiding concept for low-altitude helicopter flight was developed and evaluated in a real-time piloted simulation. The concept included an optimal control trajectory-generation algorithm based upon dynamic programming and a helmet-mounted display (HMD) presentation of a pathway-in-the-sky, a phantom aircraft, and flight-path vector/predictor guidance symbology. The trajectory-generation algorithm uses knowledge of the global mission requirements, a digital terrain map, aircraft performance capabilities, and advanced navigation information to determine a trajectory between mission way points that seeks valleys to minimize threat exposure. The pilot evaluation was conducted at NASA ARC moving base Vertical Motion Simulator (VMS) by pilots representing NASA, the U.S. Army, the Air Force, and the helicopter industry. The pilots manually tracked the trajectory generated by the algorithm utilizing the HMD symbology. The pilots were able to satisfactorily perform the tracking tasks while maintaining a high degree of awareness of the outside world.
DE- *Air navigation; *Flight simulation; *Helicopters; *Helmet mounted displays; *Low altitude; *Vertical motion simulators; Aircraft performance; Flight paths; Optimal control; Algorithms; Digital data; Dynamic programming; Mission planning; Terrain; Trajectories
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1731694
AA- <NTIS> AD-A263 458/2
TI- Effects of Superimposing Symbology on a Simulated Night Vision Goggle Display
TI- <NOTE> Interim rept

AU- McAnulty, D. M. ; Ruffner, J. W. ; Hamilton, D. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ARI-RR-1636
CN- MDA903-92-D-0025
PY- Feb 93
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9316
CP- United States
AB- The U.S. Army is acquiring a system that superimposes instrument symbology on night vision goggle (NVG) imagery. However, previous research indicates that the symbology may distract a pilot's attention from obstacle detection, recognition, and avoidance and may interfere with proper scanning patterns. To test the effects of combining imager and symbology, 36 helicopter pilots were presented night-flight scenarios simulating NVG imagery only, symbology only, and imagery plus symbology. The aviators were required to monitor and respond to predefined scene and symbology targets. They detected and responded rapidly to a high percentage of targets when viewing the scene-only and symbology-only scenarios. Their performance decreased significantly when the two types of information were presented together, but the decrease was small when compared to the increased amount of information available in the display. Aviator performance improved with practice and was related to experience and eye dominance. The aviators suggested several modifications for the symbology suite.
DE- *Night vision devices; *Head up displays; *Target detection; Pilot studies; Workload
ID- *Symbology; Eye dominance; NTISDODXA; NTISDODA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1731359
AA- <NTIS> TIB/B93-00670
TI- Flight tests of the digitally controlled Turbomeca Arrius 1B engines on EC BO 108
AU- Gersdorff, M. ; Lordon, C.
CS- Messerschmitt-Boelkow-Blohm, Deutsche Aerospace A.G., Munich (Germany). Information und Dokumentation.
CS- <CODE> 105551001; 9204259
RN- ECD--0002-92-PUB
PY- 1992
PG- 11p
NT- 18. European rotorcraft forum, Avignon (France), 15-18 Sep 1992, With 17 figs.
NT- Microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF E07
JA- GRAI9315
CP- Germany, Federal Republic of
AB- In October 1988 the first BO 108 prototype equipped with two Allison 250 C20R engines made its maiden flight. The second prototype (V2), equipped with two TURBOMECA ARRIUS 1B engines and Digital Engine Control Unit (DECU) has provided successful flight test results since June 1991. A brief description of the engine and engine control will be given together with information about the different DECU functions and mode of operation. The ground and flight test program together with the aircraft test equipment and instrumentation will be presented. Results will focus on the most important tests related to the use of a digital engine control system and the main advantages of those systems over conventional (hydro-mechanic/pneumatic) engine control systems. Finally the definition and initial flight testing of a variable rotorspeed adapted to the flight conditions will be presented. (orig.). (Copyright (c) 1993 by FIZ. Citation no. 93:000670.)
DE- *Turbojet engine control; *Bo-108 helicopter; *Flight tests; Helicopters; Digital techniques; Turboshafts; Gears; Modules; Engine performance; Optimization
ID- *Foreign technology; *Turbojet engines; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 1731143
AA- <NTIS> PB93-870491
TI- Military Helicopters. (Latest citations from the Compendex Database)
TI- <NOTE> Published Search

CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.
PY- May 93
PG- 115 citations minimum
NT- Updated with each order. Supersedes PB90-850959. Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9315
CP- United States
AB- The bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (Contains a minimum of 115 citations and includes a subject term index and title list.)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1728319
AA- <NTIS> AD-A263 011/9
TI- Sound Attenuation Characteristics of the Standard DH-132A and SPH-4 Helmets Worn in Combination with Standard Issue Earplugs
AU- Mozo, B. T. ; Barlow, L. S. ; Murphy, B. A.
CS- Army Air Mobility Research and Development Lab., Fort Eustis, VA. Eustis Directorate.
CS- <CODE> 055051001; 389646
RN- USAARL-93-10
PY- Jan 93
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9315
CP- United States
AB- The Health Hazard Assessment (HHA) of Army systems usually requires a review of noise and hearing protection associated with the systems used. Hearing protection for crews in combat vehicles is specified to be the DH-132A and, in some cases where noise levels are extremely high, earplugs are worn in combination with the helmet in order to provide adequate protection. Hearing protection for Army helicopter crewmembers is the SPH-4 helmet with a few exceptions. The attenuation data used for the HHA are measured at this Laboratory. This report incorporates the results of attenuation measurements of the SPH-4 and DH-132A helmets worn in combination with the standard Army issue earplugs. Earplugs used in the study were the single flange, triple flange, and yellow/white foam plug.
DE- *Tank crews; *Flight crews; *Acoustic attenuation; *Noise(Sound); Exposure(Physiology); Psychophysics; Adjustment(Psychology)
ID- *SPH-4 Helmet; *DH-132 Helmet; Earplugs; HHA(Health Hazard Assessment); Sound room; EEL(Effective Exposure Level); NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1728155
AA- <NTIS> AD-A262 847/7
TI- HEL Counter-Air Program (HELCAP) Combined Arms Counter-Air Simulation Facility
TI- <NOTE> Final rept
AU- Herald, G. L.
CS- Army Research Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 105322000; 425747
RN- ARL-MR-19
CN- 1L162716AH70
PY- Dec 92
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A04/MF A01
JA- GRAI9315
CP- United States
AB- The HEL counter-air program (HELCAP) is a program which focused on the soldier-machine interface issues related to combined arms counter-air operations. The thrusts of the HELCAP initiative were to (1) provide soldier-compatible interface designs for the command and control nodes which would demonstrate integration of counter-air operations between air defense and aviation units through interactive laboratory simulation, and (2) validate these soldier-interface criteria through laboratory testing of the command and control concepts. The laboratory demonstrations examined a small battalion slice which consisted of four nodes. This document provides an overview of the HELCAP simulation facility and HELCAP design specifics. The simulation equipment is described for each of the HELCAP nodes: (1) The helicopter node, describing the communications system and display, vertical situation display, tactical situation display, weapons systems equipment and displays, subsystem status monitoring display, aircraft survivability equipment display; (2) the tactical operations center nodes describing the battlefield situation display and data display; and (3) the integrated weapon's system display for the pedestal-mounted stinger node describing the simulator configuration and operation and the gunner's panel and controls. A symposium and demonstration of the HELCAP concept and simulation was provided to the Army on 17 and 18 July 1991.... Air defense, Simulation, Pedestal-mounted stinger, Counter air, Simulators, Real time, Human engineering Missiles, Command, Control, Communication.
DE- *Air defense; *Command control communications; *Man computer interface; Aircraft; Army personnel; Battlefields; Data displays; Engineering; Facilities; Helicopters; High energy lasers; Monitoring; Real time; Simulators; Survivability; Weapons; Man machine systems; Gunners; Human factors engineering; Army operations
ID- *Computerized simulation; NTISDODXA
SH- 74A (Military Sciences--Antiaircraft Defense Systems); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 1728064
AA- <NTIS> PB93-868677
TI- Anthropometry. (Latest citations from the Compendex Database)
TI- <NOTE> Published Search
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> 103588000
SP- National Technical Information Service, Springfield, VA.
PY- May 93
PG- 194 citations minimum
NT- Updated with each order. Supersedes PB90-867151. Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9314
CP- United States
AB- The bibliography contains citations concerning modeling to predict the anthropometric, biomechanical, and work physiology parameters for age, height, and weight. The human engineering of man/equipment systems is considered. Applications include automobile, truck, and bus seating; military helicopter cockpit layout; office and school furniture, and office workplace layouts. (Contains a minimum of 194 citations and includes a subject term index and title list.)
DE- *Bibliographies; *Anthropometry; Human factor engineering; Man machine systems
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1725443
AA- <NTIS> AD-A262 524/2
TI- Test and Evaluation Report of the Airborne Life Support Systems Infant Transport Incubator, Model 20-H
TI- <NOTE> Final rept
AU- Squire, B. E. ; Bruckart, J. E. ; Quattlebaum, M. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-93-7
CN- 3M463807D836; LC
PY- Jan 93
PG- 78p
NT- Prepared in collaboration with UES, Inc.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9314
CP- United States
AB- The Airborne Life Support Systems Infant Transport Incubator, Model 20-H, was tested for environmental and electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for environmental tests and electromagnetic interference/compatibility and human factors. The Airborne Life Support Systems Infant Transport Incubator, Model 20-H, was found to be compatible with the U.S. Army MEDEVAC UH-60 Black Hawk.... Electromagnetic compatibility, Test and evaluation, Aeromedical equipment.
DE- *Infants; *Life support systems; *Aeromedical evacuation; *Acceptance tests; Airborne; Electromagnetic compatibility; Electromagnetic interference; Environmental tests; Helicopters; Standards; Test and evaluation; Emergencies; Incubation; Human factors engineering; Army research
ID- Infant transport incubator; Model 20-H Incubator; UH-60 Aircraft; Army Medevac; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1725009
AA- <NTIS> AD-A262 083/9
TI- Physiological Evaluation of a Prototype Air-Vest Microclimate Cooling System
TI- <NOTE> Technical rept
AU- Cadarette, B. C. ; Latzka, W. A. ; Levine, L. ; Sawka, M. N.
CS- Army Research Inst. of Environmental Medicine, Natick, MA.
CS- <CODE> 002970000; 040850
RN- USARIEM-T14-91
PY- Aug 91
PG- 45p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9314
CP- United States
AB- These experiments were conducted to answer three specific research questions about the effectiveness of a prototype air-cooled vest with design changes that make it useful for helicopter crews as well as armored vehicle crews. The results of these experiments show that: (1) Under matching cooling conditions, the NATICK prototype air-cooled vest (PAV) is as effective as the NATICK microclimate air-cooled vest (MAV) at reducing heat strain and increasing exercise performance time; (2) With the diffuse airflow provided by the PAV, subjects experience no sensation of contact burning from air delivered at 45 deg C; (3) In a trade-off between flow rate and inlet temperature, subjects showed improved performance with air provided at 30 Low compared to 40 Hi even though 40 Hi provided greater calculated cooling potential. It is concluded from these results that: (1) The PAV would provide a suitable replacement for the MAV; (2) The PAV could be used at higher ambient temperatures than the MAV; (3) If design changes in vehicle cooling equipment necessitates a trade-off between flow rate and cooling, they should favor providing lower temperatures over higher flow rates.... MOPP 4, Thermoregulation, Heat Stress, Exercise.
DE- *Air cooled; *Vests; *Protective clothing; *Heat stress(Physiology); Armored vehicles; Cooling; Crews; Flow rate; Heat; Helicopters; Inlets; Prototypes; Replacement; Temperature control; Tanks(Combat vehicles); Army personnel; Exercise(Physiology); Army research
ID- *Performance evaluation; M-1 Tanks; PAV(Prototype Air cooled Vest); MAV(Microclimate Air Cooled Vest); Thermoregulation; NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1720127
AA- <NTIS> N93-19917/2
TI- Helicopter Night Vision Goggle Testing in the United Kingdom
AU- Swales, M. R. ; Cason, R. W.
CS- Aeroplane and Armament Experimental Establishment, Boscombe Down (England).
CS- <CODE> 000500000; AG008371
PY- cOct 92
PG- 12p
NT- In AGARD, Flight Testing 12 p.
LA- English
PC- (Order as N93-19901/6, PC A18/MF A04)
JA- GRAI9312; STAR3106

CP- United Kingdom
AB- The ominous lethality of the modern battlefield necessitates the maximum exploitation of the cover afforded by darkness, making the ability to operate effectively at night a key factor in winning any major conflict. Unfortunately, the majority of the operational helicopter fleet was designed years ago with mainly daylight operations in mind. Converting these existing cockpits to an appropriate standard of night vision goggle (NVG) compatibility is no simple task. Quick fit, inexpensive fixes are rare and offer only limited value. The United Kingdom's Ministry of Defense (UK MOD) has learned this lesson well in recent years, having made large investments in both money and manpower to achieve an acceptable NVG standard of cockpit compatibility in the Sea King, Wessex, Lynx, Puma, Chinook, Gazelle, Scout and A109 helicopters. This paper will present an overview of helicopter NVG compatibility testing in the UK. A synopsis of the principles of image intensification will justify the logic behind various NVG modifications. An historic overview will then set the stage for the NVG cockpit developments, followed by a general discussion of some important compatibility issues. A review of the NVG operational assessments conducted in several different flight environments will conclude this discussion by presenting results peculiar to each environment. These wide-ranging assessments have provided the experience to develop a practical scientific approach to NVG cockpit compatibility testing which is offered in a summary of test methods.
DE- *Compatibility; *Goggles; *Helicopters; *Night vision; Combat; Image intensifiers; Cockpits; Darkness; Lethality; Low cost; P-531 helicopter ; United kingdom
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63GE (Detection and Countermeasures--General)

AZ- 1719678
AA- <NTIS> N93-19105/4
TI- Concepts for Pilot Interaction with an Automated Noe Obstacle-Avoidance System
AU- Coppenbarger, R. A. ; Cheng, V. H. L.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:103960; A-92157; NASA-TM-103960
CN- RTOP 505-64-36
PY- Dec 92
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9312; STAR3106
CP- United States
AB- The problem of providing an appropriate method by which a human pilot interacts with an automated nap-of-the-Earth rotorcraft guidance and control system is addressed. This problem is closely related to the broader question of what level and degree of automation is effective at reducing pilot workload during low-altitude flight missions requiring obstacle avoidance. A systematic approach for establishing the possible combinations of manual versus automatic authority over relevant guidance and control functions is first presented. From these possibilities, three candidate concepts are selected; selection is based upon their potential for practical implementation and reduction in pilot workload. This paper describes the selection of these three pilot-interaction concepts and the mathematical models for their implementation.
DE- *Aircraft guidance; *Automatic flight control; *Nap-of-the-earth navigation; *Obstacle avoidance; *Rotary wing aircraft; *Man machine systems; Workloads (Psychophysiology); Low altitude; Mathematical models
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 71D (Materials Sciences--Ceramics, Refractories, and Glass); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1717187
AA- <NTIS> N93-18333/3
TI- Trade-Offs Arising from Mixture of Color Cueing and Monocular, Binoptic, and Stereoscopic Cueing Information for Simulated Rotorcraft Flight
AU- Parrish, R. V. ; Williams, S. P.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.60:3268; L-17085; NASA-TP-3268; CECOM-TR-92-B-014
CN- DA PROJ. 1L1-61102-AH-45; RTOP 505-64-13-32
PY- Feb 93

PG- 81p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9311; STAR3106
CP- United States
AB- To provide stereopsis, binocular helmet-mounted display (HMD) systems must trade some of the total field of view available from their two monocular fields to obtain a partial overlap region. The visual field then provides a mixture of cues, with monocular regions on both peripheries and a binoptic (the same image in both eyes) region or, if lateral disparity is introduced to produce two images, a stereoscopic region in the overlapped center. This paper reports on in-simulator assessment of the trade-offs arising from the mixture of color cueing and monocular, binoptic, and stereoscopic cueing information in peripheral monitoring displays as utilized in HMD systems. The accompanying effect of stereoscopic cueing in the tracking information in the central region of the display is also assessed. The pilot's task for the study was to fly at a prescribed height above an undulating pathway in the sky while monitoring a dynamic bar chart displayed in the periphery of their field of view. Control of the simulated rotorcraft was limited to the longitudinal and vertical degrees of freedom to ensure the lateral separation of the viewing conditions of the concurrent tasks.
DE- *Binocular vision; *Color; *Cues; *Flight simulators; *Helmet mounted displays; *Monocular vision; *Rotary wing aircraft; *Stereoscopic vision; Flight simulation; Degrees of freedom; Field of view; Tradeoffs ; Visual fields
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1714952
AA- <NTIS> AD-A260 204/3
TI- Attention Factors Associated with Head-Up Display and Helmet-Mounted Display Systems
TI- <NOTE> Final rept. Jul-Dec 91
AU- Morey, J. C. ; Simon, R.
CS- Dynamics Research Corp., Wilmington, MA.
CS- <CODE> 062809000; 388902
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- E-19298U; ARI-RN-93-12
CN- MDA903-87-C-0523
PY- Jan 93
PG- 64p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9311
CP- United States
AB- This report is a review of human attention research literature relevant to head-up display (HUD) and helmet-mounted display (HMD) systems in use or under development for rotary-wing aircraft. The fundamental attentional issue for HUDs and HMDs is division of attention between the outside-the-window scene and the displayed symbology. Selective attention applies more to elements within the HUD or HMD symbology. The review identified a number of areas for further research. These are effects of dichoptic viewing, eye dominance, identification of strategies for effective time-sharing, HUD and HMD training, and pilot selection.... Head-up display, Divided attention, Individual, Helmet-mounted display, Selective attention, Differences, Attention, Pilot selection, Helicopters.
DE- *Attention; *Head up displays; *Helmet mounted displays; Helicopters; Helmets; Pilots; Rotary wing aircraft; Rotary wings; Selection; Strategy; Time; Time sharing; Training
ID- NTISDODXA; NTISDODA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1714092
AA- <NTIS> N93-17570/1
TI- Integrated Helmet System Testing for a Nightflying Helicopter
AU- Boehm, H. ; Schreyer, H.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
CS- <CODE> 064776000; MT618891
RN- MBB-UD-0604-91-PUB; ETN-92-92580
PY- 1991

PG- 20p
NT- Previously Announced in Iaa as A92-56291. Presented at 17TH European Rotorcraft Forum, Berlin, Germany, 24-27 Sep. 1991; Sponsored by Dglr.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9310; STAR3105
CP- Germany
AB- The requirements for and testing of an Integrated Helmet System (IHS) for helicopter application are presented. An IHS consists of a helmet shell, a Helmet Mounted Sight (HMS), two Image Intensifier Tubes (IIT) and two Cathode Ray Tubes (CRT) with an optical system including combiners to present the images binocular. Additional symbology can be superimposed to the CRT or IIT image. The HMS can steer a sensor platform with a thermal camera or an air to air missile system. The main helicopter requirements on such a system are: human factors; fit of helmet including optimized center of gravity and weight; optimized day, twilight and night optical modules; large exit pupil, good transmission of the optical path and a large adjustment range; good geometrical resolution/modulation transfer function with a large field of view; high focussing range of the IIT; CRT automatic brightness and contrast control with a good readability in day time; flight symbology presentation for one or two eyes; good static and dynamic HMS accuracy with a large head motion box; NBC (Nuclear, Biological, Chemical) and laser protection compatibility. The results of helicopter flight trials and laboratory tests showed there is no substitute for flight trials to completely understand an IHS for day and night flight capability. The difficult human engineering aspects have to be evaluated with functional IHS models to find the necessary improvements.
DE- *Flight tests; *Helicopters; *Helmet mounted displays; *Human factors engineering; *Image intensifiers; *Night flights (Aircraft); *Performance tests; Helmets; Cathode ray tubes; Flight clothing; Night vision; Requirements; Systems integration
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1712155
AA- <NTIS> AD-A259 909/0
TI- Effects on Physiology and Performance of Wearing the Aviator NBC Ensemble While Flying the UH-60 Helicopter Flight Simulator in a Controlled Heat Environment
TI- <NOTE> Final rept. Aug 89-Nov 91
AU- Thornton, R. ; Caldwell, J. L. ; Clark, W. ; Guardiani, F. ; Rosario, J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-36
CN- 3M162787A879
PY- Sep 92
PG- 173p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A02
JA- GRAI9310
CP- United States
AB- The physiological and performance effects of wearing U.S. Army aviator NBC individual protective equipment (IPE) were evaluated in the USAARL UH-60 research flight simulator. Sixteen male aviators flew the simulator in four test conditions: standard flight suit and cool cockpit, standard flight suit and hot cockpit, NBC IPE and cool cockpit, and NBC IPE and hot cockpit. The hot condition had a WBGT of 30.6 deg C, the cool 17.9 deg C. Rectal temperature, mean skin temperature, and heart rate were monitored and showed significant increases for the NBC hot condition compared with the other three. There was a significant degree of dehydration in the hot NBC condition. Seven subjects failed to complete the sortie in the NBC hot condition, with a mean survival time of 298 minutes. All subjects flew for the target 6 hours in the other conditions. Simulator flight performance showed significant impairment in the hot NBC condition. There was little evidence of a reduction in flight performance with time. Six crashes occurred in NBC IPE, one in the standard flight suit. A performance assessment battery also was undertaken before, and at regular intervals during flight. The battery showed no effect of condition, though it was sensitive to increasing time on each test day. A subjective questionnaire assessment showed increasing fatigue with time, and that all conditions produced significantly more fatigue than baseline with the worse being for NBC hot....Chemical defense, Psychological stress, Psychological testing, Psychological performance, Heat stress, Aircrew protective ensembles, Physiology, Helicopter,

Heart rate.
DE- *Flight simulators; *Helicopters; *Physiology; *Protective equipment; *Protective clothing; *Aviation personnel; Army; Cockpits; Crashes; Dehydration; Fatigue; Flight crews; Heart rate; Heat; Intervals; Males; Questionnaires; Rates; Reduction; Simulators; Standards; Targets; Temperature; Test and evaluation; Time; Performance(Human); Collective protection; Cooling; Skin(Anatomy); Heat stress(Physiology); Psychology ; Nuclear warfare; Chemical warfare; Biological warfare
ID- *NBC(Nuclear Biological Chemical) ensemble); UH-60 Simulator; Flight suit; Impairment; Psychological stress; NTISDODXA
SH- 74D (Military Sciences--Chemical, Biological, and Radiological Warfare) ; 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1710423
AA- <NTIS> N93-16345/9
TI- Helikopter Installaties: Van Motor Tot Rotor (Helicopter Installations: From Motor to Rotor)
AU- Boer, J. F.
CS- Technische Univ. Delft (Netherlands). Faculty of Aerospace Engineering.

CS- <CODE> 102075006; TJ479965
RN- LR-675; ETN-93-92870
PY- Dec 91
PG- 192p
NT- Text in Dutch.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
PC- PC A09/MF A02
JA- GRAI9309; STAR3105
CP- Netherlands
AB- The primary installations of helicopters are described with a view to helicopter design. Some relevant helicopter principles are explained. The different types of engine installations, their fuel control systems, and instrumentation as well as the fuel installation are described. The general requirements for transmission systems, the different transmission configurations and their components, the lubrication of the gear casings, and the suspension of the main deceleration box are treated. Rotor heads, rotor blades, and couple compensation systems are presented. The different helicopter control systems are described.
DE- *Helicopter control; *Helicopter design; *Helicopter engines; *Rotary wings; Control systems design; Helicopters; Aircraft instruments; Fuel control; Fuel systems; Gears; Helicopter tail rotors; Suspension systems (Vehicles); Transmissions (Machine elements)
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 1708670
AA- <NTIS> AD-A259 222/8
TI- Test and Evaluation Report of the Physio Control Vital Signs Monitor, Model VSM 2
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Licina, J. R. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-93-1
CN- DAMD-17-86-C-6215; 3M463807D836; LC
PY- Oct 92
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9309
CP- United States
AB- The Physio Control Vital Signs Monitor, Model VSM 2, was tested for environmental and electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for environmental tests and electromagnetic interference/compatibility and human factors. The Physio Control Vital Signs Monitor, Model VSM 2, was found to be compatible with the U.S. Army MEDEVAC UH-60 Black Hawk.... Electromagnetic compatibility, test and evaluation, aeromedical equipment.
DE- *Test and evaluation; *Medical equipment; Army equipment; Control; Electromagnetic compatibility; Electromagnetic interference; Environmental tests; Helicopters; Models; Standards; Aeromedical

evacuation; Temperature; Signs and symptoms; Medical supplies; Military medicine; Military operations; Military aircraft; Rotary wing aircraft
ID- *Vital signs monitor; UH-60A Aircraft; 60A Aircraft; Human factors; NTISDODXA
SH- 74GE (Military Sciences--General); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1704528
AA- <NTIS> AD-A258 745/9
TI- Aircraft Accidents: Trends in Aerospace Medical Investigation Techniques (Les Accidents d'Aeronefs: les Tendances en Techniques d'Investigation Medicale)
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-532
PY- cSep 92
PG- 499p
NT- Text in French and English. Papers presented at the Aerospace Medical Panel Symposium Held in Cesme, Turkey, 27 Apr - 1 May 92.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding; Translation
PC- PC A21/MF A04
JA- GRAI9308
CP- Other
AB- These proceedings include the Technical Evaluation Report and 58 papers of the Symposium sponsored by the AGARD Aerospace Medical Panel held April 27th-1st May 1992. Since the commencement of aviation, accidents have occurred for a variety of reasons in both fixed- and rotary-wing aircraft. As the complexity of aviation systems increased, so did the task of investigating aircraft accidents. At the same time, advanced techniques in aviation and weapon systems have exacerbated greatly the physiological and cognitive demands on aircrews. The result is that aircraft accidents due to material causes have diminished progressively while the percentage of human factor-caused accidents has not. The papers address a variety of topics including: (a) human factor causes of accidents; (b) occupant injury investigation; (c) test devices for dynamic response; (d) fixed- and rotary-wing aircraft accident data; (e) spatial disorientation; (f) injury and accident prevention; (g) post crash fire, toxicology, and forensic pathology; (h) crew error prevention and (i) crew risk factors. These proceedings will be of interest to those involved in the investigation of aircraft accidents, their causes and the prevention thereof.
DE- *Accident investigations; *Aviation accidents; *Crashes; Cognition; Dynamic response; Errors; Flight crews; Humans; Materials; Panels; Response; Rotary wing aircraft; Simulation; Test and evaluation; Time; Toxicology; Weapon systems; Wounds and injuries
ID- *Foreign technology; *Meetings; Trends; Cause factors; Accident prevention; Complex missions; New technologies; New techniques; Human factors; Injury; Cognitive demands; Physiological demands; Forensic pathology; Manikins; Systems reliability; Risk factors; NATO Furnished; Translations; NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1704299
AA- <NTIS> AD-A258 502/4
TI- Effects of Microclimate Cooling on Physiology and Performance While Flying the UH-60 Helicopter Simulator in NBC Conditions in a Controlled Heat Environment
TI- <NOTE> Final rept. May 91-May 92
AU- Thornton, R. J. ; Caldwell, L. ; Guardiani, F. ; Pearson, J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-32
CN- 3M162787A879; BH
PY- Aug 92
PG- 250p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- GRAI9308
CP- United States
AB- The effects of microclimate cooling on aviator performance and physiology in nuclear, biological, and chemical (NBC) individual protective equipment (IPE) were evaluated in the USAARL UH-60 research flight simulator. Sixteen male aviators flew the simulator in two temperature conditions, 95 deg F and 105 deg F, both at 50 percent

relative humidity (RH). Two thermoelectric conditioning units were used, one providing cooled blown air, the other cooled water to the aviators. At each temperature, they flew for up to 6 hours in NBC IPE with no cooling, air cooling, and liquid cooling. There was an extra condition at 105 deg F when vent air with no cooling was blown through the air vest, making a total of seven test conditions. There were significant improvements in flight performance as a result of the cooling, more so at the higher temperature. Also, there were differences between the two cooling systems at 105 deg F, with the air system producing significantly lower flight error rates. Survival time was based on the length of time each subject stayed in the condition before reaching physiological withdrawal criteria (rectal temperature of 39 deg C or heart rate of 150 beats per minute for 15 minutes) or exercising their option to retire early. There were considerable increases in survival time with the use of microclimate cooling. The mean survival time at 95 deg F was increased to 385 minutes with the liquid system from 285 minutes without cooling. At 105 deg F to 333 minutes for the air system from 79 minutes with no cooling, the improvement was even more dramatic. There were significant differences between the two cooling systems at 105 deg F with the air system producing longer survival times.

DE- *Environments; *Heat; *Helicopters; *Performance(human); Cooling; Errors; Flight crews; Flight simulators; Heart rate; Humidity; Length; Liquid cooling; Males; Mean; Physiology; Protective equipment; Rates; Simulators; Sleep; Temperature; Test and evaluation; Time; Vents; Vests ; Water; Microclimatology; Psychological tests; Stress(psychology); Heat stress(physiology)

ID- *NBC Conditions; Chemical defense; Psychological stress; Psychological testing; Psychological performance; Heat stress; Aircrew protective ensembles; UH60 Aircraft; NTISDODXA

SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1700848

AA- <NTIS> AD-A258 031/4

TI- Ground Based Simulation Evaluation of the Effects of Time Delays and Motion on Rotorcraft Handling Qualities

TI- <NOTE> Final rept

AU- Mitchell, D. G. ; Hoh, R. H. ; Atencio, A. ; Key, D. L.

CS- Systems Technology, Inc., Hawthorne, CA.

CS- <CODE> 022912000; 340425

PY- Jan 92

PG- 247p

NT- Prepared in cooperation with Hoh Aeronautics, Inc., Lomata, CA.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A11/MF A03

JA- GRAI9307

CP- United States

AB- An exploratory simulation was conducted on the NASA Ames Research Center's Vertical Motion Simulator (VMS) to evaluate the effects of simulator characteristics on handling qualities for performing hover and low-speed tasks in a helicopter. The primary focus of the study was on subjective assessments of the variations, based on Cooper-Harper Handling Qualities Ratings (HQR's), rather than objective measures of pilot performance. Effects of variations in the three major elements of the simulation--the motion system, visual system, and math model--were evaluated. Seven precision and aggressive low-speed Mission-Task-Elements were performed. All tasks were Level 2 (average HQR worse than 3.5) fixed-base for the baseline helicopter, which was designed to provide Level 1 handling qualities in the real world. Addition Of motion improved ratings 1/2 to 2 points, resulting in Level l handling qualities for most tasks. Tradeoffs in motion acceleration gain and washout break frequency were evaluated with two sets of motion washouts. There was a preference for reduced washout frequencies (resulting in improved phasing between the visual and motion responses at mid to high frequencies, at the sacrifice of onset gain) for the precision tasks. Conversely, there was a slight preference for increased onset gains (at the sacrifice of visual/motion phasing) for the aggressive tasks. The effects on handling qualities of a visual delay compensation algorithm were investigated by three pilots. Helicopter, Handling qualities, Simulation, Time delay, Motion system.

DE- *Helicopters; *Hovering; *Flight simulators; Acceleration; Algorithms; Compensation; Frequency; Gain; Flight simulation; Missions; Models; Pilots; Precision; Ratings; Response; Velocity; Aviation safety; Mathematical models

ID- Handling qualities rating; Time delay; Motion system; NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1700829

AA- <NTIS> AD-A258 011/6

TI- Test and Evaluation Report of the Corometrics Medical Systems Neonatal

Monitor, Model 506
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Squire, B. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-31
CN- 3M463807D836; LC
PY- Aug 92
PG- 64p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9307
CP- United States
AB- The Corometrics Medical Systems Neonatal Monitor, Model 506, was tested for environmental and electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for environmental tests and electromagnetic interference/compatibility and human factors. The Corometrics Medical Systems Neonatal Monitor, Model 506, was found to be compatible with the U.S. Army MEDEVAC UH-60 Black Hawk. Electromagnetic compatibility, Test and evaluation, Aeromedical equipment.
DE- *Test and evaluation; *Medical equipment; Electromagnetic compatibility ; Electromagnetic interference; Environmental tests; Helicopters; Models; Monitors; Operation; Standards; Infusions; Army aircraft; High temperature; Patients
ID- *Neonatal monitors; UH-60A Aircraft; H-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1700735
AA- <NTIS> TIB/B92-03761
TI- Identification of coupled flapping/inflow models for hovering flight
AU- Leith, D.J. ; Murray-Smith, D.J. ; Bradley, R.
CS- Deutsche Gesellschaft fuer Luft- und Raumfahrt e.V., Bonn (Germany, F.R.).
CS- <CODE> 085248000; 2146350
RN- DGLR--91-45
PY- 1991
PG- 12p
NT- 17. European rotorcraft forum, Berlin (Germany), 24-27 Sep 1991.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09
JA- GRAI9306
CP- Germany, Federal Republic of
AB- The validation of coupled flapping/inflow rotor models has received much recent attention. The present paper concentrates on the analysis of flight conditions close to hover in order to resolve some of the difficulties encountered in the earlier studies. New light is shed on the fundamental problems of identifiability by designing optimal experiments for the parameters of a variety of coupled flapping/inflow models. The models include the Pitt and Peters formulation of the induced flow equations and both first and second order flapping is considered. From the design of optimal experiments it is possible to determine theoretically the minimum possible variance of parameter estimates for a given set of experimental conditions. It is thus possible to determine if the available instrumentation can provide estimates of a specified quality. Using this approach careful attention is given both to the question of whether flapping measurements alone are sufficient for the reliable identification of coupled flapping/inflow models and to the suitability of test inputs currently employed. It is concluded that for the models considered, in the absence of direct measurements of inflow, and despite the relatively short time constants of the models, it is important to retain low frequency information in the system identification process. Finally, it is shown that within the limitations of the flight data available, a simple flapping model with no induced flow dynamics cannot be bettered and gives a good fit to measured data for all frequencies up to that of the rotor. (orig.). (Copyright (c) 1992 by FIZ. Citation no. 92:003761.)
DE- *Rotary wings; *Aeroelasticity; *Airfoil oscillations; *Flapping; Rotor aerodynamics; Hovering; Flight mechanics; Dynamic models; Computerized simulation; Mathematical models
ID- *Foreign technology; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1700724
AA- <NTIS> TIB/B92-03750
TI- Research needs for a commercial passenger tiltrotor
AU- Unger, G. ; Alexander, H.
CS- Deutsche Gesellschaft fuer Luft- und Raumfahrt e.V., Bonn (Germany, F.R.).
CS- <CODE> 085248000; 2146350
RN- DGLR--91-23
PY- 1991
PG- 20p
NT- 17. European rotorcraft forum, Berlin (Germany), 24-27 Sep 1991.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09
JA- GRAI9306
CP- Germany, Federal Republic of
AB- The National Aeronautics and Space Administration (NASA) recently completed a series of contracts and studies that examined the technology needs for a tiltrotor aircraft in commercial service as well as military missions. The commercial needs arise out of market-driven requirements that include vertiport location and design, passenger comfort levels and competitive costs. The military needs are derived from time-sensitive missions and combat effectiveness. In response to these results, NASA has decided to address the commercial needs first, recognizing that there will be eventual payoff to military missions as well. Research goals were explored in acoustics, flight dynamics, human factors and displays, dynamics and loads, propulsion, safety, and configuration design. The paper describes the development of these goals from the market requirements and the implications for possible research activities. The aircraft issues that were addressed include number of blades, advanced blade planforms, steep approach requirements and pilot-cockpit interface for civil operations. (orig.). (Copyright (c) 1992 by FIZ. Citation no. 92:003750.)
DE- *Aircraft design; *Aircraft configurations; *Tilt rotor aircraft; *Aircraft performance; Passenger aircraft; Dynamic stability; Acoustics ; Aircraft safety; Aerodynamic loads; Noise prediction (aircraft); Vertical takeoff aircraft
ID- *Foreign technology; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1699505
AA- <NTIS> N93-13464/1
TI- Design Guide for the Ergonomic Aspects of Helicopter Crew Seating
AU- Messenger, A. J. ; Stratford, R. ; Griffin, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
CS- <CODE> 013996002; IM651286
RN- ISVR-TR-209
PY- cOct 92
PG- 60p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9306; STAR3103
CP- United Kingdom
AB- This Design Guide provides an aid to the design of new helicopter crew seats, the improvement of existing seats and the comparison of alternative seats. Methods of measuring seat dimensions, angles and contouring are defined. Recommendations for the dimensions, angles and contouring of the seat pan, backrest, armrests and headrest are based on the principle of matching seat dimensions to the relevant dimensions of the user population. The dimensions suggested are appropriate for British males and females aged between 19 and 45 years. The Design Guide has been formulated so that the suggested dimensions can be replaced by those appropriate to a different user population. Cushion material, cushion coverings, routing of harnessing, the positioning of seat controls, eye position, the operation of controls and ingress and egress from the seat are also considered. The Design Guide also contains recommendations for the subjective testing of seat comfort and the dynamic testing of the transmission of vibration through helicopter crew seats.
DE- *Design analysis; *Helicopters; *Seats; *Vibration tests; Dynamic tests ; Comfort; Coverings; Cushions; Positioning
ID- *Foreign technology; *Man machine systems; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1697480
AA- <NTIS> AD-A257 704/7

TI- Evaluation of Night Vision Goggles (NVG) for Maritime Search and Rescue (Summary NVG Report)
TI- <NOTE> Final rept. Mar 89-Jun 91
AU- Robe, R.Q. ; Raunig, D. L. ; Plourde, J.V. ; Marsee, R.L.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> 093810000; 413536
SP- Coast Guard, Washington, DC. Office of Research and Development.
RN- RDC-11/92; USCG-D-16-92
CN- DTCG39-89-C-E10G56
PY- Feb 92
PG- 17p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9306
CP- United States
AB- Three experiments were conducted in 1989, three in 1990, and one experiment was conducted in 1991 by the U.S. Coast Guard Research and Development (R and D) Center to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs have been evaluated: the AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) was evaluated onboard U.S. Coast Guard HH-3F, CH-3E, and HH-60J helicopters, and HU-25C and RG-8A fixed-wing aircraft. The AN/PVS-5C and AN/PVS-7A NVGs were evaluated onboard U.S. and Canadian Coast Guard Search and Rescue Units (SRUS) in the 200-foot size range and onboard U.S. Coast Guard 41-foot utility boats (UTBs). During the Spring 1991 experiment, 4- and 6-person unlighted life rafts with retroreflective tape and 18- and 21-foot white boats were employed as targets during realistically-simulated search missions. Three new SRUs were evaluated and new information obtained are discussed. A total of 4098 target detection opportunities were generated for all the target types employed during the six experiments. These data were analyzed to determine which of 25 search parameters of interest exerted a statistically-significant influence on target detection probability. Lateral range curves and sweep width estimates are presented for SRU/target type combinations that contained sufficient data to support this detailed analysis. Human factors data are presented and discussed. NVGs proved to be an effective nighttime search aid for helicopter searches for small SAR targets. The results for NVG use for SAR on CG Utility Boats indicated that NVGs did not significantly enhance search performance.
DE- *Goggles; *Search and rescue; Boats; Phosgene; Coast guard research; Detection; Estimates; Fixed wing aircraft; Helicopters; Life rafts; Missions; Onboard; Parameters; Probability; Rescues
ID- *Night vision; *Human factors engineering; AN/PVS-5C; AN/PVS-7A; HU-25C Aircraft; HH-3F Aircraft; Night vision goggles; Sweep width; Unlighted targets; Lighted targets; NTISDODXA; NTISDOTCG
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1697006
AA- <NTIS> TIB/B92-02918
TI- Integration of an integrated helmet system for PAH 2
AU- Boehm, H.D.V. ; Schreyer, H.
CS- Messerschmitt-Boelkow-Blohm, Deutsche Aerospace AG, Oberpfaffenhofen (Germany).
CS- <CODE> 888888888
RN- MBB-UD--0615-92-PUB
PY- 1992
PG- 12p
NT- RAES conference on infrared radiation (IR) sensors, London (UK), 18 Feb 1992.
NT- Microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF E07
JA- GRAI9305
CP- Germany, Federal Republic of
AB- A modern integrated helmet system (IHS) consists of a helmet shell, a Helmet Mounted Sight (HMS), two Image Intensifier tubes (IIT) and two Cathode Ray Tubes (CRT) with an optical system including combiners to present the images binocular. Additional symbology can be superimposed to the CRT- or IIT-image. An IHS is a further development of a Helmet Mounted Display (HMD) to cope with more demanding requirements regarding ergonomics and operability under adverse visual conditions. The HMS can steer a sensor platform with a thermal camera or an air-to-air missile system. The main helicopter (HC) requirements on such a system are: 1. human factors, 2. fit of helmet including optimized centre of gravity (CG) and weight, 3. optimized day, twilight and night optical modules, 4. large exit pupil, good transmission of the optical path and a large adjustment range, 5. good geometrical

resolution/Modulation Transfer Function (MTF) with a large Field of View (FOV), 6. high focussing range of the IIT and a good S/N ratio below 1 mLux, 7. CRT automatic brightness and contrast control with a good readability on day time, 8. flight symbology presentation for one or two eyes, 9. good static and dynamic HMS-accuracy with a large Head Motion Box (HMB), 10. NBC and Laser protection compatibility. EUROCOPTER Deutschland GmbH (ECD) former MBB-Helicopter Division and the German Army Aviation Corps have made in the last two years ground and flight trails with a HMS and an IHS on a BK 117 helicopter respectively a PAH1. For the PAH2 there is a MOD decision to develop and integrate an IHS from GEC Avionics. Contract negotiations are under way. The paper includes test results and PAH2 integration aspects concerning the GEC IHS. (orig.). (Available from TIB Hannover: MU 8213(615-92 PUB).) (Copyright (c) 1992 by FIZ. Citation no. 92:002918.)

DE- *Military helicopters; *Helmet mounted displays; *Integrated optics; *User requirements; *Human factors engineering; *Avionics; Cathode ray tubes; Image intensifiers; Binocular vision
ID- *Foreign technology; NTISTFFIZ
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1691699
AA- <NTIS> AD-A256 319/5
TI- Measurement of the Dynamic Undercarriage Response of a Sikorsky S-70B-2 Helicopter: Instrumentation and Test Methods
TI- <NOTE> Flight mechanics technical memo
AU- Hourigan, D. T. ; Bird, F. J. ; Sutton, C. W.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
SP- Department of Defence, Canberra (Australia).
PY- Jun 92
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9304
CP- Australia
AB- The instrumentation and techniques are described which were used to measure the dynamic undercarriage response of a Royal Australian Navy S-7OB-2 Seahawk helicopter. S-70B helicopters, Undercarriage, Dynamic response, Helicopter landings.
DE- *Helicopters; *Structural response; Dynamic response; Instrumentation; Landing; Navy; Test and evaluation; Wheels; Shock absorbers; Struts; Fuselages
ID- *Foreign technology; *Undercarriages; S-70B-2 Helicopters; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1691695
AA- <NTIS> AD-A256 315/3
TI- Use of Ultrasonics for Oleo Compression Measurements on a S-70B-2 (Seahawk) Helicopter
TI- <NOTE> Flight mechanics technical memo
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
SP- Department of Defence, Canberra (Australia).
PY- Jul 92
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9304
CP- Australia
AB- Dynamic measurements were conducted to acquire data for the development of a mathematical model of the undercarriage of a S-70B-2 (Seahawk) helicopter. The principal measuring instrumentation consisted of LVDT's and ultrasonic transducers. This memorandum discusses a Ranging Ultrasonic Transducer which was developed to overcome the inherent and excessive recovery time delay of the ultrasonic transducers when subjected to out-of-range distance operations during the flight trials. S-70B helicopters, Ultrasonic wave transducers, Undercarriage, Flight tests, Mathematical models.
DE- *Helicopters; *Transducers; *Ultrasonics; *Struts; *Dynamic loads; Delay; Instrumentation; Mathematical models; Measurement; Operation; Range(Distance); Recovery; Test and evaluation; Flight testing
ID- *Foreign technology; Seahawk helicopters; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 1691627
AA- <NTIS> AD-A256 245/2
TI- Relationship between Computer Scoring and Safety-Pilot Grading of Flight Performance
TI- <NOTE> Technical rept
AU- Caldwell, J. A. ; Jones, H. D. ; Carter, D. J. ; Caldwell, J. L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-30
CN- 3M263002F995; BF
PY- Jul 92
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9304
CP- United States
AB- Three different measures of helicopter pilot performance were correlated--two types of computer scores and one type of safety/instructor pilot grades. Results indicated the two types of computer scores were basically interchangeable. The direction of the relationship between the different types of computer and safety-pilot measures was as expected for 76 percent of the measures examined, but statistical significance was attained in fewer cases (approximately 50 percent of the total). Reasons for any noted discrepancies are discussed along with findings about the most strongly associated measures. The computer scores and safety-pilot grades were related strongly enough to conclude that they were both accurately measuring the sample type of performance. Pilots, flight performance, computer scoring.
DE- *Pilots; *Scoring; *Performance(Human); *Computer applications; Computers; Flight; Helicopters; Instructors; Safety
ID- NTISDODXA
SH- 51GE (Aeronautics and Aerodynamics--General); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1691576
AA- <NTIS> AD-A256 194/2
TI- Design for Tactical Situation Awareness Display
TI- <NOTE> Final rept
AU- Zacharias, G. L. ; Gonsalves, P. G.
CS- Charles River Analytics, Inc., Cambridge, MA.
CS- <CODE> 084097000; 398060
RN- R89351
CN- DAAA15-90-C-0019
PY- 15 Jun 92
PG- 93p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9304
CP- United States
AB- Because of continuing advances in on-board sensors, computers, and displays, we can expect to see significant growth in the amount of information presented to rotorcraft crews by next-generation tactical situation displays. If unchecked, this growth will easily exceed the crew's capability for dealing with the available on-board information base in a timely and effective fashion. A range of technologies are now being proposed to provide appropriate levels of information management and situation awareness, ranging from hardware upgrades like touch screen displays, to advanced computing horsepower to support multi-sensor data fusion, to new AI technologies including export systems like Pilot's Associate. The problem, however, is not that there is a dearth of candidate technologies; rather it is that we have no reliable means for evaluating them in terms of the fundamental situation awareness they afford the crew. What is called for is an objective metric for evaluating the awareness level provided a crew by a new cockpit technology, and a rational means for using this metric in a structured methodology involving: (1) identification of mission-specific tactical informational requirements; (2) generation of candidate display formats and symbologies; and (3) metric-based evaluation of afforded situation awareness.
DE- *Helicopters; Detectors; Computers; Artificial intelligence
ID- *Display devices; Information; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1691341
AA- <NTIS> AD-A255 943/3
TI- Test and Evaluation Report of the Impact Portable Aspirator Model 325M
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Johnson, L. W. ; Licina, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-28
CN- 3M463807D836; LC
PY- Jul 92
PG- 68p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9304
CP- United States
AB- The Impact Portable Aspirator, Model 325M, was tested for electromagnetic interference/ compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Impact Portable Aspirator, Model 325M, was found to be compatible with the U.S. Army MEDEVAC UH-60 Black Hawk. Electromagnetic compatibility, test and evaluation, aeromedical equipment.
DE- *Aspirators; *Electromagnetic compatibility; *Test and evaluation; Electromagnetic interference; Helicopters; Operation; Standards
ID- *Aeromedical equipment; 325 M Impact portable aspirator; UH-60 Aircraft ; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 44H (Health Care--Health Care Technology); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1690320
AA- <NTIS> N92-34207/0
TI- Thermal Mechanical Analysis of Sprag Clutches
TI- <NOTE> Final Report
AU- Mullen, R. L. ; Zab, R. J. ; Kurniawan, A. S.
CS- Case Western Reserve Univ., Cleveland, OH.
CS- <CODE> 004688000; CH486724
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:190686; NASA-CR-190686
CN- NAG3-653
PY- 7 Jul 92
PG- 236p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- GRAI9303; STAR3024
CP- United States
AB- Work done at Case Western Reserve University on the Thermal Mechanical analysis of sprag helicopter clutches is reported. The report is presented in two parts. The first part is a description of a test rig for the measurement of the heat generated by high speed sprag clutch assemblies during cyclic torsional loading. The second part describes a finite element modeling procedure for sliding contact. The test rig provides a cyclic torsional load of 756 inch-pounds at 5000 rpm using a four-square arrangement. The sprag clutch test unit was placed between the high speed pinions of the circulating power loop. The test unit was designed to have replaceable inner ad outer races, which contain the instrumentation to monitor the sprag clutch. The torque loading device was chosen to be a water cooled magnetic clutch, which is controlled either manually or through a computer. In the second part, a Generalized Eulerian-Lagrangian formulation for non-linear dynamic problems is developed for solid materials. This formulation is derived from the basic laws and axioms of continuum mechanics. The novel aspect of this method is that we are able to investigate the physics in the spatial region of interest as material flows through it without having to follow material points. A finite element approximation to the governing equations is developed. Iterative Methods for the solution of the discrete finite element equations are explored. A FORTRAN program to implement this formulation is developed and a number of solutions to problems of sliding contact are presented.
DE- *Clutches; *Continuum mechanics; *Cyclic loads; *Heat measurement; *Helicopters; *Nonlinear systems; *Thermal analysis; *Torque; *Torsion; Applications programs (Computers); Finite element method; Fortran; Iterative solution; Liquid cooling; Mathematical models
ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 41J (Manufacturing Technology--Tooling, Machinery, and Tools); 94F (Industrial and Mechanical Engineering--Tooling, Machinery, and Tools)

AZ- 1689870
AA- <NTIS> N92-33305/3
TI- Workshop on Aeronautical Decision Making (ADM). Volume 1: Executive Summary
TI- <NOTE> Final Report
AU- Adams, R. J. ; Adams, C. A. ; Lofaro, R. J.
CS- Advanced Aviation Concepts, Inc., Jupiter, FL.
CS- <CODE> 095616000; AC946177
RN- DOT/FAA/RD-92/14-V-1
CN- DTFA01-90-C-00042
PY- Aug 92
PG- 76p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A05/MF A01
JA- GRAI9303; STAR3024
CP- United States
AB- Presented here are the Aeronautical Decision Making (ADM) training accomplishments, limitations, and future needs from the perspectives of commercial operators, general aviation, military aviation and research development. A select group of experts on ADM was convened to share ideas, identify and explore future directions for advanced training. Cognitive training requirements based upon decision making task demands of both airplane and helicopter pilots and crews are analyzed. A major question which requires definitional research is: What is a real aircrew/pilot decision (that is, when does an event generate a true decisional opportunity for a pilot or crew versus a 'one-path only' reaction, where the actual emphasis is not on cognitive decision making, but the application of procedures and basic airmanship). Going one step further, the group analyzed the decision making differences between expert and novice pilots when a real decision was required.
DE- *Airline operations; *Cognition; *Conferences; *Decision making; *Flight crews; *Helicopters; *Pilot performance; Commercial aircraft; Education; General aviation aircraft; Military aircraft
ID- NTISNASA

SH- 51GE (Aeronautics and Aerodynamics--General); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92B (Behavior and Society--Psychology)

AZ- 1688864
AA- <NTIS> AD-A257 066/1
TI- Workshop on Aeronautical Decision Making (ADM). Volume 2. Plenary Session with Presentations and Proposed Action Plan
TI- <NOTE> Final rept
AU- Adams, R. J. ; Adams, C. A.
CS- Advanced Aviation Concepts, Inc., Jupiter, FL.
CS- <CODE> 095616000; 425435
SP- Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
RN- DOT/FAA/RD-92/14-VOL-2
CN- DTFA01-90-C-0042
PY- Aug 92
PG- 273p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A03
JA- GRAI9303
CP- United States
AB- This report analyzes the accomplishments and needs of ADM from the perspectives of the operators, researchers, the military and the FAA. Both the airplane and helicopter communitys' experiences are considered. The presentations and background material in this volume were a part of the Plenary Session conducted on the first day of the workshop. They were meant to provide a detailed understanding or the status and needs of ADM from both operational and research perspectives. Problem areas identified by the workshop participants which defined the need for basic research included: Can we define what constitutes a good decision. Can we identify different decision nodes during a flight. What do we want to train. How do we want to train. This volume presents the participants perspectives on the behavioral psychology and human factors work that has been done in these areas as well as in the area of new decision making models and concepts. Aeronautical Decision Making (ADM), Crew Resource Management (CRM), Advanced Qualification Program (AQP), Cognitive Task Analysis (CTA),

Expert Decision Making (EDM).
DE- *Cognition; *Decision making; *Flight training; *Flight crews; Aircraft ; Helicopters; Humans; Management; Models; Nodes; Psychology; Qualifications; Resource management; Resources; Volume; Work; Workshops

ID- *Pilots; NTISDODXA; NTISDOTFAA
SH- 51GE (Aeronautics and Aerodynamics--General); 92B (Behavior and Society--Psychology)

AZ- 1687341
AA- <NTIS> N92-32845/9
TI- Evaluation of Decelerating IFR Approaches Utilizing a Helicopter Flight Simulator
AU- Reid, L. D. ; Advani, S. ; Deleeuw, J. H.
CS- Toronto Univ. (Ontario).
CS- <CODE> 016819000; T2158753
RN- CTN-92-60348
CN- W2207-7-AF69/01-SS
PY- Jul 90
PG- 218p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9302; STAR3023
CP- Canada
AB- This project involved development of a helicopter flight simulator and its application to study instrumented flight rules (IFR) landing approaches. The helicopter simulator was implemented on the University of Toronto Institute for Aerospace Studies (UTIAS) Flight Research Simulator. It employed all the major subsystems of that facility including the motion systems, visual display system, sound system, and computer system. In addition, the flight controls and seat of a Bell 205 helicopter were installed and interfaced with the flight computer. An electronic flight instrumentation system (EFIS) was developed to act as the pilot helicopter interface. A side arm controller was also included in the simulation. The helicopter flight equations were based on an ARMCOP software package. The system was tuned with the help of an experienced Bell 205 test pilot. The simulated flight test project was directed towards establishing the ability of the simulator to duplicate handling qualities results achieved in actual flight. The task selected was that of decelerating IFR approaches using flight control systems and a three cue flight director. A group of 6 evaluation pilots repeated flying tasks previously completed in an actual Bell 205. Good agreement between the simulator and flight test data was achieved except for one configuration. This configuration was found to be easier to fly in the simulator. The cause of this was felt to be incorrect simulation of the corresponding flight control system.
DE- *Flight control; *Flight simulators; *Flight tests; *Helicopters; *Instrument flight rules; Checkout; Approach; Canada; Deceleration; Research facilities; Tuning
ID- *Foreign technology; NTISNASAE
SH- 85E (Transportation--Pipeline Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 85A (Transportation--Air Transportation); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1687307
AA- <NTIS> N92-32788/1
TI- Collaborative Research on V/STOL Control System/Cockpit Display Tradeoffs under the NASA/MOD Joint Aeronautical Program
AU- Franklin, J. A. ; Nicholas, O. P.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:103910; A-92039; NASA-TM-103910
CN- RTOP 533-02-37
PY- Jan 92
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9302; STAR3023
CP- United States
AB- Summarized here are activities that have taken place from 1979 to the present in a collaborative program between NASA Ames Research Center and the Royal Aerospace Establishment (now Defence Research Agency), Bedford on flight control system and cockpit display tradeoffs for low-speed and hover operations of future V/STOL aircraft. This program was created as Task 8A of the Joint Aeronautical Program between NASA in the United States and the Ministry of Defence (Procurement

Executive) in the United Kingdom. The program was initiated based on a recognition by both parties of the strengths of the efforts of their counterparts and a desire to participate jointly in future simulation and flight experiments. In the ensuing years, teams of NASA and RAE engineers and pilots have participated in each other's simulation experiments to evaluate control and display concepts and define design requirements for research aircraft. Both organizations possess Harrier airframes that have undergone extensive modification to provide in-flight research capabilities in the subject areas. Both NASA and RAE have profited by exchanges of control/display concepts, design criteria, fabrication techniques, software development and validation, installation details, and ground and flight clearance techniques for their respective aircraft. This collaboration has permitted the two organizations to achieve jointly substantially more during the period than if they had worked independently. The two organizations are now entering the phase of flight research for the collaborative program as currently defined.

DE- *Display devices; *Flight control; *Flight simulation; *Harrier aircraft; *V/stol aircraft; Research aircraft; Airframes; Clearances; Cockpits; Computer programming; Design analysis; Fabrication; Hovering; Low speed; Procurement; Software engineering; Tradeoffs

ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1687181

AA- <NTIS> N92-32424/3

TI- Vision-Based Range Estimation Using Helicopter Flight Data

AU- Smith, P. N. ; Sridhar, B. ; Hussien, B.

CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657

RN- NAS 1.15:103930; A-92085; NASA-TM-103930

CN- RTOP 505-64-36

PY- Jun 92

PG- 20p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A03/MF A01

JA- GRAI9302; STAR3023

CP- United States

AB- Pilot aiding during low-altitude flight depends on the ability to detect and locate obstacles near the helicopter's intended flightpath. Computer-vision-based methods provide one general approach for obstacle detection and range estimation. Several algorithms have been developed for this purpose, but have not been tested with actual flight data. This paper presents results obtained using helicopter flight data with a feature-based range estimation algorithm. A method for recursively estimating range using a Kalman filter with a monocular sequence of images and knowledge of the camera's motion is described. The helicopter flight experiment and four resulting datasets are discussed. Finally the performance of the range estimation algorithm is explored in detail based on comparison of the range estimates with true range measurements collected during the flight experiment.

DE- *Computer vision; *Flight tests; *Helicopters; *Kalman filters; *Rangefinding; *Visual observation; Feasibility analysis; Algorithms; Cameras; Data acquisition; Estimates; Low altitude

ID- NTISNASA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1685955

AA- <NTIS> AD-A255 920/1

TI- Test and Evaluation Report of the Medical Technology Products Peristaltic Infusion Pump Model 1001

TI- <NOTE> Final rept

AU- Bruckart, J. E. ; Quattlebaum, M. ; Licina, J. R.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; 404578

RN- USAARL-92-24

CN- 3M463807D836; LC

PY- Jun 92

PG- 71p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A04/MF A01

JA- GRAI9302

CP- United States

AB- The Medical Technology Products Peristaltic Infusion Pump, Model 1001, was test for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Medical Technology Products Peristaltic Infusion Pump, Model 1001, was found to be compatible with U.S. Army aeromedical aircraft. Electromagnetic compatibility, test and evaluation, aeromedical equipment.
DE- Army; Compatibility; Electromagnetic compatibility; Electromagnetic interference; Helicopters; Humans; Infusions; Interference; Models; Operation; Pumps; Standards; Test and evaluation; Medical technicians
ID- *Infusion pumps; UH-60A Aircraft; H-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1685954
AA- <NTIS> AD-A255 919/3
TI- Test and Evaluation Report of the IVAC (Trademark) Volumetric Controller Model 280EE
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-22
CN- 3M463807D836; LC
PY- Apr 92
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9302
CP- United States
AB- The IVAC Volumetric Controller, Model 280EE, was tested for electromagnetic interference/ compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The IVAC Model 280EE did not perform properly in the altitude chamber and excess electromagnetic emissions make it ineligible for an airworthiness release. Therefore, the unit is not considered compatible with the U.S. Army aeromedical aircraft. Electromagnetic compatibility, test and evaluation, aeromedical equipment.
DE- *Test and evaluation; *Medical equipment; Airworthiness; Altitude chambers; Army; Chambers; Compatibility; Electromagnetic compatibility; Electromagnetic interference; Emission; Helicopters; Humans; Models; Operation; Release; Standards; Volumetric analysis; Rotary wing aircraft
ID- UH-60 A Aircraft; H-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1685889
AA- <NTIS> AD-A255 849/2
TI- Test and Evaluation Report of the Catalyst Research Oxygen Monitor Model Miniox III
TI- <NOTE> Test rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Licina, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-29
CN- 3M46380TD836; 3M463807D836; LC
PY- Jul 92
PG- 66p
NT- Prepared in collaboration with Universal Energy Systems, Inc.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9302
CP- United States
AB- The Catalyst Research Oxygen Monitor, Model Miniox III, was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/ compatibility and human factors. The Catalyst Research Oxygen Monitor, Model Miniox III, was found to be compatible with U.S. Army MEDEVAC UH-60 Black Hawk. Electromagnetic compatibility, test and

evaluation, aeromedical equipment.
DE- *Catalysts; *Monitors; *Oxygen; Army; Compatibility; Electromagnetic compatibility; Electromagnetic interference; Helicopters; Humans; Interference; Operation; Standards; Test and evaluation; Medical equipment; Electrical equipment; Safety; Low pressure; Vibration; Stresses; Storage; Temperature; Humidity
ID- *Model miniox 3; Aeromedical equipment; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1685772
AA- <NTIS> AD-A255 722/1
TI- Relationship between Environmental Conditions and UH-60 Cockpit Temperature
TI- <NOTE> Final rept. May 90-May 92
AU- Thornton, R. ; Guardiani, F.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-25
CN- 3M162787A879; BH
PY- Jul 92
PG- 50p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9302
CP- United States
AB- Data have been collected in the UH-60 helicopter in various flight configurations (hover, contour (250 ft) and cruise (650 ft)) to relate the thermal conditions found in the cockpit to data available to commanders and researchers in the field. These have been used to develop equations for use in future thermal modelling studies, and to provide information to increase the fidelity of helicopter environmental simulations.
DE- *Cockpits; *Helicopters; *Heat stress(Physiology); Configurations; contours; Flight; Heat; Simulation; Temperature; Human factors engineering
ID- UH-60 Helicopters; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 1685743
AA- <NTIS> AD-A255 691/8
TI- Test and Evaluation Report of the Physio Control Defibrillator/Monitor, Model LifePak (Trademark) 6s
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Licina, J. R. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-27
CN- 3M463807D836; LC
PY- Jul 92
PG- 78p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9302
CP- United States
AB- The Physio Control Defibrillator/Monitor, Model LifePak 6s, was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/ compatibility and human factors. The Physio Control Defibrillator/Monitor, Model LifePak 6s was found to be compatible with U.S. Army aeromedical aircraft.
DE- *Monitors; *Defibrillation; *Medical equipment; Army; Compatibility; Control; Electromagnetic compatibility; Electromagnetic interference; Helicopters; Humans; Interference; Models; Operation; Standards; Test and evaluation; Military operations; Safety
ID- Aeromedical equipment; Physio control; UH-60A Aircraft; H-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1685585
AA- <NTIS> AD-A255 525/8
TI- Evaluation of Night Vision Goggles (NVG) for Maritime Search and Rescue (Joint Canadian/U.S. Coast Guard Experiment)

TI- <NOTE> Interim rept. Mar 89-Feb 91
AU- Robe, R. Q. ; Plourde, J. V. ; Marsee, R. L.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> 093810000; 413536
RN- USCG-D-13-92; USCG-RDC-03/92
PY- Nov 91
PG- 67p
NT- Prepared in collaboration with Analysis and Technology, Inc., New London, CT.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9302
CP- United States
AB- Three experiments were conducted in 1989 and three more were conducted in 1990 by the U.S. Coast Guard Research and Development (RD) Center to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs have been evaluated: the AN/AVS-6 Aviators Night Vision Imaging System (ANVIS) NVG has been tested onboard U.S. Coast Guard HH-3 and CH-3 helicopters, and the AN/PVS-5C and AN/PVS-7A NVGs have been tested onboard U.S. Coast Guard 41 -foot utility boats (UTBs) and a U.S. Coast Guard 210-foot medium endurance cutter and a Canadian Coast Guard 234-foot (71.5-meter) ship. During the fall 1990 experiment in the waters of Canso Bank off the coast of Nova Scotia, the medium endurance cutter and Canadian Coast Guard ship were employed in realistically-simulated search missions for 4- and 6-person lighted and unlighted life rafts with retroreflective tape. This interim report discusses the results of the Canso Bank experiment. Search and Rescue, Night Vision, Night Vision Goggles, Sweep Width, Unlighted Targets, Lighted Targets, Search, Life Raft, Lighted, Unlighted.
DE- *Night vision; *Search and rescue; *Aviation goggles; Boats; Coast guard research; Coast guard ships; Cutters; Helicopters; Life rafts; Missions; Nova scotia; Onboard; Rescues; Ships; Tapes; Targets; Width
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57U (Medicine and Biology--Public Health and Industrial Medicine)

AZ- 1682859

AA- <NTIS> DE92015225
TI- Comparison of passive-remote and conventional Fourier transform infrared systems for continuously monitoring incinerator emissions
AU- Demirgian, J. C. ; Hammer, C. L. ; Kroutil, R. T.
CS- Argonne National Lab., IL.
CS- <CODE> 001960000; 0448000
SP- Department of Energy, Washington, DC.
RN- ANL/CP-74716; CONF-920527-7
CN- W-31109-ENG-38
PY- 1992
PG- 10p
NT- 1992 incineration conference, Albuquerque, NM (United States), 11-14 May 1992. Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI9301; ERA9253
CP- United States
AB- Significant improvements in detection technology are needed to comply with the requirements in the Clean Air Act of 1990, Title 3, which requires the monitoring of air toxics. Fourier transform infrared (FTIR) spectroscopy can satisfy these requirements in two different modes. Conventional FTIR spectrometers can be installed on-stream so that a vapor stream enters an infrared cell for analysis. Other types of FTIR spectrometers can detect chemical plumes remotely, measure the natural emissions of the molecules in the plume. The samples do not come to the instrument, and the instrument has neither source nor reflector mirrors. We will discuss the applications of FTIR spectrometry for both conventional and passive-remote FTIR spectroscopy. Some applications of conventional FTIR include a continuous emission monitor for measuring incinerator emissions and determining indoor air quality. Passive-remote FTIR spectroscopy can be used to identify and track a chemical plume. It can also be used to detect fugitive emissions. Hence, it can be used as an independent means to assure compliance with environmental regulations in real-time. Because of the relatively simple instrumentation, passive-remote instruments can be helicopter- or vehicle-mounted for mobile detection of plumes.
DE- *Exhaust Gases; *Incinerators; *Plumes; Benzene; Detection; Emission; Fourier Transform Spectrometers; Intermediate Infrared Radiation;

Methane; Monitoring; Remote Sensing; Toluene; Meetings
ID- *Air pollution detection; *Chemical analysis; EDB/440800; EDB/540120; EDB/400102; NTISDE
SH- 68A (Environmental Pollution and Control--Air Pollution and Control); 99A (Chemistry--Analytical Chemistry)

AZ- 1682587
AA- <NTIS> AD-A254 983/0
TI- Selective Factors Affecting Rotary Wing Aviator Performance with Symbology Superimposed on Night Vision Goggles
TI- <NOTE> Research rept
AU- Ruffner, J. W. ; Grubb, M. G. ; Hamilton, D. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-349-91; ARI-RR-1622
CN- MDA903-87-C-0523
PY- Jul 92
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9301
CP- United States
AB- This report presents the findings of a review of the literature on night vision goggles (NVGs), head-up displays (HUDs), and helmet-mounted displays (HMDs). The review was conducted to identify factors affecting the performance of pilots using the NVG-HMD system that superimposes symbology on the NVG image. The perceptual and attentional problems associated with using NVGs, HUDs, and HMDs are well documented in the literature but are not well understood. The literature suggests that use of the NVG-HMD system is likely to result in several perceptual and attentional problems, most notably errors in distance estimation, inappropriate division of attention, and spatial disorientation. A coordinated program of research on the NVG-HMD system should be undertaken using laboratory simulation devices, flight simulators, and operational aircraft. Priority should be given to investigating the effects of variables that are identified as important in the literature review, and of practical significance to the Army and that have not been determined by design decisions. Attentional switching, Helmet-mounted display, Perceptual judgment, Symbology, Head-up display, Night vision goggles.
DE- *Helmet mounted displays; *Night vision; *Performance(Human); *Aviation goggles; Aircraft; Army; Attention; Division; Errors; Flight simulators ; Head up displays; Head(Anatomy); Helmets; Images; Laboratories; Pilots; Switching; Variables; Judgment(Psychology)
ID- NTISDODXA; NTISDODA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1679166
AA- <NTIS> AD-A254 524/2
TI- Stinger Team Performance during Engagement Operations in a Chemical Environment: The Effect of Cuing
TI- <NOTE> Final rept. Aug 90-Mar 92
AU- Johnson, D. M. ; Silver, J. D.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-TR-957
CN- 2Q263007A793; 1201
PY- Jul 92
PG- 89p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9224
CP- United States
AB- For this report, 29 Stinger teams were tested wearing chemical protective clothing under conditions of MOPPO (Mission Oriented Protective Posture 0) and MOPP4 in the Range Target System engagement simulation facility. Twelve teams performed without precise cuing information, and 17 performed with precise cuing information. Measurements were recorded for engagement performance, stress, workload, and vision. Engagement performance was degraded by wearing MOPP4, but was improved with the addition of precise visual cues. Use of these cues substantially reduced the degradation from wearing MOPP4. For rotary-wing targets' cues restored 53% of the engagement time lost to MOPP4. For fixed-wing targets, cues restored engagement ranges to

MOPPO levels. Reported stress and workload ratings were higher for MOPP4 than for MOPPO. Detection performance of Stinger team chiefs both in MOPPO and MOPP4, was correlated with several measures of visual sensitivity.
DE- *Forward area air defense systems; *Forward areas; *Protective clothing ; Air defense; Chemicals; Clothing; Degradation; Detection; Environments; Facilities; Measurement; Missions; Operation; Posture(Physiology); Ratings; Rotary wings; Sensitivity; Silver; Simulation; Targets; Time; Vision; Wings; Workload
ID- *Engagement simulation; Chemical protective clothing; Forward Area Air Defense(FAAD); Mission Oriented Protective; Posture(MOPP); Stinger; Stress; Workload; NTISDODXA
SH- 74A (Military Sciences--Antiaircraft Defense Systems); 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1679097
AA- <NTIS> AD-A254 455/9
TI- Human Factors Research in Aircrew Performance and Training: 1986-1991
TI- <NOTE> Final summary rept. Oct 86-Dec 91
AU- McAnulty, D. M.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-348-91; ARI-TR-954
CN- MDA903-87-C-0523
PY- Jul 92
PG- 170p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A02
JA- GRAI9224
CP- United States
AB- This report presents summary descriptions of the research performed by Anacapa Sciences, Inc., for the U.S. Army Research Institute for the Behavioral and Social Sciences Fort Rucker Field Unit. This effort was entitled Human Factors Research in Aircrew Performance and Training. From 9 October 1986 to 31 December 1991, Anacapa personnel worked on 42 research projects and 20 technical advisory services in emerging aviation systems design, manpower and personnel programs, aviator training, and aviation safety research. The report also describes research and development projects that were conducted under 17 subcontracts to Anacapa Sciences. These descriptions contain (a) a background section that describes the rationale for the project and specifies the research objectives; (b) a research approach section that describes the tasks and activities required to meet the project objectives; and (c) a work completed section that may include research findings or, in the case of developmental activities, a description of the research products.
DE- *Training; *Human factors engineering; *Aviation personnel; *Performance(Human); Army research; Aviation safety; Computers; Flight crews; Flight simulation; Gunnery; Helicopters; Instructions; Maintainability; Manpower; Pilots; Predictions; Requirements; Social sciences; Systems engineering; Social psychology; Behavior
ID- Computer-based instruction; Aviator selection testing; Flight systems; Aviator training; Helicopter gunnery; Pilot requirements; Symbology; System design; Workload prediction; NTISDODXA; NTISDODA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1677419
AA- <NTIS> N92-29413/1
TI- Army-NASA Aircrew/Aircraft Integration Program: Phase 4 a(3)I Man-Machine Integration Design and Analysis System (MIDAS) Software Detailed Design Document
AU- Banda, C. ; Bushnell, D. ; Chen, S. ; Chiu, A. ; Constantine, B.
CS- Sterling (Walter V.), Inc., Palo Alto, CA.
CS- <CODE> 104604000; S2506602
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177593; A-92049; NASA-CR-177593
CN- NAS2-13210
PY- Dec 91
PG- 514p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A22/MF A04

JA- GRAI9223; STAR3020
CP- United States
AB- The Man-Machine Integration Design and Analysis System (MIDAS) is an integrated suite of software components that constitutes a prototype workstation to aid designers in applying human factors principles to the design of complex human-machine systems. MIDAS is intended to be used at the very early stages of conceptual design to provide an environment wherein designers can use computational representations of the crew station and operator, instead of hardware simulators and man-in-the-loop studies, to discover problems and ask 'what if' questions regarding the projected mission, equipment, and environment. This document is the Software Product Specification for MIDAS. Introductory descriptions of the processing requirements, hardware/software environment, structure, I/O, and control are given in the main body of the document for the overall MIDAS system, with detailed discussion of the individual modules included in Annexes A-J.
DE- *Cockpit simulators; *Computer aided design; *Human factors engineering ; *Man machine systems; *Military helicopters; Computer graphics; Computer programs; Helicopter design; Mission planning; Workstations
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 41A (Manufacturing Technology--Computer Aided Design (CAD)); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1674465
AA- <NTIS> PB92-222629
TI- Public-Sector Aviation Issues Graduate Research Award Papers, 1990-1991

TI- <NOTE> Transportation research record
AU- Dodd, R. S. ; Drollinger, M. T. ; Hegwood, J. A. Y. ; Heidner, S. J. ; Stouffer, V.
CS- Transportation Research Board, Washington, DC.
CS- <CODE> 044780000
RN- TRB/TRR-1332; ISBN-0-309-05171-1
PY- 1992
PG- 56p
NT- See also PB91-242271. Library of Congress catalog card no. 92-15610.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9222
CP- United States
AB- Contents: Factors Involved in Emergency Medical Service Helicopter Occupant Crash Survival; Land Use Planning Approaches To Mitigating General Aviation Aircraft Noise; Human Factors in 1988 General Aviation Accidents; Trends at United States International Gateway Airports to Europe; Commercial Aviation Safety and Risk.
DE- *Aircraft accidents; *Human factors; *Aircraft noise; Accident analysis ; Land use; Airports; Aviation safety; Air transportation; Airline operations; Risk; Helicopters; Trends; Injuries
ID- NTISNASTRB
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 1673789
AA- <NTIS> N92-28744/0
TI- Crew Station Research and Development Facility Training for the Light Helicopter Demonstration/Validation Program
AU- Matsumoto, J. H. ; Rogers, S. ; Mccauley, M. ; Salinas, A.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:103865; A-91153; NASA-TM-103865; USAAVSCOM-TR-92-A-003
CN- NAS2-12849; RTOP 505-61-51
PY- Mar 92
PG- 10p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9222; STAR3019
CP- United States
AB- The U.S. Army Crew Station Research and Development Branch (CSRDB) of the Aircraft Simulation Division (AVSCOM) was tasked by the Light Helicopter Program Manager (LH-PM) to provide training to Army personnel in advanced aircraft simulation technology. The purpose of this training was to prepare different groups of pilots to support and evaluate two contractor simulation efforts during the Demonstration/Validation (DEM/VAL) phase of the LH program. The personnel in the CSRDB developed mission oriented training programs to accomplish the objectives, conduct the programs, and provide guidance

to army personnel and support personnel throughout the DEM/VAL phase.
DE- *Flight crews; *Flight simulators; *Light helicopters; *Training simulators; Computerized simulation; Systems simulation; Contractors; Military helicopters; Personnel; Pilot performance
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1673683
AA- <NTIS> N92-28584/0
TI- Effects of Cockpit Lateral Stick Characteristics on Handling Qualities and Pilot Dynamics
AU- Mitchell, D. G. ; Aponso, B. L. ; Klyde, D. H.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; S9710660
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:4443; H-1769; NASA-CR-4443
CN- NAS2-12722; ATD-90-STI-6401
PY- Jun 92
PG- 208p
NT- Prepared for PRC Kentron, Inc., Edwards, Ca.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9222; STAR3019
CP- United States
AB- This report presents the results of analysis of cockpit lateral control feel-system studies. Variations in feel-system natural frequency, damping, and command sensing reference (force and position) were investigated, in combination with variations in the aircraft response characteristics. The primary data for the report were obtained from a flight investigation conducted with a variable-stability airplane, with additional information taken from other flight experiments and ground-based simulations for both airplanes and helicopters . The study consisted of analysis of handling qualities ratings and extraction of open-loop, pilot-vehicle describing functions from sum-of-sines tracking data, including, for a limited subset of these data, the development of pilot models. The study confirms the findings of other investigators that the effects on pilot opinion of cockpit feel-system dynamics are not equivalent to a comparable level of added time delay, and until a more comprehensive set of criteria are developed, it is recommended that feel-system dynamics be considered a delay-inducing element in the aircraft response. The best correlation with time-delay requirements was found when the feel-system dynamics were included in the delay measurements, regardless of the command reference. This is a radical departure from past approaches.
DE- *Aircraft control; *Aircraft performance; *Cockpits; *Flight control; *Lateral control; Controllability; Flight characteristics; Damping; Flight tests; Helicopters; Resonant frequencies; Time lag
ID- *Human factors engineering; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1670457
AA- <NTIS> N92-27894/4
TI- Status of Automatic Guidance Systems for Rotorcraft in Low Altitude Flight
AU- Sridhar, B. ; Cheng, V. H. L. ; Swenson, H. N.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- cMar 92
PG- 12p
NT- In AGARD, Air Vehicle Mission Control and Management 12 p.
LA- English
PC- (Order as N92-27887/8, PC A12/MF A03)
JA- GRAI9221; STAR3018
CP- United States
AB- Rotorcraft operating in high-threat environments fly close to the earth's surface to utilize surrounding terrain, vegetation, or man-made objects to minimize the risk of being detected by an enemy. The piloting of the rotorcraft is at best a very demanding task and the pilots need help from on-board automation tools in order to devote more time to mission-related activities. The Automated Nap-of-the-Earth (NOE) Flight Program is a cooperative NASA/Army program aimed at the development of technologies for enhancing piloted low-altitude/NOE flight path management and control through computer and sensor aiding. The long-term objective is to work towards achieving automation for aiding the pilot in NOE flight with a flight demonstration of resulting computer/sensor aiding concepts at an established course. The technology for pilot-centered NOE automation is not currently

available. Success in automating NOE functions will depend on major breakthroughs in real-time flight path planning algorithms, effective methods for the pilot to interface to the automatic modes, understanding of visual images, sensor data processing/fusion, and sensor development. Our approach to developing the technologies required to solve this problem consist of the following phases: (1) algorithm development, (2) laboratory evaluation, (3) piloted ground simulation, and (4) evaluation in flight. An overview of the research in this area at NASA Ames Research Center is given.
DE- *Aircraft guidance; *Aircraft pilots; *Flight paths; *Human factors engineering; *Nap-of-the-earth navigation; *Rotary wing aircraft; Flight plans; Man-computer interface; Real time operation; Trajectory planning; Algorithms; Flight simulation; Flight tests; Low altitude; Terrain
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 76D (Navigation, Guidance, and Control--Navigation Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1665736
AA- <NTIS> AD-A252 235/7
TI- Correlating Visual Scene Elements with Simulator Sickness Incidence: Hardware and Software Development
TI- <NOTE> Final rept. Apr-Oct 91
AU- Kennedy, R. S. ; Berbaum, K. S. ; Smith, M. G.
CS- Essex Corp., Orlando, FL
CS- <CODE> 084158000; 398322
CN- N00019-91-C-0149; LQ220
PY- 27 Oct 91
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9220
CP- United States
AB- Simulator sickness occurs in a large number of Army, Navy, and Marine Corps simulators, and is most prevalent in moving-base, rotary-wing devices which employ cathode.ray tube (CRT) video displays as opposed to fixed-wing, dome-display trainers with no motion base. Based on data from a factor analysis of over 1000 Navy and Marine Corps pilot simulation exposures, a new scoring procedure was applied to two helicopter simulators with similar rates of simulator sickness incidence. Based on the factor analytic scoring key, the two simulators showed slightly different sickness profiles. Preliminary work was begun to record the visual scene by video frame-by-frame decomposition and automated scoring algorithms were developed. The findings are discussed from the standpoints of (1) recommendations for future design and use of simulators, and (2) the metric advantages and other merits of the field experiment methodology to address human factors problems with simulator sickness. Simulator sickness, Flight simulators, Visual displays, Motion perception, Human engineering, Image generation.
DE- *Motion sickness; *Human factors engineering; Factor analysis; Flight simulators; Images; Marine corps; Methodology; Perception; Pilots; Simulators; Video frames
ID- *Simulator sickness; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 57S (Medicine and Biology--Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1663784
AA- <NTIS> N92-25598/3
TI- Palette Zur Hubschrauber-Versuchsinstrumentierung (Pallet for Helicopter Testing Instrumentation)
AU- Haehnlein, G. ; Jaensch, P.
CS- Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
CS- <CODE> 008798000; DO744537
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jul 91
PG- 40p
NT- Text in German. In Its Flight Test of Avionic and Air-Traffic Control Systems p 114-153.
LA- German
DT- Translation
PC- (Order as N92-25590/0, PC A12/MF A03)
JA- GRAI9219; STAR3016
CP- Germany, Federal Republic of
AB- The conceptualization, realization, and application of a helicopter experimental platform are presented. The different factors influencing the helicopter system were identified and optimized with respect to higher mission requirements and an improved execution of the mission. The most varied user programs were conducted using a BO-105-S3

helicopter and the experience was exceptionally positive. The systems reliability is high and no failures occurred. The data acquisition components of the system were actualized several times. According to the concept, the hardware and software components of the data acquisition system are in a state of permanent technological upgrading.

DE- *Flight test instruments; *Helicopter performance; *Performance tests; Experiment design; Research aircraft; Bo-105 helicopter; Data acquisition; Flight simulation; Flight tests; Helicopter design
ID- *Foreign technology; Translations; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1660828
AA- <NTIS> N92-24678/4
TI- NASA Aerodynamics Program
TI- <NOTE> Annual Report, 1991
AU- Williams, L. J. ; Hessenius, K. A. ; Corsiglia, V. R. ; Hicks, G. ; Richardson, P. F.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NAS 1.15:4368; NASA-TM-4368
CN- NASW-4430
PY- Apr 92
PG- 245p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- GRAI9218; STAR3015
CP- United States
AB- The annual accomplishments is reviewed for the Aerodynamics Division during FY 1991. The program includes both fundamental and applied research directed at the full spectrum of aerospace vehicles, from rotorcraft to planetary entry probes. A comprehensive review is presented of the following aerodynamics elements: computational methods and applications; CFD validation; transition and turbulence physics; numerical aerodynamic simulation; test techniques and instrumentation; configuration aerodynamics; aeroacoustics; aerothermodynamics; hypersonics; subsonics; fighter/attack aircraft and rotorcraft.
DE- *Aerodynamic configurations; *Aerodynamics; *Aerospace vehicles; *Atmospheric entry; *Flow distribution; *Rotary wing aircraft; Aeroacoustics; Aerothermodynamics; Computational fluid dynamics; Computerized simulation; Fighter aircraft; Hypersonics; National aerospace plane program; Navier-stokes equation; Turbulence
ID- NTISNASA
SH- 51GE (Aeronautics and Aerodynamics--General)

AZ- 1658683
AA- <NTIS> AD-A251 078/2
TI- Test and Evaluation Report of the Ohio Medical Transport Incubator Model Air-Vac
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Quattlebaum, M. ; Licina, J. R. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-20
CN- 3M463807D836; LC
PY- Apr 92
PG- 81p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9218
CP- United States
AB- The Ohio Medical Transport Incubator, Model Air-Vac, was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Ohio Medical Transport Incubator, Model Air-Vac, was found to be compatible with U.S. Army MEDEVAC UH-60A Black Hawk.
DE- *Aeromedical evacuation; *Medical equipment; Helicopters; Medical evacuation; Wounds and injuries; Aerospace medicine
ID- *Transport incubator; UH-60A Helicopter; Air Vac; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1658682

AA- <NTIS> AD-A251 077/4
TI- Test and Evaluation Report of the IVAC (Trade Name) Volumetric Infusion Pump Model 580+EE
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-21
CN- 3M463807D836; LC
PY- May 92
PG- 57p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9218
CP- United States
AB- The IVAC Volumetric Infusion Pump, Model 580+EE, was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The IVAC Model 580+EE did not perform properly in the altitude chamber, vibration test, and excess electromagnetic emissions make it ineligible for an air-worthiness release. Therefore, the unit is not considered compatible with U.S. Army aeromedical aircraft.
DE- *Medical equipment; Parenteral infusions; Infusions; Pumps; Standards; Compatibility
ID- *Medical infusion pump; Aeromedical aircraft; 580 + EE Pumps; Tests and evaluation; Military medicine; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1658681
AA- <NTIS> AD-A251 076/6
TI- Test and Evaluation Report of the Human Technology Ambulatory Cortemp Recorder Model COR-124
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-19
CN- 3M463807D836; LC
PY- Mar 92
PG- 70p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9218
CP- United States
AB- The Human Technology Ambulatory Cortemp Recorder Model COR-124 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Human Technology Ambulatory Cortemp Recorder Model COR-124 was found to be compatible with the U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Aeromedical evacuation; *Medical equipment; Helicopters; Aerodynamic characteristics; Compatibility; Standards
ID- UH-60A Helicopter; CUR-124; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1658337
AA- <NTIS> AD-A250 719/2
TI- Pilot Errors Involving Head-Up Displays (HUDs), Helmet-Mounted Displays (HMDs), and Night Vision Goggles (NVGs)
TI- <NOTE> Final rept. Jun-Nov 91
AU- Biberman, L. M. ; Alluisi, E. A.
CS- Institute for Defense Analyses, Alexandria, VA.
CS- <CODE> 075311000; 179350
SP- Institute for Defense Analyses, Alexandria, VA.
RN- IDA-P-2638; IDA/HQ-91-40259
PY- Jan 92
PG- 166p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A02
JA- GRAI9218
CP- United States
AB- Having become aware of difficulties with night vision and display equipment in helicopters and fixed-wing aircraft, IDA staff members collected pertinent literature, interviewed aircrews, aeromedical research people, and cockpit designers, and then carried out display simulations. They found serious safety problems associated with the newer techniques of displaying information to aircrews. At highly task-loaded moments, pilots are often stressed that they channelize attention and ignore indications of trouble. Thus, human-factors problems cancel the technological advances being introduced into modern aircraft cockpits. To help solve those problems, the investigators undertook to: appraise the reality and severity of shortcomings in display instrumentation and its use; arrange for specific laboratory research by the Army and the Air Force, followed by tests and demonstrations. They presented their findings and recommendations to the Air Staff and the Air Force Scientific Advisory Board, as well as the Army Deputy Under Secretary for Operations Research and the Commander of the Army Aviation Center and his aeromedical staff at Fort Rucker.
DE- *Head up displays; *Helmet mounted displays; *Night vision devices; *Human factors engineering; *Pilots; Display systems; Flight crews; Errors; Image intensifiers(Electronics); Fixed wing aircraft; Computerized simulation; Cockpits; Attack helicopters; Cathode ray tubes; Forward looking infrared systems; Fighter aircraft
ID- *Night vision goggles; SBI1; Fiscal year 92; FOV(Field of View); Aeromedical research; APACHE Aircraft; Field of view; NTISDODXA; NTISDODSD
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1653014
AA- <NTIS> AD-A249 636/2
TI- Test and Evaluation Report of the Paravant (Trade Name) Ruggedized Hand Held Computer Model RHC-88
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-15
CN- 3M463807D836; LC
PY- Feb 92
PG- 70p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9216
CP- United States
AB- The Paravant Ruggedized Hand Held Computer Model RHC-88 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/ compatibility and human factors. The Paravant Ruggedized Hand Held Computer Model RHC-88 was found to be compatible with the U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Computers; *Electromagnetic compatibility; *Electromagnetic interference; *Aeromedical evacuation; Army; Hand held; Helicopters; Humans; Interference; Models; Operation; Standards; Test and evaluation ; Human factors engineering
ID- UH-60A Aircraft; H-60 Aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology); 62A (Computers, Control, and Information Theory--Computer Hardware)

AZ- 1653012
AA- <NTIS> AD-A249 633/9
TI- Test and Evaluation Report of the SSCOR PacVac Portable Suction Pump Model 10002
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-11
CN- 3M463807D836; LC
PY- Feb 92
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9216
CP- United States
AB- The SSCOR PacVac Portable Suction Pump Model 10002 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. Since in-flight testing of the PacVac portable suction unit could not be completed, its compatibility with the U.S. Army medical evacuation UH-60A Blackhawk could not be determined.
DE- *Electromagnetic compatibility; *Electromagnetic interference; *Suction pumps; *Medical equipment; *Rotary wing aircraft; Army; Flight testing; Helicopters; Humans; Interference; Medical evacuation; Models; Operation; Standards; Test and evaluation; Aviation medicine; Human factors engineering; Safety; Portable equipment; Temperature; Vibration

ID- UH-60A Aircraft; Aeromedical equipment; S836; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1651438
AA- <NTIS> N92-21479/0
TI- Contextual Specificity in Perception and Action
AU- Proffitt, D. R.
CS- Virginia Univ., Charlottesville. Rotor Dynamics Lab.
CS- <CODE> 015207094; V3127208
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Apr 91
PG- 5p
NT- In NASA. Ames Research Center, Visually Guided Control of Movement p 151-155.
LA- English
PC- (Order as N92-21467/5, PC A11/MF A03)
JA- GRAI9215; STAR3012
CP- United States
AB- The visually guided control of helicopter flight is a human achievement, and, thus, understanding this skill is, in part, a psychological problem. The abilities of skilled pilots are impressive, and yet it is of concern that pilots' performance is less than ideal: they suffer from workload constraints, make occasional errors, and are subject to such debilities as simulator sickness. Remedying such deficiencies is both an engineering and a psychological problem. When studying the psychological aspects of this problem, it is desirable to simplify the problem as much as possible, and thereby, sidestep as many intractable psychological issues as possible. Simply stated, we do not want to have to resolve such polemics as the mind-body problem in order to contribute to the design of more effective helicopter systems. On the other hand, the study of human behavior is a psychological endeavor and certain problems cannot be evaded. Four related issues that are of psychological significance in understanding the visually guided control of helicopter flight are discussed. First, a selected discussion of the nature of descriptive levels in analyzing human perception and performance is presented. It is argued that the appropriate level of description for perception is kinematical, and for performance, it is procedural. Second, it is argued that investigations into pilot performance cannot ignore the nature of pilots' phenomenal experience. The conscious control of actions is not based upon environmental states of affairs, nor upon the optical information that specifies them. Actions are coupled to perceptions. Third, the acquisition of skilled actions in the context of inherent misperceptions is discussed. Such skills may be error prone in some situations, but not in others. Finally, I discuss the contextual relativity of human errors. Each of these four issues relates to a common theme: the control of action is mediated by phenomenal experience, the veracity of which is context specific.
DE- *Aviation psychology; *Flight control; *Helicopter control; *Pilot performance; *Sensory perception; *Visual control; Human behavior; Motion sickness; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51GE (Aeronautics and Aerodynamics--General); 92B (Behavior and Society--Psychology)

AZ- 1651436
AA- <NTIS> N92-21477/4
TI- Simple Control-Theoretic Models of Human Steering Activity in Visually Guided Vehicle Control
AU- Hess, R. A.
CS- California Univ., Davis.
CS- <CODE> 004365000; CC907079

SP- National Aeronautics and Space Administration, Washington, DC.
PY- Apr 91
PG- 6p
NT- In NASA. Ames Research Center, Visually Guided Control of Movement p 115-120.
LA- English
PC- (Order as N92-21467/5, PC A11/MF A03)
JA- GRAI9215; STAR3012
CP- United States
AB- A simple control theoretic model of human steering or control activity in the lateral-directional control of vehicles such as automobiles and rotorcraft is discussed. The term 'control theoretic' is used to emphasize the fact that the model is derived from a consideration of well-known control system design principles as opposed to psychological theories regarding egomotion, etc. The model is employed to emphasize the 'closed-loop' nature of tasks involving the visually guided control of vehicles upon, or in close proximity to, the earth and to hypothesize how changes in vehicle dynamics can significantly alter the nature of the visual cues which a human might use in such tasks.
DE- *Control systems design; *Design analysis; *Feedback control; *Human performance; *Human reactions; *Mathematical models; *Steering; *Visual control; Automobiles; Guidance (Motion); Rotary wing aircraft; Visual stimuli
ID- NTISNASA
SH- 62C (Computers, Control, and Information Theory--Control Systems and Control Theory); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 1651427
AA- <NTIS> N92-21468/3
TI- Use of Visual Cues for Vehicle Control and Navigation
AU- Hart, S. G. ; Battiste, V.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Apr 91
PG- 17p
NT- In Its Visually Guided Control of Movement p 7-23.
LA- English
PC- (Order as N92-21467/5, PC A11/MF A03)
JA- GRAI9215; STAR3012
CP- United States
AB- At least three levels of control are required to operate most vehicles: (1) inner-loop control to counteract the momentary effects of disturbances on vehicle position; (2) intermittent maneuvers to avoid obstacles, and (3) outer-loop control to maintain a planned route. Operators monitor dynamic optical relationships in their immediate surroundings to estimate momentary changes in forward, lateral, and vertical position, rates of change in speed and direction of motion, and distance from obstacles. The process of searching the external scene to find landmarks (for navigation) is intermittent and deliberate, while monitoring and responding to subtle changes in the visual scene (for vehicle control) is relatively continuous and 'automatic'. However, since operators may perform both tasks simultaneously, the dynamic optical cues available for a vehicle control task may be determined by the operator's direction of gaze for wayfinding. An attempt to relate the visual processes involved in vehicle control and wayfinding is presented. The frames of reference and information used by different operators (e.g., automobile drivers, airline pilots, and helicopter pilots) are reviewed with particular emphasis on the special problems encountered by helicopter pilots flying nap of the earth (NOE). The goal of this overview is to describe the context within which different vehicle control tasks are performed and to suggest ways in which the use of visual cues for geographical orientation might influence visually guided control activities.
DE- *Cues; *Helicopter control; *Navigation; *Pilot performance; *Visual control; *Visual stimuli; Aircraft pilots; Automobiles; Landmarks; Visual perception
ID- NTISNASA
SH- 76A (Navigation, Guidance, and Control--Control Devices and Equipment); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1649807
AA- <NTIS> AD-P006 398/2
TI- Helicopter Integrated Helmet Requirements and Test Results
AU- Boehm, H.-D. ; Schreyer, H.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Helicopter and Military Aircraft Group.
CS- <CODE> 064776003; 417215
PY- cDec 91
PG- 17p
NT- This article is from Conference Proceedings on Helmet Mounted Displays and Night Vision Goggles (Visuels Montes sur le Casque et Equipements

de Vision Nocturne) Held in Pensacola, FL on May 2, 1991, AD-A246 925, p3-1 thru 3-17.
NT- This paper covered by copyright. No copies furnished by DTIC/NTIS.
LA- English
PC- Not available NTIS
JA- GRAI9215
CP- Germany, Federal Republic of
AB- A modern integrated helmet (IH) consists out of two Image Intensifier Tubes (IIT) and two Cathode Ray Tubes (CRT) with an optical system including combiners to present the images binocular. Additional symbology can be superimposed to the CRT- or IIT-image. An IH is a further development of a Helmet Mounted Display (HMD). A Helmet-Mounted-Sight (HMS) can steer a sensor platform with a thermal camera or an air-to-air missile system. The main helicopter (HC) requirements of such a system are: (1) human factors (2) optimized day, twilight and night optical modules (3) large exit pupil, good transmission of the optical path and a large adjustment range (4) fit of helmet including optimized centre of gravity(CG) and weight (5) good geometrical resolution / Modulation Transfer Function (MTF) with a large Field of View (FOV) (6) high focussing range of the IIT and a good S/N ratio below 1 mLux (7) CRT automatic brightness and contrast control (8) flight symbology presentation for one or two eyes (9) good static and dynamic HMS-accuracy with a large Head Motion Box (HMB) (10) NBC and Laser protection compatibility MBB and the Army Corps have made in this year ground and flight trails with an Integrated Helmet and a HMS on a PAH 1 respectively a BK 11 7 helicopter. The paper will present IH requirements for HC application and some test results.
DE- *Helmets; Cameras; Helicopters; Lasers; Ratios; Night sights; Optical images; Image intensifiers(Electronics); Transfer functions; Human factors engineering; Helmet mounted displays
ID- *Foreign technology; *Binoculars; Component Reports; NATO Furnished; MTF(Modulation Transfer Functions); Helmet mounted sights; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1649472
AA- <NTIS> AD-A248 834/4
TI- Test and Evaluation Report of the IVAC (Trademark) Vital Check Monitor Model 4000AEE
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-14
CN- 3M463807D836; LC
PY- Feb 92
PG- 144p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A02
JA- GRAI9215
CP- United States
AB- The IVAC Vital Check Monitor Model 4000AEE was tested for electromagnetic interference/ compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The IVAC Vital Check Monitor Model 4000AEE was found to be compatible with U.S. Army medical evacuation UH-60A Blackhawk. However, ambient noise levels in the helicopter prevented proper operation of the microphone in the blood pressure cuff which resulted in measurement errors.
DE- *Blood pressure; Ambient noise; Army; Blood; Compatibility; Electromagnetic compatibility; Electromagnetic interference; Errors; Evacuation; Helicopters; Humans; Interference; Measurement; Medical evacuation; Microphones; Models; Monitors; Noise; Operation; Pressure; Standards; Test and evaluation
ID- *Medical equipment; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1649182
AA- <NTIS> AD-A248 538/1
TI- Test and Evaluation Report of the IMED Volumetric Infusion Pump Model 960A
TI- <NOTE> Final rept
AU- Bruckart, J. E. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-18
CN- 3M463807D836; LC
PY- Feb 92

PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9215
CP- United States
AB- The IMED Volumetric Infusion Pump Model 960A was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The IMED Volumetric Infusion Pump Model 960A was found to be compatible with the U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Medical equipment; Army; Electromagnetic compatibility; Evacuation; Helicopters; Humans; Infusions; Interference; Medical evacuation; Models; Pumps; Standards; Test and evaluation; Human factors engineering; Aviation medicine; Safety
ID- *Infusion pumps; Electromagnetic; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1646184
AA- <NTIS> AD-A248 355/0
TI- Test and Evaluation Report of the Physio Control Blood Pressure Monitor Model LIFESTAT (Trademark) 200
TI- <NOTE> Final rept
AU- Haun, J. D. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-6
CN- 3M463807D836; LC
PY- Sep 91
PG- 72p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9214
CP- United States
AB- The Physio Control Blood Pressure Monitor Model LIFESTAT 200 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Test and Evaluation of Aeromedical Equipment program. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Physio Control Blood Pressure Monitor Model LIFESTAT 200 was found to be compatible with U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Medical equipment; Army; Blood pressure; Electromagnetic compatibility ; Electromagnetic interference; Helicopters; Monitors; Test and evaluation; Aeromedical evacuation
ID- *Blood pressure monitor; Health care technology; LIFESTAT 200 Blood pressure monitor; UH-60A Helicopter; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1646183
AA- <NTIS> AD-A248 354/3
TI- Test and Evaluation Report of the IMED 927 Infusion Pump
TI- <NOTE> Final rept
AU- Haun, J. D. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-7
CN- 3M463807D836; LC
PY- Oct 91
PG- 70p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9214
CP- United States
AB- The IMED 927 Infusion Pump was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical

Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The IMED 927 Infusion Pump was found to be compatible with U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Medical equipment; Army; Electromagnetic compatibility; Electromagnetic interference; Helicopters; Infusions; Pumps; Test and evaluation; Aeromedical evacuation
ID- *Infusion pump; IMED 927 Infusion pump; UH-60A Helicopter; Health care technology; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1646181
AA- <NTIS> AD-A248 352/7
TI- Test and Evaluation Report of the Physio Control Blood Pressure Monitor Model LIFESTAT (Trademark) 100
TI- <NOTE> Final rept
AU- Delrie, D. M. ; Licina, J. R. ; Haun, J. D. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-4
CN- 3M463807D836; LC
PY- Dec 91
PG- 72p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9214
CP- United States
AB- The Physio Control Blood Pressure Monitor Model LIFESTAT 100 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The LIFESTAT 100 was found to be compatible with U.S. Army medical evacuation UH-60A Blackhawk.
DE- *Medical equipment; Army; Blood pressure; Electromagnetic compatibility ; Electromagnetic interference; Helicopters; Monitors; Test and evaluation; Aeromedical evacuation
ID- *Blood pressure monitor; LIFESTAT 100 Blood pressure monitor; UH-60A Helicopter; Health care technology; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 1646115
AA- <NTIS> AD-A248 283/4
TI- Test and Evaluation Report of the Physio Control Defibrillator/Monitor Model LIFEPAK (Trademark) 8
TI- <NOTE> Final rept
AU- Haun, J. D. ; Licina, J. R. ; Olding, B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-5
CN- 3M463807D836; LC
PY- Dec 91
PG- 75p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9214
CP- United States
AB- Physio Control Defibrillator/Monitor Model LIFEPAK 8 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing Evaluation of Equipment for Aeromedical Operations. The tests were conducted using our rent military and industrial standards and procedures for electromagnetic interference/ compatibility and human factors. The LIFEPAK 8 was found to be compatible with U.S. Army medical evacuation UH-60A Blackhawk.
DE- Army; Compatibility; Control; Electromagnetic compatibility; Electromagnetic interference; Evacuation; Helicopters; Humans; Interference; Medical evacuation; Models; Monitors; Standards; Test and evaluation
ID- *Medical equipment; *Electromagnetic Compatibility; *Aeromedical Equipment; Test and Evaluation; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AA- <NTIS> AD-A247 470/8
TI- Methods of Visual Scanning with Night Vision Goggles
TI- <NOTE> Final rept
AU- Kotulak, J. C.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-92-10
CN- 3M162787A879; BG
PY- Feb 92
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9213
CP- United States
AB- This report describes recommended methods for scanning the flight path and cockpit instruments for pilots wearing night vision goggles (NVGs) while flying Army helicopters. The impetus for this report was a task force sponsored by the Office of the Deputy Chief of Staff of the Army for Plans and Operations, which determined that the development of scanning methods was the Army's top training priority for night helicopter operations. The recommended methods of scanning were derived from published scientific works, interviews with scientists, and interviews with aviators from field tactical units, training units, and from the research and development community. The proposed scanning methods recommend free search as opposed to formalized scan patterns. In addition, they place equal weight on crew coordination and individual technique. The proposed methods stress actions taken before flight, such as premission planning and NVG preflight adjustments. Furthermore, the proposed methods are intended to build an awareness of: NVG performance limits, and how to maximize performance; common problems encountered while scanning with NVGs, and the conditions which elicit them; and the scientific basis for scanning. Separate scanning methods were developed for individuals and for crews. In addition, the relevant scientific literature was reviewed.
DE- *Goggles; *Night vision; *Vision; Addition; Army; Awareness; Cockpits; Communities; Crews; Flight; Helicopters; Night; Patterns; Pilots; Planning; Scanning; Scientific literature; Scientists; Task forces; Training; Weight
ID- *Flight crews; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57S (Medicine and Biology--Physiology)

AZ- 1640608
AA- <NTIS> AD-A247 182/9
TI- Evaluation of Night Vision Goggles (NVG) for Maritime Search and Rescue
TI- <NOTE> Interim rept. no. 3, Mar 89-Feb 91
AU- Robe, R. Q. ; Plourde, J. V. ; Hover, G. L.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> 093810000; 413536
SP- Coast Guard Research and Development Center, Groton, CT.; Coast Guard, Washington, DC. Office of Research and Development.
RN- CGR/DC-19/91; USCG-D-03-92
CN- DTCG39-89-C-80671
PY- Jun 91
PG- 106p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A02
JA- GRAI9212
CP- United States
AB- Three experiments were conducted during 1989 and two more have been conducted during 1990 by the U.S. Coast Guard Research and Development (RD) Center to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs were evaluated: the AN/AVS-6 Aviators Night Vision Imaging System (ANVIS) NVG was tested onboard Coast Guard HH-3 and CH-3 helicopters, and the AN/PVS-5C and AN/PVS-7A NVGs were tested onboard 41-foot Coast Guard utility boats (UTBs). During the Fall 1990 experiment, 4-and 6-person unlit life rafts, with and without retro-reflective tape and 18-and 21-foot white boats were employed as targets during realistically-simulated search missions and are discussed herein. A large quantity of well moonlit data were collected during the fall 1990 experiment and this third interim report discusses target types where new information was obtained. A total of 1,612 target detection opportunities were generated for the above-mentioned target types during the five experiments. These data were analyzed to determine which of 25 search parameters of interest exerted a statistically-significant influence on target detection probability.

Lateral range curves and sweep width estimates are developed for each search unit/target type combination. Human factors data are presented and discussed. Recommendations for conducting NVG searches for small targets and for additional data collection and analysis are provided.
DE- *Goggles; *Night vision; *Search and rescue; Boats; Coast guard research; Collection; Detection; Estimates; Helicopters; Humans; Life rafts; Missions; Onboard; Parameters; Probability; Quantity; Rescues; Tapes; Targets; Target detection; Width
ID- NTISDODXA; NTISDOTCG
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection)

AZ- 1640252
AA- <NTIS> AD-A246 821/3
TI- Human-Powered Helicopter: A Program for Design and Construction
TI- <NOTE> Master's thesis
AU- Bruce, S. A.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Jun 91
PG- 130p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A07/MF A02
JA- GRAI9212
CP- United States
AB- The various aspects of helicopter design and human-powered aircraft design are studied to present a program to design and build a human-powered helicopter (HPH) at the Naval Postgraduate School. The HPH will be designed to meet the requirements for the AHS-Sikorsky Award. The helicopter design is refined, and the feasibility of construction is assessed. In addition to pursuing a significant historical achievement, the program seeks to enhance the helicopter and composite programs of the Aeronautical Engineering curriculum at the NPS. Benefits to NPS in terms of research topics and as a research aircraft are presented. Potential future uses for ultra-low powered aircraft technology are also outlined.
DE- *Helicopters; *Research aircraft; Aeronautical engineering; Construction; Education; Feasibility studies; History
ID- *Human-powered helicopter; Theses; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1637405
AA- <NTIS> AD-A246 355/2
TI- Instrumentation for Airwake Measurements on the Flight Deck of a FFG-7
TI- <NOTE> Technical memo
AU- Hourigan, D. T. ; Sutton, C. W. ; Bird, F. J.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
SP- Department of Defence, Canberra (Australia).
RN- DODA-AR-006-623
PY- Nov 91
PG- 34p
NT- Original contains color plates: All DTIC/NTIS reproductions will be in black and white.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9211
CP- Australia
AB- The Royal Australian Navy (RAN) operates helicopters aboard many classes of ships, including the Sikorsky S-70B-2 Seahawk helicopter on the FFG class and possibly the new ANZAC class of frigate. In support of the RAN aviation activities the Aeronautical Research Laboratory (ARL) is pursuing the development of a computer simulation model of helicopter operations from a ship. As part of the RAN sponsored helicopter/ship model validation task (Task 89/073) sea trials were conducted aboard HMAS Darwin, an extended deck FFG-7 class of ship, to obtain airwake data in the proximity of the flight deck. The data, after processing, will be used, together with results obtained from wind tunnel tests based on a 1/64th scale ship model, to form a suitable airwake model in a helicopter/ship simulation computer code. Much of the instrumentation described in this paper has had extensive use in other wide-ranging applications such as a Clear Air Turbulence (CAT) investigation, First of Class Flight Trials (FOCFT) and dynamic undercarriage measurements on a Sikorsky S-70B-2 Seahawk helicopter. Motion-related trials have involved a road vehicle and various types of ships. The equipment was reconfigured to that considered applicable for the airwake application.

DE- *Helicopters; Aeronautics; Clear air turbulence; Computerized simulation; Flight decks; Flight testing; Frigates; Navy; Roads; Sea testing; Vehicles; Wind tunnel tests
ID- *Foreign technology; *Ship launched; *Airwake data; RAN(Royal Australian Navy); Models; Australia; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft); 47A (Ocean Technology and Engineering--Marine Engineering)

AZ- 1631521
AA- <NTIS> AD-A244 669/8
TI- Baseline Vibration Measurements of Remotely Piloted Helicopters for Higher Harmonic Control Research
TI- <NOTE> Master's thesis
AU- Ransford, K. M.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Dec 91
PG- 70p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A04/MF A01
JA- GRAI9209
CP- United States
AB- The Dept of Aeronautics and Astronautics at the Naval Postgraduate School (NPS) is conducting a research program in methods of high harmonic control (HHC) for reduction of helicopter vibrations. The program at NPS uses remotely piloted helicopters (RPH) to study HHC effects on vibration and blade load reduction. The scope of this thesis was to measure the baseline vibration profile of the RPH test vehicles prior to the installation of a HHC system. This goal was met by the development of a data instrumentation and recording system and by conducting a ground and flight test program for the RPH test vehicles. From the results of these tests it was concluded that: (a) the data instrumentation and recording system was of sufficient sensitivity to detect vibrations experienced within the RPH airframe; and (b) the RPH exhibited a vibration profile similar to that of a full scale helicopter. It is recommended that a HHC system be designed, fabricated, and installed on the RPH so that the effects of HHC on helicopter performance may be evaluated.
DE- *Helicopters; *Remotely piloted vehicles; *Vibration; Aeronautics; Airframes; Astronautics; Base lines; Blades; Control; Flight testing; Harmonics; Instrumentation; Measurement; Performance(Engineering); Profiles; Recording systems; Reduction; Test vehicles; Theses
ID- Aerodynamic loading; Rotor blades(Rotary Wings); Control systems; Test methods; HHC(Higher Harmonic Control); RPH(Remotely Piloted Helicopters); Blade load; Harmonic control; Vibration control; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1630098
AA- <NTIS> N92-13982/3
TI- Flight Simulation
AU- Reid, L. D. ; Advani, S. ; Graf, W. O. ; Soosaar, R. J. ; Grant, P. R.

CS- Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
CS- <CODE> 065675001; T2124662
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 1989
PG- 2p
NT- In Its Activities of the University of Toronto Institute for Aerospace Studies p 78-79.
LA- English
PC- (Order as N92-13975/7, PC A06/MF A02)
JA- GRAI9208; STAR3005
CP- Canada
AB- A brief description is provided of several University of Toronto Institute for Aerospace Studies (UTIAS) programs designed to investigate human factors and system optimization involved in flight simulation. A program of study has been undertaken to determine the critical amplitudes required to provide sensations of motion in the flight simulator sickness that are congruent with the expected motion of an aircraft. An electrogastrogram system designed to measure stomach activity associated with simulator sickness has been developed and tested. A program to evaluate nonlinear motion drive algorithms for flight simulators has been completed. The modelling of atmospheric disturbances, especially atmospheric turbulence and wind gradients associated with thunderstorms, is under study. Implementation of software for Instrument Flight Rule (IFR) flight test evaluations of a Bell 205 Helicopter simulator developed earlier, is currently underway. A generic spin simulator for simulation of light aircraft flight when

airframe spin data is unavailable has been implemented on the flight simulator. An expert system for the purpose of tuning motion drive algorithms is to be developed.
DE- *Expert systems; *Flight simulation; *Motion sickness; *Motion simulation; *Physiological effects; Aircraft spin; Algorithms; Atmospheric turbulence; Flight tests; Helicopters; Human factors engineering; Nausea
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1626477
AA- <NTIS> N92-13060/8
TI- Helicopter Physical and Performance Data (Final Report)
AU- Mcconkey, E. D. ; Anoll, R. K. ; Renton, M. B. ; Young, J.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; S9210736
SP- National Aeronautics and Space Administration, Washington, DC.
RN- SCT-91RR-27; DOT/FAA/RD-90/3
CN- DTFA01-87-C-00014
PY- Aug 91
PG- 196p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A03
JA- GRAI9207; STAR3004
CP- United States
AB- A determination of physical and performance data for 8 civil helicopters was made. The used helicopters were chosen to exhibit a wide range of characteristics representative of the current civil fleet. Flight manual data as well as certification, flight test, and computer generated performance data were used to complete the study. Approach and departure profiles were developed for several gross weights and ambient conditions and translated into graphs. A menu-driven database was designed to provide easy access to the data. The airspace required for approaches is dependent upon pilot skill and desired approach slope. Pilots can fly approaches steeper than the current standard 8:1 surface if required though pilot workload tends to increase and comfort levels tend to decrease. The airspace required for departures is a function of aircraft performance and ambient conditions.
DE- *Airspace; *Approach; *Flight tests; *Helicopter performance; *Helicopters; Air traffic control; Certification; Data bases; Flight paths; Pilot performance; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1626139
AA- <NTIS> DE92001158
TI- Comparison of spanwise aerodynamic loads estimated from measured bending moments versus direct pressure measurements on horizontal axis wind turbine blades
AU- Simms, D. A. ; Butterfield, C. P.
CS- National Renewable Energy Lab., Golden, CO.
CS- <CODE> 102636000; 9529807
SP- Department of Energy, Washington, DC.
RN- NREL/TP-257-4507; CONF-9109112-3
CN- AC02-83CH10093
PY- Oct 91
PG- 11p
NT- American Wind Energy Association conference: windpower '91 (21st), Palm Springs, CA (United States), 24-27 Sep 1991. Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9207; ERA9213
CP- United States
AB- Two methods can be used to determine aerodynamic loads on a rotating wind turbine blade. The first is to make direct pressure measurements on the blade surface. This is a difficult process requiring costly pressure instrumentation. The second method uses measured flap bending moments in conjunction with analytical techniques to estimate airloads. This method, called ALEST, was originally developed for use on helicopter rotors and was modified for use on horizontal axis wind turbine blades. Estimating airloads using flap bending moments in much simpler and less costly because measurements can be made with conventional strain gages and equipment. This paper presents results of

airload estimates obtained using both methods under a variety of operating conditions. Insights on the limitations and usefulness of the ALEST bending moment technique are also included. 10 refs., 6 figs.
DE- *Dynamic Loads; *Turbine Blades; A Codes; Aerodynamics; Airfoils; Horizontal Axis Turbines; Pressure Measurement; Strain Gages; Wind; Meetings
ID- EDB/170602; EDB/990200; NTISDE
SH- 97O (Energy--Miscellaneous Energy Conversion and Storage); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 1623966
AA- <NTIS> N92-12422/1
TI- Helicopter Integrated Helmet Requirements and Test Results
AU- Vonboehm, H. ; Schreyer, H.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
CS- <CODE> 064776000; MT618891
SP- National Aeronautics and Space Administration, Washington, DC.
RN- MBB-UD-0595-91-PUB; ETN-91-90197
PY- May 91
PG- 19p
NT- Presented at the AGARD Aerospace Medical Panel Symposium, Pensacola, Fl, 2 May 1991.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9206; STAR3003
CP- Germany, Federal Republic of
AB- Integrated Helmet (IH) requirements for helicopter applicatons and some test results are given. A modern IH consists of two Image Intensifier Tubes (IIT) and two Cathode Ray Tubes (CRT) with an optical system including combiners to present binocular images. Additional symbology can be superimposed on the CRT or IIT image. An IH is a further development of a Helmet Mounted Display (HMD). A Helmet Mounted Sight (HS) can steer a sensor platform with a thermal camera or an air to air missile system. The main helicopter requirements of such a system are given.
DE- *Helicopters; *Helmets; *Man machine systems; *Performance tests; *Systems integration; *User requirements; Air to air missiles; Aircraft safety; Cathode ray tubes; Image intensifiers; Optical measuring instruments; Visual perception
ID- *Foreign technology; NTISNASAE
SH- 51GE (Aeronautics and Aerodynamics--General); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1623776
AA- <NTIS> N92-12003/9
TI- Resonance and Control Response Tests Using a Control Stimulation Drive
AU- Mueller, H. ; Gruenewald, A.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
CS- <CODE> 064776000; MT618891
SP- National Aeronautics and Space Administration, Washington, DC.
RN- MBB-UD-0586-90-PUB; ETN-91-90194
PY- 8 Oct 90
PG- 11p
NT- Previously Announced in Iaa as A91-31292. Presented at the National Technical Specialists Meeting of the American Helicopter Society, Scottsdale, Az, 8-12 Oct. 1990.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9206; STAR3003
CP- Germany, Federal Republic of
AB- The main functions of the STIMULI system currently used for ground and flight testing of the BO 108 are discussed. The control stimulation device was installed for better performance of ground and flight tests. Many types of collective or cyclic inputs can be chosen in a computer menu. It is possible to select the longitudinal and lateral control signals separately or in combination. Each input is of an accuracy which no pilot can reproduce. Hence ground and flight testing can be performed at a higher level of efficiency. The various applications of computer controlled main rotor inputs are demonstrated. For comparison, helicopter testing done with manual control inputs is also shown.
DE- *Automatic flight control; *Flight tests; *Ground tests; *Helicopter control; *Resonance testing; Active control; Computer programs; Performance tests; Pilot performance; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1616136
AA- <NTIS> DE91018195
TI- Radiological survey of the McGuire Bomarc Site, New Jersey. Date of survey: November 1973
CS- EG and G, Inc., Las Vegas, NV.
CS- <CODE> 010462000; 2309000
SP- Department of Energy, Washington, DC.
RN- EGG-1183-1624
CN- AC08-76NV01183
PY- 4 Mar 74
PG- 30p
NT- Sponsored by Department of Energy, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9204; ERA9206
CP- United States
AB- On November 12, 13 and 14, 1973, an aerial radiation survey was flown over a US Air Force deactivated Bomarc missile site near McGuire Air Force Base, New Jersey. The purpose of the survey was to map (sup 241)Am associated with weapons grade plutonium within and immediately adjacent to the site. Presence of the (sup 241)Am was the result of a fire in one of the bunkers, which occurred in 1960. The aerial survey was conducted by EG&G, Inc., a contractor to the United States Atomic Energy Commission (AEC), Division of Operational Safety, at the request of the United States Air Force, Office of the Surgeon General. This equipment and contractor team are part of a special capability recently developed within the AEC Division of Military Applications, to rapidly evaluate radiological contamination in areas affected as the result of a Broken-Arrow situation. Standard military helicopters, with military pilots, provide the aerial platform. Installation of equipment requires a few hours under supervision of the contractor team. The spatial distribution of the (sup 241)Am contamination on the terrain surface was measured using a large array of NaI gamma ray detectors, mounted on a helicopter. The data was acquired utilizing the REDAR (Radiation and Environmental Data Acquisition and Recorder) system. It was processed on the REDAC (Radiation and Environmental Data Analyzer and Computer) system. Measurements of both gamma ray count rate and energy spectra were made and correlated with the helicopter position data. Results are presented as isopleths giving the (sup 241)Am surface concentration in units of (mu)g/m(sup 2). Measured values varied from background levels (< 0.04 (mu)g/m(sup 2) to between 0.43 (mu)g/m(sup 2) and 0.81 (mu)g/m(sup 2)). Additionally, gamma energy spectra and intensity variations over the affected areas are presented. 16 figs., 1 tab.
DE- *Background Radiation; *Gamma Spectra; *Military Facilities; *Radiometric Surveys; Aerial Surveying; Americium 241; Computer Calculations; Computer Output Devices; Contamination; Data Acquisition; Data Analysis; Electronic Equipment; Environmental Exposure; Gamma Detection; Mapping; Measuring Methods; Missile Silos; NaI Detectors; New Jersey; Plotters; Plutonium 241; Remote Sensing; Site Characterization; Soils
ID- EDB/540230; EDB/440103; EDB/450200; NTISDE
SH- 68F (Environmental Pollution and Control--Radiation Pollution and Control); 77D (Nuclear Science and Technology--Nuclear Explosions and Devices); 77E (Nuclear Science and Technology--Nuclear Instrumentation) ; 74E (Military Sciences--Logistics, Military Facilities, and Supplies) ; 48C (Natural Resources and Earth Sciences--Natural Resource Surveys)

AZ- 1615565
AA- <NTIS> AD-A241 966/1
TI- Effects of the Chemical Defense Antidote Atropine Sulfate on Helicopter Pilot Performance: An In-Flight Study
AU- Caldwell, J. A. ; Carter, D. J. ; Stephens, R. L. ; Stone, L. W. ; Delrie, D. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-17
CN- 3M263002D995; BF
PY- Jun 91
PG- 209p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A03
JA- GRAI9204
CP- United States
AB- The effect of 2 mg and 4 mg injections of atropine sulfate on helicopter pilots was investigated using a specially instrumented UH-1H helicopter and several laboratory tests. A counterbalanced, within-subjects design was employed in which flight performance, vision, electroencephalographic activity, cognitive skill, and tracking performance were assessed on each of three different drug

administration days (placebo, 2 mg, and 4 mg) separated by control days. Results indicated numerous atropine-related difficulties, seen most often with the 4 mg dose. Measurements of flight performance revealed decrements on at least one measure (i.e., heading, air speed, vertical speed) in both visual- and instrument-referenced straight and level flight, standard-rate turns, a straight climb and descent, steep turns, a climbing turn, and an instrument landing system (ILS) approach. Also, there were degradations in performance of a confined area approach and an out-of-ground-effect hover maneuver. Vision tests showed atropine-related increases in pupil diameter and double vision, concurrent with decreases in accommodation and depth perception. Cognitive tests revealed decrements in visual search, logical reasoning, quantitative ability, short-term memory, and response times. Psychomotor tracking tasks indicated atropine-induced increases in tracking errors across three levels of tracking complexity, and these sometimes were accompanied by deficits in responding to a secondary task. Electrophysiological data revealed a number of effects on both evoked potentials and resting EEGs which were consistent with the observed atropine-related performance problems.

DE- *Helicopters; *Pilots; Airspeed; Climbing; Cognition; Confined environments; Control; Descent; Diameters; Drugs; Electroencephalography; Electrophysiology; Errors; Eye; Flight; Inflight; Instrument landings; Laboratory tests; Landing aids; Level flight; Measurement; Memory(Psychology); Placebos; Psychomotor tests; Reasoning; Response; Searching; Secondary; Separation; Short range(Time); Skills; Space perception; Sulfates; Test and evaluation; Tracking; Velocity; Vertical orientation; Vision; Visual perception

ID- *Antidotes; *Atropine sulfate; *Performance(Human); *Chemical warfare agents; NTISDODXA

SH- 74D (Military Sciences--Chemical, Biological, and Radiological Warfare) ; 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry); 57W (Medicine and Biology--Stress Physiology)

AZ- 1614427

AA- <NTIS> PB91-910407

TI- Aircraft Accident/Incident Summary Report - Midair Collision Involving Lycoming Air Services Piper Aerostar PA-60 and Sun Company Aviation Department Bell 412, Merion, Pennsylvania, April 4, 1991

CS- National Transportation Safety Board, Washington, DC.

CS- <CODE> 022327000

RN- NTSB/AAR-91/01-SUMM

PY- 17 Sep 91

PG- 29p

NT- See also PB91-910401.

NT- Paper copy available on Standing Order, deposit account required (minimum deposit $100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

LA- English

PC- PC A03/MF A01

JA- GRAI9203

CP- United States

AB- The report explains the midair collision involving a Lycoming Air Services Piper Aerostar PA-60 and a Sun Company Aviation Department Bell 412. The National Transportation Safety Board determines that the probable causes of the accident were the poor judgment by the captain of the airplane to permit the in-flight inspection after he had determined to the best of his ability that the nose landing gear was fully extended, the poor judgment of the captain of the helicopter to conduct the inspection, and the failure of the flightcrew of the helicopter to maintain safe separation. Contributing to the accident was the incomplete training and checking that the flightcrew of N3645D received from Lycoming Air Services, Inc., and the FAA principal operations inspector assigned to the operator.

DE- *Accident investigations; *Aircraft accidents; Helicopters; Piper aircraft; Human factors; Landing gear; Fatalities; Injuries; Pennsylvania

ID- Midair collision; Merion(Pennsylvania); NTISNTSB

SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1611638

AA- <NTIS> N91-31145/6

TI- Low Temperature Environment Operation of Turbo Engines: A Military Operator's Experience and Requirements

AU- Summerton, M.

CS- Army Air Corps, Stockbridge (England). School of Aeronautical Engineering.

CS- <CODE> 102085001; AY878010

SP- National Aeronautics and Space Administration, Washington, DC.

PY- c1990

PG- 3p

NT- In AGARD, Low Temperature Environment Operations of Turboengines (Design and User's Problems) 3 p.

LA- English

PC- (Order as N91-31144/9, PC A16/MF A03)

JA- GRAI9202; STAR2923

CP- United Kingdom
AB- The United Kingdom's commitment to NATO includes the regular use of Royal Marine and Army helicopters in low temperature conditions. The operation of the Westland LYNX helicopter is addressed with its Rolls Royce GEM engines during winter deployments in Norway where the near-arctic conditions present certain operating and working difficulties. These difficulties are considered both generally, from a human and physical point of view, and then more specifically with regard to the engines themselves. Finally, a few areas for improvements are discussed, with the emphasis on reliability, ease of maintenance, and effective development and testing before entry into service.
DE- *Helicopter engines; *Helicopter performance; *Low temperature environments; *Military helicopters; *Military operations; *Operator performance; United kingdom; Aircraft maintenance; Aircraft reliability ; Engine tests; Human factors engineering; North atlantic treaty organization (Nato); Norway; Winter
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines); 74G (Military Sciences--Military Operations, Strategy, and Tactics); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 85D (Transportation--Transportation Safety)

AZ- 1610849
AA- <NTIS> AD-A241 256/7
TI- NASA Aerodynamics Program Annual Report 1990
TI- <NOTE> Annual rept
AU- Williams, L. J. ; Hessenius, K. A. ; Dudley, M. ; Richardson, P. F. ; Unger, G.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; 240400
RN- NASA-TM-4312
PY- Aug 91
PG- 227p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A03
JA- GRAI9202
CP- United States
AB- This report is the annual accomplishments review for the Aerodynamics Division during FY 1990. The program includes both fundamental and applied research directed at the full spectrum of aerospace vehicles, from rotorcraft to planetary entry probes. This report contains a comprehensive review of the following aerodynamics elements: computational methods and applications, CFD validation, transition and turbulence physics, numerical aerodynamic simulation, test techniques and instrumentation, configuration aerodynamics, aeroacoustics, aerothermodynamics, hypersonics, subsonics, fighter/attack aircraft and rotorcraft.
DE- *Aerodynamics; Acoustics; Aerospace craft; Aerothermodynamics; Attack aircraft; Fighter aircraft; Hypersonic characteristics; Mathematical models; Numerical analysis; Numerical methods and procedures; Physics; Planetary atmospheres; Rotary wing aircraft; Space probes; Spectra; Test methods; Turbulence; Validation
ID- *Computational fluid dynamics; Subsonic characteristics; Supersonic characteristics; Navier Stokes equations; Flow fields; Cross flow; NAS(Numerical Aerodynamics Simulation); Reentry vehicles; National aerospaceplanes; Aerospaceplanes; Jet fighters; Aeroacoustics; Aerobraking; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 46B (Physics--Fluid Mechanics)

AZ- 1610728
AA- <NTIS> AD-A241 134/6
TI- Human Factors Research in Aircrew Performance and Training: 1990 Annual Summary Report
TI- <NOTE> Interim rept. Oct 89-Oct 90
AU- McAnulty, D. M.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI-690-339-90; ARI-TR-930
CN- MDA903-87-C-0523; 2Q162785A790; 2Q263007A792
PY- Jun 91
PG- 118p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A02
JA- GRAI9202

CP- United States
AB- This report presents summary descriptions of the research projects performed by the contractor. Anacapa personnel worked on 21 research projects and one technical advisory service in emerging aviation systems design, manpower and personnel programs, aviator training, and aviation safety research. The report also describes two research projects that were conducted under subcontract to Anacapa Sciences. The summary description for each project and the technical advisory service contains (a) a background section that describes the rationale for the project and specifies the research objectives; (b) a research approach section that describes the tasks and activities required to meet the project objectives; (c) a work completed section that may include research findings or, in the case of developmental activities, a description of the research products; and (d) a project status section that describes the projections for future research, if any.
DE- *Flight crews; *Human factors engineering; *Performance(Human); Advisory activities; Aeronautics; Aviation safety; Background; Manpower ; Personnel; Pilots; Training
ID- *Flight training; Aviator training; Army aviation; Helicopters; Computerized simulation; Aerial gunnery; Workload prediction; Pilot requirements; Applied psychology; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74GE (Military Sciences--General)

AZ- 1610653
AA- <NTIS> AD-A241 057/9
TI- Night Vision and Night Vision Goggles
TI- <NOTE> Research rept
AU- Oldham, T. W.
CS- Air War Coll., Maxwell AFB, AL.
CS- <CODE> 001030000; 014550
PY- Jun 90
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9202
CP- United States
AB- Night Vision Goggles (NVG) do not turn night into day. In fact, they have limited performance capability. This article addresses the rationale for low light operations, how NVGs work, and various NVG limitations. Knowledge of the NVG performance envelope, inherent NVG limitations, effects of human vision deficiencies, and factors of self-imposed stress, constitute the formula for determining safe maneuver limits. The article concludes with recommendations to improve NVG use and affirms that NVG are safe for helicopter operations.
DE- *Goggles; *Night vision devices; Deficiencies; Envelope(Space); Helicopters; Humans; Limitations; Low light levels; Vision
ID- *Flight crews; Aviation safety; Stress(Physiology); Night vision goggles; Night flight; H-3 Aircraft; AN/PVS-5; Flight maneuvers; Flight tactics; NTISDODXA
SH- 51GE (Aeronautics and Aerodynamics--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1609840
AA- <NTIS> N91-30906/2
TI- Evaluating the Effectiveness of Active Noise Reduction in Flight Helmets
AU- Forshaw, S. E. ; Rylands, J. M. ; Crabtree, R. B.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; DG855253
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DCIEM-88-RR-34; CTN-91-60217
PY- Aug 88
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03
JA- GRAI9201; STAR2922
CP- Canada
AB- The advent of high powered fixed- and rotary-wing aircraft and tracked armoured fighting vehicles has increased the level of noise to which crews are exposed. Active noise reduction (ANR) offers a means of increasing the attenuation at low and mid frequencies. It relies on sensing the sound inside a circumaural device and cancelling it by means of negative feedback through a miniature speaker inside the enclosed volume. This study was carried out to investigate laboratory procedures appropriate for measuring the effectiveness of ANR devices.

The procedures were: ear-canal measurements using an acoustic test fixture (an objective procedure), and masked threshold and loudness balance tests (psycho-physical procedures). In addition, the effect of ANR on signal detection and speech reception was investigated. The results do not clearly permit one procedure to be recommended for the evaluation of ANR systems. Signal detection performance and speech intelligibility may be used, but the results are specific to the acoustic environment of the listener and the detection task or speech-system parameters of the evaluation. When the attenuation of the ANR system is measured objectively with a transducer inside the earmuff/ear-canal volume, the location of the transducer affects the observed ANR attenuations.
DE- *Acoustic measurement; *Effective perceived noise levels; *Negative feedback; *Noise reduction; *Psychoacoustics; Aircraft noise; Auditory perception; Human factors engineering; Noise intensity; Physiological responses
ID- *Foreign technology; NTISNASAE
SH- 51GE (Aeronautics and Aerodynamics--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1609737
AA- <NTIS> N91-30706/6
TI- Canadian Forces Flight Trial of Individually Molded Fiberglass Lumbar Supports
AU- Popplow, J. R. ; Bossi, L. L. M.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; DG855253
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DCIEM-88-RR-12; CTN-91-60212
PY- Mar 88
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03
JA- GRAI9201; STAR2922
CP- Canada
AB- Individually molded fibreglass lumbar supports may be useful in alleviating backache in aircrew members. This paper concludes a flying trial of 13 fixed wing (FW) and 25 rotary wing (RW) aircrew. Each aircrew member had been referred with a complaint of recurrent backache in their particular flying environment. Thirty-eight aircrew members were individually fitted, flew from five to 300 hours wearing the lumbar support, then completed a pre- and post-support subjective evaluation. Prior to use of the lumbar support, most subjects experienced frequent or occasional backache of varied duration. Trial participants indicated that the lumbar supports were easy to handle and position in the aircraft with only occasional shifting during flight. Most aircrew were not distracted, and all reported that flying performance was not affected while lumbar supports were worn. The two year study of lumbar support use had the following results: 60 percent of FW subjects and 32 percent of RW subjects reported fatigue relief; 75 percent of FW subjects and 36 percent of RW subjects reported considerably less backache; and 85 percent of the FW subjects and 45 percent of the RW subjects reported increased sitting comfort. It is speculated that the FW aircrew benefitted more because they were able to sit upright more consistently than RW aircrew and this upright posture allowed the lumbar support to provide its benefits.
DE- *Back injuries; *Comfort; *Flight crews; *Flight tests; *Lumbar region; *Seats; *Sitting position; *Supports; Aerospace medicine; Aircraft configurations; Aircraft pilots; Human factors engineering; Man machine systems; Physiological responses; Pilot performance
ID- *Foreign technology; NTISNASAE
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1607824
AA- <NTIS> TIB/B91-01345
TI- Helmet mounted sight and display testing
AU- Boehm, H.D. ; Schreyer, H. ; Schranner, R.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Information und Dokumentation.
CS- <CODE> 064776008
RN- MBB-UD--0594-91-PUB
PY- 26 Feb 91
PG- 29p
NT- SPIE conference 1456 - HMD III, San Jose, CA (USA), 26-28 Feb 1991.
NT- Microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF E07

JA- GRAI9124
CP- Germany, Federal Republic of
AB- MBB has more than 10 years experience with HMS/D systems on helicopters. The results of conducted tests of Helmet Mounted Sights (HMS) and Helmet Mounted Displays (HMD) will be presented. To compare the accuracy of the different HMS-Systems (on magnetic, acoustic or optical basis) it is intended to find and unify a test procedure for verification. The test conditions vary, dependent on the principle of the HMS system. Magnetic systems should be tested with the influence of magnetic disturbances, Ultrasonic systems under occurrence of noise and changing characteristics of the dispersion medium air, Optical systems under high luminance to check saturation effects of the sensors. Modern Integrated Helmets (IH) consist of CRTs for displaying binocular images of TV- or Infrared-cameras and superimposed symbology and a second channel with Image Intensifier Tubes (IIT). Important points for checking CRTs are the resolution, distortion, homogeneity and brightness in day and night time. The most important test for the IIT-channel is the resolution measured as a function of luminance of the test pattern. Tests of the basic helmet regarding head fit, earphone, centre of gravity, weight etc. are also necessary because these properties have an influence on the performance of the complete man-machine system. (orig.). (Available from TIB Hannover: RN 3775(0594-91).) (Copyright (c) 1991 by FIZ. Citation no. 91:001345.)
DE- *Helmet mounted displays; *Helicopters; *Proving; *Tests; Magnetic disturbances; Ultrasonics; Cathode ray tubes; Image intensifiers; Image resolution
ID- *Foreign technology; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1601099
AA- <NTIS> N91-26490/3
TI- Applied High-Speed Imaging for the Icing Research Program at NASA Lewis Research Center
AU- Slater, H. ; Owens, J. ; Shin, J.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; ND315753
RN- NAS 1.15:104415; E-6246; NASA-TM-104415
CN- NAS3-24816
PY- 1991
PG- 18p
NT- Presented at the 1991 International Symposium on Optical Applied Science and Engineering, San Diego, Ca, 21-26 Jul. 1991; Sponsored by the Society of Photo-Optical Instrumentation Engineers.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9122; STAR2918
CP- United States
AB- The Icing Research Tunnel at NASA Lewis Research Center provides scientists a scaled, controlled environment to simulate natural icing events. The closed-loop, low speed, refrigerated wind tunnel offers the experimental capability to test for icing certification requirements, analytical model validation and calibration techniques, cloud physics instrumentation refinement, advanced ice protection systems, and rotorcraft icing methodology development. The test procedures for these objectives all require a high degree of visual documentation, both in real-time data acquisition and post-test image processing. Information is provided to scientific, technical, and industrial imaging specialists as well as to research personnel about the high-speed and conventional imaging systems will be on the recent ice protection technology program. Various imaging examples for some of the tests are presented. Additional imaging examples are available from the NASA Lewis Research Center's Photographic and Printing Branch.
DE- *Calibrating; *Feedback control; *High speed; *Ice formation; *Image processing; *Imaging techniques; *Low speed wind tunnels; *Mathematical models; Cloud physics; Deicing; Ice prevention; Photographs; Real time operation; Rotary wing aircraft
ID- NTISNASA
SH- 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1597788
AA- <NTIS> N91-25449/0
TI- Goodard Space Flight Center/Wallops Flight Facility Airborne Geoscience Support Capability
AU- Navarro, R. L.
CS- National Aeronautics and Space Administration, Wallops Island, VA. Wallops Flight Center.
CS- <CODE> 018684002; NE200400
PY- 1991

PG- 3p
NT- In NASA, Washington, 4TH Airborne Geoscience Workshop p 81-83.
LA- English
PC- (Order as N91-25445/8, PC A13/MF A02)
JA- GRAI9121; STAR2917
CP- United States
AB- Goddard Space Flight Center's Wallops Facility (GSFC/WFF), operates six aircraft which are used as airborne geoscience platforms. The aircraft complement consists of two UH-1B helicopters, one twin engine Skyvan, one twin jet T-39, and two four engine turboprop aircraft (P-3 and Electra) offering the research community a wide range of payload, altitude, speed, and range capabilities. WFF's support to a principal investigator include mission planning of all supporting elements, installation of equipment on the aircraft, fabrication of brackets, and adapters as required to adapt payloads to the aircraft, and planning of mission profiles to meet science objectives. The flight regime includes local, regional, and global missions. The WFF aircraft serve scientists at GSFC, other NASA centers, other government agencies, and universities. The WFF mode of operation features the walk on method of conducting research projects. The principal investigator requests aircraft support by letter to WFF and after approval is granted, works with the assigned mission manager to plan all phases of project support. The instrumentation is installed in WFF electronics racks, mounted on the aircraft, the missions are flown, and the equipment is removed when the scientific objectives are met. The principal investigator reimburses WFF for each flight hours, any overtime and travel expenses generated by the project, and for other mission-related expenses such as aircraft support services required at deployment bases.
DE- *Flying platforms; *Geophysics; Geology; Mission planning; Payloads; Support systems; Wallops island; Deployment; Helicopters; Sc-7 aircraft ; Turboprop aircraft
ID- NTISNASA
SH- 51GE (Aeronautics and Aerodynamics--General)

AZ- 1596680
AA- <NTIS> AD-A237 641/6
TI- Human Factors of Night Vision Devices: Anecdotes from the Field Concerning Visual Illusions land other Effects
TI- <NOTE> Final rept
AU- Crowley, J. S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-15
PY- May 91
PG- 49p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9121
CP- United States
AB- To investigate the breadth of visual illusions experienced by aviators flying with night vision devices (NVDs), an open-ended questionnaire was distributed to the military helicopter community in the fall of 1989. Of the 242 returned questionnaires, there were 221 night vision goggle (NVG) reports and 21 thermal imaging system (FLIR) reports. Most sensory events occurred at night, during low illumination, good weather, and over varied terrain. Contributing factors included inexperience, division of attention, and fatigue. Frequently reported illusions were misjudgements of drift, clearance, height above the terrain, and attitude. Also reported were illusions due to external lights, and distributed depth perception caused by differences in brightness between NVG tubes. Other respondents cited hardware problems and physiological effects. There were no obvious differences between the experiences of NVG users and FLIR users. Although incidence rates cannot be inferred from these data, the variety of expected aviator anecdotes in this report will be useful to all those concerned with human factors and safety of NVDs.
DE- *Human factors engineering; *Night vision devices; *Physiological effects; Communities; Distribution; Flight; Forward looking infrared systems; Helicopters; Illusions; Land areas; Low light levels; Military aircraft; Military organizations; Night; Pilots; Rates; Senses(Physiology); Space perception; Terrain; Vision; Weather
ID- *Aviation safety; Night vision; Optical illusions; NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1595930
AA- <NTIS> PB91-217596
TI- Flight Testing in the Netherlands: An Overview
AU- van Doorn, J. T. M. ; van der Velde, R. L.

CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000
RN- NLR-MP-88053-U
PY- 1 Sep 88
PG- 30p
NT- Presented at the Symposium of the Flight Mechanics Panel of AGARD (73rd), 'Flight Test Techniques', Edwards Air Force Base (United States), October 17-20, 1988.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9120
CP- Netherlands
AB- The report gives an overview of the flight test activities and capabilities in The Netherlands. A general description of the flight test programs of the last decades with civil and military aircraft, helicopters and research aircraft will be given. Some of the highlights of the more recent programs will be presented, i.e. the type certification of the Fokker 50 and Fokker 100 civil transport aircraft, evaluation and certification trials with the military F16 fighter aircraft, helicopter-ship compatibility testing and the determination of the mathematical model of the Cessna Citation 500 for a Phase II flight simulator. Furthermore, a short description will be given of the flight test instrumentation and flight test techniques that have become available in The Netherlands during the last decade.
DE- *Flight tests; *Netherlands; *Certification; *Flight simulators; Flight simulation; Military aircraft; Helicopters; Transport aircraft; Data acquisition; Test facilities
ID- *Foreign technology; Fokker aircraft; F-16 aircraft; NTISTFNPO
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1595351
AA- <NTIS> N91-24843/5
TI- AGARD Flight Test Techniques Series. Volume 9: Aircraft Exterior Noise Measurement and Analysis Techniques
AU- Heller, H.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; AD455458
SP- National Aeronautics and Space Administration, Washington, DC.
RN- AGARD-AG-300-V-9; ISBN-92-835-0612-X
PY- cApr 91
PG- 201p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A02
JA- GRAI9120; STAR2916
CP- Other
AB- Testing and analysis techniques to measure aircraft noise primarily for purposes of noise certification as specified by the 'International Civil Aviation Organization', ICAO are described. The relevant aircraft noise certification standards and recommended practices are presented in detail for subsonic jet aircraft, for heavy and light propeller-driven aircraft, and for helicopters. The practical execution of conducting noise certification tests is treated in depth. The characteristics and requirements of the acoustic and non-acoustic instrumentation for data acquisition and data processing are discussed, as are the procedures to determine the special noise measures - effective perceived noise level (EPNL) and maximum overall A-weighted noise level (L sub pA,max) - that are required for the noise certification of different types of aircraft. The AGARDograph also contains an extensive, although selective, discussion of test and analysis techniques for more detailed aircraft noise studies by means of either flight experiments or full-scale and model-scale wind tunnel experiments. Appendices provide supplementary information.
DE- *Aircraft noise; *Certification; *Civil aviation; *Data acquisition; *Data processing; *Effective perceived noise levels; *Flight tests; *Noise intensity; *Noise measurement; *Procedures; Helicopters; Jet aircraft; Light aircraft; Subsonic flow; Wind tunnels
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46A (Physics--Acoustics)

AZ- 1594670
AA- <NTIS> MIC-91-03666
TI- Regulatory and economic impact for mandatory requirements for shoulder harnesses in small commercial aeroplanes and commercial helicopters
AU- Monroe, R. L. ; McLeish, W. M. ; Biggs, D.
CS- Transportation Development Center, Montreal (Quebec).

CS- <CODE> 090678000;
SP- Sypher:Mueller International (Canada).
PY- c1990
PG- 123p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E12/MF E01
JA- GRAI9120
CP- Canada
AB- Assessment of the regulatory and economic impact of mandatory requirements for shoulder harnesses in flight crew seats of all small commercial aircraft regardless of their date of manufacture, and investigates the general availability of low-cost harness kits. A review of US and Australian regulations for small aircraft was undertaken and accident data was assessed to provide the basis for the estimation of injury and fatality rates with and without shoulder harnesses. The accident assessment compared rate of injury with and without shoulder harnesses. A sample of accidents where no shoulder harness was worn was selected and survivability was investigated if it had been worn, based on injury type, deceleration G forces, impact angle and intrusion of airframe into the pilot seat area. An extensive survey of aircraft manufacturers, distributors, suppliers, operators, and overhaul shops was undertaken to gain cost data to retrofit aircraft and a cost/benefit analysis was used to determine if retrofitting in commercial helicopters and small commercial planes can be justified.
DE- *Airplanes; Airworthiness; Helicopters
ID- *Foreign technology; *Assessment; *Aviation safety; *Safety devices; NTISTFCAN
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 1591382
AA- <NTIS> PB91-186213
TI- Helicopter Safety Study. Main Report
AU- Ingstad, O. ; Rosness, R. ; Sten, T. ; Ulleberg, T. ; Rausand, M.
CS- Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Safety and Reliability.
CS- <CODE> 084057002
SP- Norske Stats Oljeselskap A/S, Stavanger (Norway).
RN- STF75-A90008; ISBN-82-595-6199-9
PY- 1 Nov 90
PG- 134p
NT- Sponsored by Norske Stats Oljeselskap A/S, Stavanger (Norway).
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E09/MF E09
JA- GRAI9119
CP- Norway
AB- The report summarizes main results from the Helicopter Safety Study: Significant risk factors associated with helicopter transportation in the North Sea area are identified and described. A procedure for identification and evaluation of risk factors has been developed. The risk factors where risk reducing means have potential to give the highest improvements of the overall helicopter safty are identified and ranked.
DE- *Helicoptors; *Aviation safety; North Sea; Air transportation; Accident rates; Fatalities; Human factors; Reliability; Maintenance; Risk assessment
ID- *Foreign technology; NTISTFSIN
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 1589566
AA- <NTIS> AD-A235 647/5
TI- Test and Evaluation Report of the Laerdal Suction Unit
TI- <NOTE> Final rept
AU- Haun, J. D. ; Licinia, J. R. ; Olding, B. ; Thomas, R. ; Woodrum, L. C.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-2
CN- 3M463807D836; LC
PY- Dec 90
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A04/MF A01
JA- GRAI9119
CP- United States
AB- The Army program for Test and Evaluation of Aeromedical Equipment uses existing military standards and collective professional expertise to test and evaluate selected medical equipment proposed for use aboard Army aircraft. Meeting these standards ensures the safety and the aircraft, crew, and patients due to: (1) interference by the medical equipment with aircraft systems/subsystems operation, (2) by the aircraft system's interference with the operation of the medical equipment, (3) the medical equipment's susceptibility to environmental exposure, or (4) physical and/or functional incompatibility while in use on board selected rotary-wing aircraft. This program tests both developmental and nondevelopmental (off the shelf) medical equipment destined for use aboard Army aeromedical aircraft.
DE- Aeromedical evacuation; Aircraft; Army; Army aircraft; Compatibility; Environments; Exposure(General); Interference; Medical equipment; Military requirements; Off the shelf equipment; Operation; Rotary wing aircraft; Standards; Suction; Test and evaluation
ID- *Aeromedical equipment; Electromagnetic compatibility; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57GE (Medicine and Biology--General)

AZ- 1588627
AA- <NTIS> N91-23065/6
TI- Diverse Applications of Advanced Man-Telerobot Interfaces
AU- Mcaffee, D. A.
CS- Jet Propulsion Lab., Pasadena, CA.
CS- <CODE> 014828000; JJ574450
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Mar 91
PG- 12p
NT- In National Aeronautics and Space Administration, Technology 2000, Volume 1 p 350-360.
LA- English
PC- (Order as N91-23021/9, PC A18/MF A03)
JA- GRAI9118; STAR2914
CP- United States
AB- Advancements in man-machine interfaces and control technologies used in space telerobotics and teleoperators have potential application wherever human operators need to manipulate multi-dimensional spatial relationships. Bilateral six degree-of-freedom position and force cues exchanged between the user and a complex system can broaden and improve the effectiveness of several diverse man-machine interfaces.
DE- *Complex systems; *Controllers; *Man machine systems; *Teleoperators; *Telerobotics; Computer graphics; Cues; Degrees of freedom; Display devices; Helicopters; Spatial distribution
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1588375
AA- <NTIS> N91-22713/2
TI- Military Air Crew Helmet Design Study
TI- <NOTE> B.S. Thesis
AU- Foley, A. P. ; Mcilfatrick, G. R.
CS- Bristol Univ. (England). Dept. of Aerospace Engineering.
CS- <CODE> 004430003; BX274147
SP- National Aeronautics and Space Administration, Washington, DC.
RN- BU-502; ETN-91-99195
PY- Jun 90
PG- 48p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A03/MF A01
JA- GRAI9118; STAR2914
CP- United Kingdom
AB- Many current aircrew flying helmets are considered unsatisfactory by their users. By circulating a questionnaire among aircrew, a new specification was produced with the emphasis placed on their opinions and wishes. Apart from comfort criteria, fast jet and helicopter aircrew require differing helmet designs. For helicopter aircrew, protection and noise reduction are of greatest importance. Fast jet aircrew require above all a helmet which will not adversely affect their lookout capability either due to bulk, balance, weight, or field of view obstruction. In their opinion, protection is not of paramount importance. Helmet mounted systems are accepted as an operational requirement but present methods are considered unsatisfactory and system integration is a necessity.
DE- *Flight crews; *Helmets; Noise reduction; Protection; Structural design

; Vision; Comfort; Flight clothing; Helicopters; Jet aircraft
ID- *Foreign technology; *Human factors engineering; Theses; NTISNASAE
SH- 51GE (Aeronautics and Aerodynamics--General); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1585931
AA- <NTIS> AD-A234 593/2
TI- Test and Evaluation Report of the Physio Control Defibrillator/Monitor Model LIFEPAK (Trade Name) 10
TI- <NOTE> Final rept
AU- Haun, J. D. ; Licina, J. R. ; Olding, B. ; Quattlebaum, M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-14
CN- 3M463807D836; LC
PY- Mar 91
PG- 75p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9118
CP- United States
AB- The Physio Control Defibrillator/Monitor Model LIFEPAK 10 was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The LIFEPAK 10 passed the overall evaluation and is validated as compatible with U.S. Army aeromedical aircraft.
DE- Aeromedical evacuation; Army aircraft; Electromagnetic interference; Human factors engineering; Industries; Military requirements; Standards

ID- *Army medicine; *Physio Control Defibrillators; LIFEPAK 10; Aeromedical equipment; UH-60 Aircraft; Test and Evaluation; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1585930
AA- <NTIS> AD-A234 592/4
TI- Visual and Field-of-View Evaluation of the M-43 Protective Mask with Prescription Eyepieces
TI- <NOTE> Final rept
AU- Crosley, J. K. ; Rash, C. E. ; Levine, R. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-13
CN- 3M463807D993; BR
PY- Mar 91
PG- 37p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9118
CP- United States
AB- The U.S. Army Aeromedical Research Laboratory was requested by the proponent of the 43 aviator protective mask to conduct a laboratory study of the visual performance of flight AH-64 Apache helicopter pilots wearing masks with 'glue-on' prescription lenses. In response, several visual functions tests were conducted including: high and low contrast visual acuity, heterophoria, fixation disparity, and stereopsis at both near and far. In addition, visual field losses of the Integrated Helmet and Display Sighting system were examined. Performance in the corrective mask was compared to that with habitual correction, either spectacles or contact lenses. The results of the visual functions tests indicated acceptable performance on all the measures except fixation disparity. The high degree of variability found on this test suggested problems associated with the prescription lens optical design, namely its high radius of curvature and its additional thickness. Field-of-view results indicated losses in visual field above those obtained with spectacle correction, but comparable to that found with the plano mask.
DE- Line of sight; Optical lenses; Test and evaluation; Vision
ID- *Protective masks; *Eyepiece; *Eyeglasses; *Contact lenses; AH-64 Apache; Visual performance; Army aviator; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57S (Medicine and Biology--Physiology)

AZ- 1584601
AA- <NTIS> N91-21149/0
TI- Fully Automatic Guidance and Control for Rotorcraft Nap-of-the-Earth Flight Following Planned Profiles. Volume 1: Real-Time Piloted Simulation
AU- Clement, W. F. ; Gorder, P. J. ; Jewell, W. F.
CS- Systems Technology, Inc., Mountain View, CA.
CS- <CODE> 100938000; S9813870
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177571-V-1; STI-TR-1254-1; NASA-CR-177571-V-1
CN- NAS2-12640
PY- Jan 91
PG- 145p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI9117; STAR2913
CP- United States
AB- Developing a single-pilot, all-weather nap-of-the-earth (NOE) capability requires fully automatic NOE (ANOE) navigation and flight control. Innovative guidance and control concepts are investigated in a four-fold research effort that: (1) organizes the on-board computer-based storage and real-time updating of NOE terrain profiles and obstacles in course-oriented coordinates indexed to the mission flight plan; (2) defines a class of automatic anticipative pursuit guidance algorithms and necessary data preview requirements to follow the vertical, lateral, and longitudinal guidance commands dictated by the updated flight profiles; (3) automates a decision-making process for unexpected obstacle avoidance; and (4) provides several rapid response maneuvers. Acquired knowledge from the sensed environment is correlated with the forehand knowledge of the recorded environment (terrain, cultural features, threats, and targets), which is then used to determine an appropriate evasive maneuver if a nonconformity of the sensed and recorded environments is observed. This four-fold research effort was evaluated in both fixed-based and moving-based real-time piloted simulations, thereby, providing a practical demonstration for evaluating pilot acceptance of the automated concepts, supervisory override, manual operation, and re-engagement of the automatic system. Volume one describes the major components of the guidance and control laws as well as the results of the piloted simulations. Volume two describes the complete mathematical model of the fully automatic guidance system for rotorcraft NOE flight following planned flight profiles.
DE- *Aircraft guidance; *Automatic flight control; *Automatic pilots; *Autonomous navigation; *Nap-of-the-earth navigation; *Obstacle avoidance; *Real time operation; *Rotary wing aircraft; Algorithms; Computerized simulation; Control theory; Flight simulation; Pilot performance
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1584590
AA- <NTIS> N91-21134/2
TI- Suppression of Biodynamic Interference in Head-Tracked Teleoperation
AU- Lifshitz, S. ; Merhav, S. J. ; Grunwald, A. J. ; Tucker, G. E. ; Tischler, M. B.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:103833; A-91058; NASA-TM-103833
PY- Jan 91
PG- 15p
NT- Presented at the 16TH European Rotorcraft Forum, Glasgow, Scotland, 18-20 Sep. 1990.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9117; STAR2913
CP- United States
AB- The utility of helmet-tracked sights to provide pointing commands for teleoperation of cameras, lasers, or antennas in aircraft is degraded by the presence of uncommanded, involuntary heat motion, referred to as biodynamic interference. This interference limits the achievable precision required in pointing tasks. The noise contributions due to biodynamic interference consists of an additive component which is correlated with aircraft vibration and an uncorrelated, nonadditive component, referred to as remnant. An experimental simulation study is described which investigated the improvements achievable in pointing and tracking precision using dynamic display shifting in the

helmet-mounted display. The experiment was conducted in a six degree of freedom motion base simulator with an emulated helmet-mounted display. Highly experienced pilot subjects performed precision head-pointing tasks while manually flying a visual flight-path tracking task. Four schemes using adaptive and low-pass filtering of the head motion were evaluated to determine their effects on task performance and pilot workload in the presence of whole-body vibration characteristic of helicopter flight. The results indicate that, for tracking tasks involving continuously moving targets, improvements of up to 70 percent can be achieved in percent on-target dwelling time and of up to 35 percent in rms tracking error, with the adaptive plus low-pass filter configuration. The results with the same filter configuration for the task of capturing randomly-positioned, stationary targets show an increase of up to 340 percent in the number of targets captured and an improvement of up to 24 percent in the average capture time. The adaptive plus low-pass filter combination was considered to exhibit the best overall display dynamics by each of the subjects.

DE- *Aircraft pilots; *Biodynamics; *Helmet mounted displays; *Motion simulators; *Optical tracking; *Tasks; *Teleoperators; Tracking (Position); Workloads (Psychophysiology); Adaptive filters; Cameras; Degrees of freedom; Flight paths; Helicopters; Lasers; Low pass filters ; Targets

ID- NTISNASA

SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1583253

AA- <NTIS> AD-A233 798/8

TI- Evaluation of Night Vision Goggles for Maritime Search and Rescue

TI- <NOTE> Interim rept. Mar 89-Sep 90

AU- Reynolds, W. H. ; Robe, R. Q. ; Hover, G. L. ; Plourde, J. V.

CS- Analysis and Technology, Inc., New London, CT.

CS- <CODE> 093810000; 413536

SP- Coast Guard, Washington, DC. Office of Research and Development.

RN- USCG-D-01-91

CN- DTCG39-89-C-E10G56

PY- Aug 90

PG- 112p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A06/MF A01

JA- GRAI9117

CP- United States

AB- Experiments were conducted to evaluate night vision goggles (NVGs) for their effectiveness in detecting small targets at night. Three types of NVGs were evaluated: the AN/AVS-6 Aviators Night Vision Imaging System (ANVIS) NVG was tested onboard Coast Guard HH-3 and CH-3 helicopters, and the AN/PVS-5C and AN/PVS-7A NVGs were tested onboard 41-foot Coast Guard utility boats. During the spring 1990 experiments, simulated persons in the water wearing orange personal floatation devices, retroreflective tape, and either a green personnel marker light or a red safety light; 4- and 6-person life rafts with and without retroreflective tape; and 18- and 21-foot white boats were employed as targets during realistically-simulated search missions. A total of 1355 target detection opportunities were generated for the above-mentioned target types during four experiments. These data were analyzed to determine which of 25 search parameters of interest exerted a statistically-significant influence on target detection probability. Lateral range curves and sweep width estimates are developed for each search unit/target type combination. Human factors data are presented and discussed. Recommendations for conducting NVG searches for small targets are provided.

DE- *Night vision devices; Goggles; Human factors engineering; Marker lights; Personnel; Probability; Rescues; Retroreflectors; Safety; Searching; Simulation; Target detection; Targets; Water

ID- *Search and rescue; AN/AVS-6; Coast Guard operations; Coast Guard aircraft; Sea rescue equipment; AN/PVS-5C; AN/PVS-7A; NTISDODXA; NTISDOTCG

SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 1581924

AA- <NTIS> N91-20385/1

TI- Evaluation of Virtual Cockpit Concepts During Simulated Missions

AU- Kaye, M. G. ; Ineson, J. ; Jarett, D. N. ; Wickham, G.

CS- Royal Aerospace Establishment, Farnborough (England).

CS- <CODE> 092599000; R1297595

SP- National Aeronautics and Space Administration, Washington, DC.

RN- RAE-TM-MM-36; BR115970

PY- c9 Apr 90

PG- 16p

NT- Presented at the Spie Helmet-Mounted Displays 2 Conference, Orlando,

FL, 12-20 Apr. 1990.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9116; STAR2912
CP- United Kingdom
AB- The Virtual Environment Integration Laboratory (VEIL) of the Royal Aerospace Establishement (RAE) is described. The VEIL program is intended to provoke appropriate technological developments by exploring the human requirements of operating within a virtual cockpit whilst conducting demanding missions. Under construction is a lightweight binocular, color helmet mounted display with a wide field of view, driven by a versatile parallel architecture computer graphic system which accommodates simulated sensor images from a camera and terrain model. Prototypes of suitable display formats will be developed using a bench mounted stereoscopic viewing rig which will also facilitate investigation of critical psychophysical issues. The complete VEIL hardware will integrate eye and head position sensors, three dimensional sound, direct voice input, and tactile sensors with the binocular display system. When allied to the ground attack, helicopter and air combat simulator facilities of Mission Management Department, it will enable the practicality of operating virtual cockpit systems in a wide variety of missions and tasks to be addressed.
DE- *Cockpit simulators; *Computer graphics; *Helmet mounted displays; *Image processing; *Military technology; *Position sensing; *Sound transmission; *Systems integration; *Voice communication; Binoculars; Cameras; Cockpits; Flight simulation; Human factors engineering; Parallel processing (Computers); Position indicators; Tactile discrimination
ID- *Foreign technology; NTISNASAE
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1580583
AA- <NTIS> AD-A233 349/0
TI- Airbag as a Supplement to Standard Restraint Systems in the AH-1 and AH-64 Attack Helicopters and Its Role in Reducing Head Strikes of the Copilot/Gunner. Volume 1
TI- <NOTE> Final rept
AU- Alem, N. M. ; Shanahan, D. F. ; Barson, J. V. ; Muzzy, W. H.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-6-VOL-1
CN- 3M162787A878; AG
PY- Jan 91
PG- 50p
NT- See also Volume 2, AD-A232 907.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9116
CP- United States
AB- Accident investigation records of U.S. Army helicopter crashes show injuries of pilots due to striking a structure inside the cockpit outnumber those due to excessive accelerations by a five-to-one ratio. This two-volume reports presents the results of a study of the effectiveness of airbags in reducing the severity of contact injury to the gunner when striking the gunsight. Airbag systems were installed on the gunsights in simulated Cobra and Apache cockpits, then sled tested at 7 and 25 g. The tests indicated airbags reduced head accelerations by 65%, head injury criteria by 77%, and head angular acceleration by 76% in the Cobra tests. In the Apache tests, the airbags reduced those same indicators by 68, 52, and 83%. An airbag system, the report concludes, Volume 1 of the report describes the tests and discusses the results. Volume 2 consists of Appendixes A, B, C of the report and contains processed signal graphs of all sled tests. Volume II is available upon request from SIC, USAARL.
DE- Acceleration; Accident investigations; Angular acceleration; Army aircraft; Cockpits; Crashes; Graphs; Gun sights; Gunners; Head(Anatomy) ; Helicopters; Pilots; Records; Restraint; Signals; Simulation; Sled tests; Test and evaluation; Wounds and injuries
ID- *Airbags; *Crash injuries; *AG-1G helicopter; *AH-64 helicopter; Head strikes; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1580173
AA- <NTIS> TIB/B91-00502
TI- Noise level reduction inside helicopter cabins
AU- Laudien, E. ; Niesl, G.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).

Information und Dokumentation.
CS- <CODE> 064776008
RN- MBB-Z--0353-90-PUB
PY- 1990
PG- 12p
NT- 16. European rotorcraft forum (ERF-16) and 8. annual symposium of the European Helicopter Association (EHS), Glasgow (UK), 18-21 Sep 1990.
NT- Microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF E07
JA- GRAI9115
CP- Germany, Federal Republic of
AB- The paper discusses a number of measures to reduce the noise level in helicopter cabins. Laboratory test results of various panellings are presented as well as the insulation capacities of different panel mounts. Experiments in acoustic facilities - anechoic chamber and reverberation room - with the original cabin door and its frame led to an optimization of the transmission losses of door components such as windows, sealing, and frame. The reduction of the cabin noise level by adding absorption is illustrated in the case of a honeycomb bulkhead with Helmholtz resonators. These sound absorption elements were designed to damp discrete gearbox frequencies. Resonators were also used for noise attenuation of an oil cooler fan. Cabin noise comfort can be improved by eliminating discrete frequencies. This was achieved in an experimental set-up where properly tuned resonators were placed as close as possible to the passengers' ear in the headrest of the seat. In order to reduce structure-borne transmission system noise, ground and flight test data of gearbox strut impedance were used for the design of specially tuned vibration absorbers. (orig.). (TIB: RO 2656.) (Copyright (c) 1991 by FIZ. Citation no. 91:000502.)
DE- *Noise reduction; *Cockpits; *Helicopters; *Test chambers; Noise intensity; Acoustic attenuation; Anechoic chambers; Reverberation chambers; Honeycomb structures; Bulkheads; Doors; Sealing; Frames; Loudness; Comfort; Human factors engineering; Aircraft compartments
ID- *Foreign technology; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1579890

AA- <NTIS> PB91-181065
TI- Status and Shortcomings of Military Noise Standards
AU- Dancer, A.
CS- Institut Franco-Allemand de Recherches, Saint-Louis (France).
CS- <CODE> 012819000
RN- ISL-CO-221/90
PY- 1991
PG- 26p
NT- Presented at the International Conference on Effects of Noise on the Auditory System (4th), Beaune, France, May 28-30, 1990.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E05/MF E05
JA- GRAI9115
CP- Other
AB- In the military environment noise is a severe hazard to hearing and can be a limiting factor in the use of some weapons. Two different types of noise can be found in these environments: Continuous or Intermittent Noises; Inside vehicles (tank, army personal carrier, helicopter...) the acoustic level can exceed 120 dB SPL. Impulse Noises; Impulse noises are produced by the weapons themselves and consist generally of an advancing shock wave. The pressure-time history can be very simple in the free field or very complex in a reverberant field. On behalf of the French Military, the French Committee for Weapon Noises (FCWN) and the 'Direction des Armements Terrestres' (DAT) established another criterion which was derived from the criterion used for industrial noises. This criterion corresponds to an A-weighted equivalent level of 90 dB over 8 hours. It allows to evaluate in a simpler way the hazard of combined exposures: continuous and impulse noises as well as the efficiency of the hearing protectors (which is frequency dependent).
DE- *Ear protectors; *Standards; *Noise reduction; *Military equipment; *Audiometry; Acoustic measurement; Sound pressure; Noise(Sound); Acoustics; Attenuation; Sound transmission; Hearing; Auditory masking
ID- *Foreign technology; *Ear plugs; NTISTFCDA
SH- 74GE (Military Sciences--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57U (Medicine and Biology--Public Health and Industrial Medicine); 57W (Medicine and Biology--Stress Physiology)

AZ- 1579508

AA- <NTIS> N91-19714/5
TI- Army-NASA Aircrew/Aircraft Integration Program (A3I) Software Detailed Design Document, Phase 3
AU- Banda, C. ; Chiu, A. ; Helms, G. ; Hsieh, T. ; Lui, A.
CS- Sterling Federal Systems, Inc., Palo Alto, CA.
CS- <CODE> 090697000; S2511762
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177557; A-90197; NASA-CR-177557
CN- NAS2-11555
PY- Jun 90
PG- 318p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A02
JA- GRAI9115; STAR2911
CP- United States
AB- The capabilities and design approach of the MIDAS (Man-machine Integration Design and Analysis System) computer-aided engineering (CAE) workstation under development by the Army-NASA Aircrew/Aircraft Integration Program is detailed. This workstation uses graphic, symbolic, and numeric prototyping tools and human performance models as part of an integrated design/analysis environment for crewstation human engineering. Developed incrementally, the requirements and design for Phase 3 (Dec. 1987 to Jun. 1989) are described. Software tools/models developed or significantly modified during this phase included: an interactive 3-D graphic cockpit design editor; multiple-perspective graphic views to observe simulation scenarios; symbolic methods to model the mission decomposition, equipment functions, pilot tasking and loading, as well as control the simulation; a 3-D dynamic anthropometric model; an intermachine communications package; and a training assessment component. These components were successfully used during Phase 3 to demonstrate the complex interactions and human engineering findings involved with a proposed cockpit communications design change in a simulated AH-64A Apache helicopter/mission that maps to empirical data from a similar study and AH-1 Cobra flight test.
DE- *Anthropometry; *Cockpits; *Computer aided design; *Computerized simulation; *Crew workstations; *Dynamic models; *Human factors engineering; *Human performance; *Man machine systems; *Systems engineering; Communication equipment; Control simulation; Decomposition ; Flight tests; Performance prediction; Product development; Prototypes ; Three dimensional models
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1577942
AA- <NTIS> AD-A232 723/7
TI- Test of the American Safety Flight Systems, Inc. Prebreather/Portable Oxygen System
TI- <NOTE> Final rept
AU- Stephens, R. L. ; Knox, F. S. ; Mitchell, R. A. ; Patel, V. M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-5
CN- 3E162787A878; AF
PY- Jan 91
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9115
CP- United States
AB- In response to a request from the Aviation Life Support Equipment Product Manager (ALSE-PM) of the Aviation Systems Command (AVSCOM), the U.S. Army Aeromedical Research Laboratory (USAARL) conducted an investigation and evaluation of the Prebreather/Portable Oxygen System (P/POS) manufactured by American Safety Flight Systems, Inc. A test of the P/POS was conducted in the hypobaric chamber at the U.S. Army School of Aviation Medicine. Four crews of four subjects each and one crew of three (the last crew had only three because one subject had a middle ear infection) prebreathed 100 percent chamber oxygen for 30 minutes. Then they switched to the P/POS while the chamber was depressurized to 18,000 feet MSL at a rate of 500 fpm. They remained at this altitude pressure until they reduced the P/POS pressure from 1800 psi to 200 psi. Following this, the chamber was repressurized to sea level at a rate of 4000 fpm. Mission durations, percent oxygen saturation and cognitive performance were measured for each subject. The average mission duration was 2 hr 28 min with a standard deviation of 13.9 min. The study indicated the P/POS will meet the needs of all helicopter missions for the Army that do not require prebreathing.

DE- Aeronautics; Altitude; Army research; Aviation medicine; Chambers; Cognition; Crews; Flight; Helicopters; Hypobaric chambers; Medical laboratories; Middle ear; Missions; Oxygen equipment; Performance(Human); Pressure; Safety; Saturation; Sea level; Standard deviation; Time
ID- *P/POS(Prebreather/Portable Oxygen System); *Aviation medicine; Helicopter oxygen systems; High altitude flight; Cognitive performance; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 57W (Medicine and Biology--Stress Physiology)

AZ- 1577603
AA- <NTIS> AD-A232 373/1
TI- Contact Lenses in the U.S. Army Attack Helicopter Environment
TI- <NOTE> Interim rept
AU- Lattimore, M. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-91-3
CN- 3M162787A879; BG
PY- Dec 90
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9115
CP- United States
AB- Recent technological advances have had a major impact on military aviation. While modern methods of providing visual information via electro-optics/visionics systems have extended the aviator's operational envelope, these devices are becoming increasingly incompatible with spectacle wear. Since approximately 20 percent of Army aviators are ametropic (spectacle wearing), alternative means of providing a refractive error correction need to be investigated. One alternative being considered is the use of a contact lens correction. For the past year, the U.S. Army Aeromedical Research Laboratory (USAARL) has been conducting a worldwide, AH-64 Apache contact lens research project in order to develop a comprehensive database on contact lens wear in a variety of environments. A three-tier contact lens fitting system is being used: two different types of soft lens and one rigid gas permeable (RGP) lens type. The wearing schedule is set at a maximum of 7 days/6 nights of extended lens wear. Fundamental operational data is being chronicled by unit flight surgeons.
DE- *Attack helicopters; *Contact lenses; Army aircraft; Army operations; Army personnel; Army research; Aviation medicine; Corrections; Environments; Eyeglasses; Fittings; Pilots; Refraction; Vision; Visionics; Wear
ID- Ametropic; Volunteers; AH-64; Aviators; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 1577561
AA- <NTIS> AD-A232 330/1
TI- Analyses of Selected LHX Mission Functions: Implications for Operator Workload and System Automation Goals
TI- <NOTE> Research note 7 Jul 83-Jun 84
AU- McCracken, J. H. ; Aldrich, T. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
RN- ASI479-024-84
CN- MDA903-81-C-0504; 2Q263739A793
PY- Jun 84
PG- 376p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A17/MF A02
JA- GRAI9115
CP- United States
AB- Twenty-nine Light Helicopter Experimental (LHX) scout and attack mission segments were analyzed for excessive workload. Each of the mission segments was broken down into critical flight control, support, and mission functions, and positioned on a mission timeline. Functional analyses were performed by identifying the critical performance elements with their man-machine interface. Sensory, cognitive, and psychomotor workload and durations were estimated for each performance element.
DE- *Workload; Attack; Automation; Flight control systems; Functional analysis; Functions; Interfaces; Man machine systems; Missions; Operators(Personnel); Psychomotor tests
ID- *Human factors engineering; *Man machine interface; *Mission analysis;

*Helicopters; Cognition; Pilot overload; Predicting; Psychomotor; Task analysis; Automated crew functions; NTISDODXA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1577359
AA- <NTIS> AD-A232 126/3
TI- Mechanical Component Diagnostic System
TI- <NOTE> Final rept. Oct 87-May 90
AU- Sewersky, R. A.
CS- United Technologies Corp., West Palm Beach, FL. Sikorsky Aircraft Div.
CS- <CODE> 049378001; 416244
SP- Army Aviation Systems Command, St. Louis, MO.
RN- SER-701-640; USAAVSCOM-TR-90-D-24
CN- DAAJ02-87-C-0015
PY- Jan 91
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9115
CP- United States
AB- The Mechanical Component Diagnostic System (MCDS) research and development (RD) program was designed to investigate and demonstrate the benefits of onboard data recording/processing and rotor tuning equipment for monitoring and diagnosis of mechanical subsystems on rotorcraft. The payoffs for such a concept include reduced aircraft vibration levels (with extended MTBF of electronics and mechanical systems as well as reduced crew fatigue), reduced maintenance flights, and early warning of component failures. This program demonstrates an approach to a practical, automated system which monitors certain mechanical subsystems, provides inflight vibration and control system status, and prescribes corrective actions to the maintainer. Various monitoring components were developed and integrated to demonstrate the concept.
DE- Aircraft; Automation; Control systems; Crews; Data processing; Diagnostic equipment; Early warning systems; Electronics; Failure; Fatigue(Physiology); Inflight; Intensity; Monitoring; Monitors; Onboard ; Recording systems; Reduction; Rotary wing aircraft; Rotors; Tuning; Vibration
ID- *Mechanical components; *Diagnostics; Flight data recorder; Vibration tuning; Usage monitoring; NTISDODXA; NTISDODA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1574245
AA- <NTIS> AD-A231 887/1
TI- Selection of an Experimental Test Battery for Aviator Cognitive, Psychomotor Abilities and Personal Traits
TI- <NOTE> Interim rept. Jan-Jul 87
AU- Intano, G. P. ; Howse, W. R. ; Lofaro, R. J.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RN-91-21
PY- Jan 91
PG- 29p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A03/MF A01
JA- GRAI9114
CP- United States
AB- In late 1986, the U.S. Army Aviation Center (USAAVNC) redesigned the Initial Entry Rotary Wing (IERW) course for aviator candidates. The new training is called IERW Multitrack (IERW-MT) and became operative in May 1988. The research problem for the U.S. Army Research Institute Aviation RD Activity (ARIARDA) was to develop tests and procedures for selecting aviator candidates for one of four helicopters prior to training day 100. ARIARDA simultaneously pursued two avenues of research. On the one hand, available test instruments were considered and evaluated for their potential to discriminate among aviators. On the other hand, groups of Subject Matter Experts (SMEs) developed criticality-rated aviator candidate abilities and traits for specific operational helicopters. Extensive literature reviews and liaison with sister services and other agencies were accomplished. Four test instruments were evaluated for use. The underlying abilities, traits, and skills these batteries purported to measure matched the abilities, traits, and skills identified as necessary by the SMEs for each of

their helicopters. Upon selection of the subjects contained in the ARIARDA experimental test battery, high-time aviators were given the experimental battery to develop scoring profiles for specific aircraft and to generate the data for the statistical analyses that resulted in the Preliminary Multi-Track Classification Algorithm.
DE- Aircraft; Army aviation; Army research; Cognition; Discriminate analysis; Experimental design; Helicopters; Instrumentation; Literature surveys; Mental ability; Pilots; Profiles; Psychomotor tests; Scoring; Statistical analysis; Test and evaluation; Test equipment; Training
ID- *Army aviation; *Cognition; Selection; Classification; Multi-track training; Theses; NTISDODXA
SH- 92B (Behavior and Society--Psychology); 57T (Medicine and Biology--Psychiatry); 92A (Behavior and Society--Job Training and Career Development); 74GE (Military Sciences--General)

AZ- 1574117
AA- <NTIS> AD-A231 759/2
TI- Formulative Evaluation Study of a Prototype Near-Infrared Projection System: Night Vision Goggle Study
TI- <NOTE> Interim rept. Aug-Dec 88
AU- Pedroni, G. M. ; Intano, G. P.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RN-91-15
CN- 2Q163007A795; 3309
PY- Jan 91
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9114
CP- United States
AB- U.S. Army Aviation relies upon image intensifiers, such as night vision goggles (NVGs), for night nap-of-the-earth (NOE) flight. During initial flight training, OH-58 student pilots are expected to apply academic knowledge of NVG use in flight after limited review. To facilitate OH-58 students' transition to NVG flight, researchers projected images through a prototype near-infrared (IR) video projection system. Helicopter pilot students received hands-on experience with the AN/PVS-5A NVGs, which are compatible with the projection system's output range. Instructor pilots rated OH-58 students' flight performance throughout the night/NVG phase of instruction. A strong positive effect on students' confidence (increase) and anxiety (decrease) levels were observed. No difference in flight performance was observed between matched pairs (experimental vs. control) of students. Additional research is planned in the areas of safety of flight, terrain navigation, special operations, mission planning, and threat recognition.
DE- Anxiety; Army aviation; Confidence level; Flight training; Goggles; Helicopters; Image intensifiers(Electronics); Images; Inflight; Instructions; Low altitude; Matching; Mission profiles; Navigation; Near infrared radiation; Night; Night vision devices; Output; Pilots; Prototypes; Students; Terrain; Test and evaluation; Threat evaluation; Video signals
ID- *Night vision devices; *Training devices; Image intensifiers(Electronics); AN/PVS-5A; Near infrared radiation; Video projectors; Night flight; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51E (Aeronautics and Aerodynamics--Avionics); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

AZ- 1573860
AA- <NTIS> AD-A231 494/6
TI- Development of an Integrated Life-Preserver/Survival Vest for Canadian Forces Aircrew
TI- <NOTE> Technical rept
AU- Graham, P. G. ; Ferguson, D. W.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
CS- <CODE> 062120000; 406986
CN- DCIEM-90-50
PY- Jan 91
PG- 51p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9114
CP- Canada

AB- Canadian Forces aircrew have been using one of three basic life preservers. Ejection seat aircrew wear the Irvin high performance life-preserver that incorporates an automatic inflation device (AID); helicopter/transport aircrew wear the same life preserver with a manual inflation device; maritime aircrew, fixed-wing and rotary-wing, wear a Bauer life-preserver that incorporates three independent buoyancy compartments. These life-preservers were designed in the early 1950's and have changed little during the years.
DE- Air transportation; Ejection seats; Flight crews; Helicopters; Military forces(Foreign); Wear
ID- *Foreign technology; *Life preservers; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1572150
AA- <NTIS> DE91617505
TI- Aufspueren von Bruchstuecken von Satelliten mit Kernreaktoren - ein Vergleich verschiedener Methoden. (Comparison of airborne detection methods of fragments of reactor supplied satellites)
AU- Mueck, K. ; Schmitzer, C. ; Lovranich, E. ; Henrich, E. ; Seiberl, W.
CS- Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
CS- <CODE> 076193000; 4862725
PY- Jun 90
PG- 100p
NT- In German.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC A05/MF A01
JA- GRAI9113
CP- Austria
AB- In several experiments utilizing airplanes and helicopters the detection limits of different measuring techniques with regard to the location of small, point-like radiation sources as may occur as consequence of a satellite crash with reactor on bord, were investigated. The minimum detectable activities of (sup 60)Co at a flight height of 100 m and a flight speed of 100 km/h amounted to appr. 2,9 GBq for dose equivalent GM-detector systems, to approx. 1 GBq for HPGe-detectors, to 0,17 GBq for 3'x3' NaI-detectors and to 0,05 GBq for extremely large NaI-detectors (33 l aerial geological probe). The deterioration of the detection limit upon changes in flight height, flight speed and the lateral deviation from direct overflight was also investigated. From measurement data and derived detection limits an optimal measurement proposal adjusted to the available instruments is presented which permits a quick and area-covering surveillance of a possibly affected area. 9 refs., 28 tabs., 7 figs. (Authors). (Atomindex citation 22:016929)
DE- *Radioactive Materials; *Measuring Methods; Aerial Monitoring; Comparative Evaluations; Reactors; Reentry; Satellites
ID- *Foreign technology; EDB/440101; EDB/220800; NTISINIS
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 77F (Nuclear Science and Technology--Radiation Shielding, Protection, and Safety); 68F (Environmental Pollution and Control--Radiation Pollution and Control)

AZ- 1571398
AA- <NTIS> AD-P006 235/6
TI- Comparison of Computerized Measurement of Helicopter Pilot Performance with Atropine Sulfate during Actual and Simulated Flight
AU- Caldwell, J. A. ; Jones, H. D.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
PY- cSep 90
PG- 10p
NT- This article is from 'Conference Proceedings of Safety Network to Detect Performance Degradation and Pilot Incapacitation' Held in Tours, France on 2 April 1990, AD-A231 148, p5-1 thru 5-10.
NT- This paper covered by copyright. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9113
CP- United States
AB- The requirement for aviators to operate under stressful circumstances raises concerns over both safety and effectiveness. Although appropriate countermeasures for stress-induced performance deteriorations are available, the implementation of these counter-measures require that commanders know the time-course and extent of the problem. For this reason, the U.S. Army Aeromedical Research Laboratory has focused research on the practical assessment of helicopter pilot degradation using flight performance assessments which combine enhanced automation and objectivity with optimized data

analysis procedures.
DE- *Atropine; *Aviation medicine; *Helicopters; *Measurement; Army research; Computer applications; Countermeasures; Data processing; Degradation; Flight; Flight simulation; Flight testing; Medical laboratories; Optimization; Performance(Engineering); Performance(Human); Pilots; Sulfates
ID- *Human factors engineering; *Pilot performance; Component Reports; Medicine; Toxicity; Stress(Physiology); Man machine systems; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1570145
AA- <NTIS> N91-16690/0
TI- Vehicular Sources in Acoustic Propagation Experiments
AU- Prado, G. ; Fitzgerald, J. ; Arruda, A. ; Parides, G.
CS- Textron Defense Systems, Wilmington, MA.
CS- <CODE> 098228000; TV740967
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Dec 90
PG- 15p
NT- In NASA, Langley Research Center, 4TH International Symposium on Long-Range Sound Propagation p 85-99.
LA- English
PC- (Order as N91-16682/7, PC A12/MF A02)
JA- GRAI9112; STAR2908
CP- United States
AB- One of the most important uses of acoustic propagation models lies in the area of detection and tracking of vehicles. Propagation models are used to compute transmission losses in performance prediction models and to analyze the results of past experiments. Vehicles can also provide the means for cost effective experiments to measure acoustic propagation conditions over significant ranges. In order to properly correlate the information provided by the experimental data and the propagation models, the following issues must be taken into consideration: the phenomenology of the vehicle noise sources must be understood and characterized; the vehicle's location or 'ground truth' must be accurately reproduced and synchronized with the acoustic data; and sufficient meteorological data must be collected to support the requirements of the propagation models. The experimental procedures and instrumentation needed to carry out propagation experiments are discussed. Illustrative results are presented for two cases. First, a helicopter was used to measure propagation losses at a range of 1 to 10 Km. Second, a heavy diesel-powered vehicle was used to measure propagation losses in the 300 to 2200 m range.
DE- *Acoustic propagation; *Acoustic properties; *Diesel engines; *Ground truth; *Helicopters; *Motor vehicles; *Position (Location); *Tracking (Position); *Transmission loss; Cost effectiveness; Mathematical models ; Performance prediction; Phenomenology; Support systems
ID- NTISNASA
SH- 63A (Detection and Countermeasures--Acoustic Detection); 46A (Physics--Acoustics)

AZ- 1568055
AA- <NTIS> AD-A230 127/3
TI- Meta-Analytic Approach for Relating Subjective Workload Assessments with U.S. Army Aircrew Training Manual (ATM) Ratings of Pilot Performance
TI- <NOTE> Final rept. Jun 86-Nov 89
AU- Stewart, J. E. ; Lofaro, R. J.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-TR-913
CN- 2Q162785A790
PY- Sep 90
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9112
CP- United States
AB- In 1985 Lofaro, using a modified Delphi technique, had subject matter experts (SMEs) generate estimated ratings of the subjective workload imposed by various Aircrew Training Manual (ATM) tasks for several Army helicopters, including the UH-60 Blackhawk. For each task, ratio-scaled estimates of difficulty and time to perform were derived. This research was performed to determine the validity of the UH-60 ATM estimates by correlating them with instructor pilot (IP) ratings of checkride performance from two other unrelated research projects. The other efforts investigated the decay of ATM task-related skills among Reserve and regular Army aviators. A second phase of this project compared the

difficulty ratings of ATM tasks associated with UH-60 accidents over FY 1980-1988 with those not associated with UH-60 accidents. A negative correlation between the modified Delphi weights assigned to ATM tasks and IP ratings on these tasks was hypothesized; the hypothesis was confirmed. Analysis of the UH-60 accident data confirmed the second hypothesis.
DE- *Army training; Army aircraft; Army personnel; Correlation; Delphi techniques; Estimates; Flight crews; Flight training; Helicopters; Hypotheses; Instruction manuals; Instructors; Manual operation; Performance(Human); Pilots; Ratings; Test and evaluation; Weight
ID- *Subjective workload assessment; *Aircrew training; ATM(Aircrew Training Manual); UH-60 Aircraft; 1P(Instructor Pilot) ratings); Nominal group methods; Aviation safety; Delphi; Helicopters; Delphi techniques; Skills; Accidents; Ratios; NTISDODXA
SH- 74GE (Military Sciences--General); 92A (Behavior and Society--Job Training and Career Development); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1567068
AA- <NTIS> N91-15730/5
TI- Cockpit Mock Up (CMU): A Design and Development Tool
AU- Weber, C.
CS- Elektronik-System G.m.b.H., Munich (Germany, F.R.).
CS- <CODE> 081743000; ER092442
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cAug 90
PG- 9p
NT- In AGARD, Computer Aided System Design and Simulation 9 p.
LA- English
PC- (Order as N91-15715/6, PC A17/MF A03)
JA- GRAI9111; STAR2907
CP- Germany, Federal Republic of
AB- Designing a modern helicopter cockpit, ergonomics, operational, and technical aspects have to be considered. To ensure a low cost development schedule the Cockpit Mock-Up (CMU) is a flexible, inexpensive design and development tool for optimization of the Man Machine Interface (MMI). The ESG CMU, realized in close cooperation with the user, is a full size model cockpit of future helicopters such as NH 90 and PAH-2. The future user is integrated in the experimental closed loop simulation with the CMU.
DE- *Cockpit simulators; *Computer aided design; *Computerized simulation; *Helicopter design; *Man-computer interface; Aircraft specifications; Display devices; Feedback control; Human factors engineering; Low cost; Optimal control; Optimization; Software tools
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1565947
AA- <NTIS> DE91006045
TI- Remote detection of organics using Fourier transform infrared spectroscopy
AU- Demirgian, J. C. ; Spurgash, S. M.
CS- Argonne National Lab., IL.
CS- <CODE> 001960000; 0448000
SP- Department of Energy, Washington, DC.
RN- CONF-9002156-2
CN- W-31109-ENG-38
PY- 1990
PG- 21p
NT- International symposium on field screening methods for hazardous wastes and toxic chemicals (2nd), Las Vegas, NV (USA), 12-14 Feb 1990. Sponsored by Department of Energy, Washington, DC.
NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9111; ERA9124
CP- United States
AB- Fourier transform infrared (FTIR) spectroscopy is an ideal technique for remote detection of organic emissions. There is an atmospheric window in the 1200 to 800 cm(sup (minus)1) region, which corresponds to the "fingerprint" region for organic molecules. Virtually all organic molecules have a unique absorption/emission pattern in the fingerprint region. A remote-passive FTIR relies on ambient emission of infrared energy from organics to obtain spectra. The instrumentation consists of inlet optics, and interferometer, a mercury cadmium telluride (MCT) detector, and an on-board computer. The transportable unit measures 40 cm by 50 cm and has been used to collect data while mounted on a helicopter or ground vehicle. Through the use of this FTIR combined with least squares software, it is possible to analyze qualitatively and quantitatively for organic vapors from either the air or ground.

The data presented will include quantitative releases of common organics present in incinerator stacks, hazardous wastes, and illegal laboratories. Data will be presented for pure compounds, mixtures, and target analytes in the presence of interfering compounds. The sensitivity, reproducibility, and the potential of the technique will be discussed. 1 ref., 8 figs., 6 tabs.
DE- *Carbon Tetrachloride; *Chloroform; *Gaseous Wastes; *Methanol; Fourier Transform Spectrometers; Infrared Spectra; Mixtures; Monitoring; Organic Compounds; Sensitivity; Vapors; Meetings
ID- *Air pollution detection; EDB/400102; EDB/540120; Land pollution; NTISDE
SH- 68A (Environmental Pollution and Control--Air Pollution and Control); 99A (Chemistry--Analytical Chemistry)

AZ- 1563634
AA- <NTIS> MIC-91-00176
TI- Investigation into the use of side-arm control for civil rotorcraft applications
TI- <NOTE> Aeronautical note no. IAR-AN-67
AU- Baillie, S. W. ; Kereliuk, S.
CS- Institute for Aerospace Research (Canada), Ottawa (Ontario).
CS- <CODE> 888888888
PY- c1990
PG- 43p
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LA- English
PC- MF E01
JA- GRAI9110
CP- Canada
AB- The advent of fly-by-wire technology and its adaptability to integrated multi-axis side-arm control will have far-reaching effects on the design and operational utility of rotorcraft. This type of control was investigated for military aircraft but not for civilian rotorcraft. This experiment was designed to address the use of multi-axis side-arm control as a viable option for civil rotorcraft; its effect on pilot workload and performance vs. use of conventional controls while performing civil operations; and if there are any special civil certification issues which must be addressed for deflection-sensing and force-sensing integrated side-arm controls. Experiments were carried out using the IAR airborne simulator, an extensively modified Bell 205A-1 with special fly-by-wire capabilities.
DE- *Helicopters
ID- *Foreign technology; *Human factors engineering; *Aircraft control; NTISTFCAN
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1561040
AA- <NTIS> N91-13875/0
TI- Modeling Pilot Interaction with Automated Digital Avionics Systems: Guidance and Control Algorithms for Contour and Nap-of-the-Earth Flight

TI- <NOTE> Final Report, period ending 30 Sep. 1990
AU- Hess, R. A.
CS- California Univ., Davis.
CS- <CODE> 004365000; CC907079
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:186105; NASA-CR-186105
CN- NAG2-221
PY- 1990
PG- 121p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9109; STAR2905
CP- United States
AB- A collection of technical papers are presented that cover modeling pilot interaction with automated digital avionics systems and guidance and control algorithms for contour and nap-of-the-earth flight. The titles of the papers presented are as follows: (1) Automation effects in a multiloop manual control system; (2) A qualitative model of human interaction with complex dynamic systems; (3) Generalized predictive control of dynamic systems; (4) An application of generalized predictive control to rotorcraft terrain-following flight; (5) Self-tuning generalized predictive control applied to terrain-following flight; and (6) Precise flight path control using a predictive algorithm.
DE- *Aircraft control; *Aircraft guidance; *Control theory; *Man-computer interface; *Pilot performance; Algorithms; Complex systems; Automatic

control; Digital systems; Flight control; Flight paths; Human factors engineering; Mathematical models; Nap-of-the-earth navigation; Rotorcraft aircraft
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 1557717
AA- <NTIS> N91-13066/6
TI- Technical Aspects of a Demonstration Tape for Three-Dimensional Sound Displays
AU- Begault, D. R. ; Wenzel, E. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:102826; A-90162; NASA-TM-102826
PY- Oct 90
PG- 22p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9108; STAR2904
CP- United States
AB- This document was developed to accompany an audio cassette that demonstrates work in three-dimensional auditory displays, developed at the Ames Research Center Aerospace Human Factors Division. It provides a text version of the audio material, and covers the theoretical and technical issues of spatial auditory displays in greater depth than on the cassette. The technical procedures used in the production of the audio demonstration are documented, including the methods for simulating rotorcraft radio communication, synthesizing auditory icons, and using the Convolvotron, a real-time spatialization device.
DE- *Cockpits; *Display devices; *Human factors engineering; *Real time operation; *Tape recorders; Sound transmission; Radio communication; Rotary wing aircraft; Simulation; Texts
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1555709
AA- <NTIS> AD-A227 583/2
TI- Prevalence of Spectacle Wear among U.S. Army Aviators
TI- <NOTE> Final rept
AU- Schrimsher, R. H. ; Lattimore, M. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-90-13
CN- 3M162787A879; BG
PY- Aug 90
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9108
CP- United States
AB- The advanced avionic and electro-optical systems installed within Army rotary wing aircraft are becoming increasingly incompatible with spectacle wear. Therefore, the prevalence of spectacle wear among Army aviators is an important factor to take into account in the development of future systems. A review of spectacle prevalence data within the Aviation Epidemiology Data Register (AEDR) for the years 1986, 1987, 1988, and 1989 was performed. Data were consistent across all four years, with mean prevalence of spectacle wear being 22.25 percent for active component forces. Over the same four-year period, Reserve and National Guard forces displayed mean spectacle-wear prevalences of 27 percent and 32 percent, respectively. These prevalence rates are higher than those previously obtained in 1985 by a similar but slightly different paradigm. The prevalence of presbyopic aviators by this query is also higher than previous appraisals. In conclusion, spectacle-wearing aviators exist in greater numbers than previously documented, and represent a segment of the aviation population that will have increasing compatibility problems with advanced flight systems. Therefore, system planners will need to address these incompatibilities in future hardware developments.
DE- *Army personnel; *Eyeglasses; *Pilots; Aeronautics; Army aircraft; Avionics; Compatibility; Electrooptics; Flight; Population; Rotary wing aircraft
ID- NTISDODXA

SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57W (Medicine and Biology--Stress Physiology)

AZ- 1552803
AA- <NTIS> AD-A226 360/6
TI- Transfer-of-Training Study of Emergency Touchdown Maneuvers in the AH-1 Flight and Weapons Simulator
TI- <NOTE> Interim rept. Feb 87-Jun 88
AU- Kaempf, G. L. ; Blackwell, N. J.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-311-88; ARI-RR-1561
CN- MDA903-87-C-0523; 2Q263007A795
PY- Jun 90
PG- 76p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9107
CP- United States
AB- For this report, researchers conducted a transfer of training study to investigate the effectiveness of the AH-1 Flight and Weapons Simulator (FWS) as a training device for the reacquisition of skills on five emergency touchdown maneuvers (ETMs). Twenty aviators assigned to operational aviation units served as subjects. All aviators received initial check rides in the aircraft and the FWS and were assigned to one of two groups on the basis of their checkride scores. The control group received training to proficiency in the aircraft on each of the five maneuvers and a second checkride in the FWS. The experimental group received training to proficiency in the FWS on each of the five maneuvers followed by similar training in the aircraft. Analysis of the initial checkride scores indicated that the aviator's skills were deficient on the ETMs prior to the study. They required extensive training to reach proficiency in the FWS but relatively little training to regain proficiency in the aircraft. Prior training in the FWS reduced the number of practice trials and the amount of flight training time required to reach proficiency in the aircraft. However, training in the existing FWS alone is insufficient for reacquisition of ETM skills to a standard of aircraft proficiency. In view of the prohibition on practice of ETMs in the aircraft, it is recommended that the Army initiate a product improvement program for the FWS. Keywords: Attack helicopters, Aircrew training, Backward transfer, Continuation training, Flight simulation, Pilot performance measurement. (sdw)
DE- *Flight simulation; *Flight training; *Performance(Human); Aeronautics; Aircraft; Attack helicopters; Control; Emergencies; Flight crews; Maneuvers; Measurement; Pilots; Proficiency; Simulators; Skills; Time; Training; Training devices; Weapons
ID- *Aviation safety; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development); 92B (Behavior and Society--Psychology); 85A (Transportation--Air Transportation); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1551548
AA- <NTIS> N91-11371/2
TI- Anthropometric Accommodation of Females in Canadian Forces Aircraft Crew Stations
AU- Rothwell, P. L. ; Pigeau, R. A.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; DG869614
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cAug 90
PG- 13p
NT- In AGARD, Recruiting, Selection, Training and Military Operations of Female Aircrew 13 p.
LA- English
PC- (Order as N91-11358/9, PC A08/MF A08)
JA- GRAI9106; STAR2902
CP- Canada
AB- To ensure physical accommodation of humans in aircraft crew stations, aircrew traditionally were selected on the basis of specific standards. To be effective, these standards must be based on anthropometric limitations imposed by actual crew stations. Evidence suggests this generally is not the case. Instead, selection standards have frequently evolved from (1) aircraft design recommendations, which often bear little relationship to the finished product, or (2) anthropometry of existing aircrew, which ignores the issue. Recognizing this problem, the Canadian Forces (CF) has undertaken a large-scale study known as ACCE (Aircrew/Cockpit Compatibility Evaluation). A computer-based modelling strategy was developed to determine anthropometric

limitations, on a crew station by crew station basis, and their subsequent effect on accommodation of pilot and navigator populations. The approach is attractive because it encompasses possible multivariate relationships between anthropometry and crew station geometries, and it is sub-population independent; it assumes a human anthropometry but is blind to gender, nationality, and race-specific differences. The flexibility of this strategy has allowed assessments of fit for both female and male populations in two CF aircraft - the CT133 utility jet and the CH136 light observation helicopter. Results show that current CF selection standards do not represent the range of anthropometry these aircraft can accommodate. This leads to biases in selection against females and small males.

DE- *Anthropometry; *Canada; *Females; *Flight crews; *Human factors engineering; *Aircraft design; Compatibility; Crew workstations; Navigators; Observation aircraft

ID- *Foreign technology; *Military personnel; NTISNASAE

SH- 74GE (Military Sciences--General); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1551366

AA- <NTIS> N91-10954/6

TI- Procedural Error Monitoring and Smart Checklists

AU- Palmer, E.

CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657

PY- Oct 90

PG- 9p

NT- In NASA, Langley Research Center, Aviation Safety/Automation Program Conference p 199-208.

LA- English

PC- (Order as N91-10936/3, PC A12/MF A12)

JA- GRAI9106; STAR2902

CP- United States

AB- Human beings make and usually detect errors routinely. The same mental processes that allow humans to cope with novel problems can also lead to error. Bill Rouse has argued that errors are not inherently bad but their consequences may be. He proposes the development of error-tolerant systems that detect errors and take steps to prevent the consequences of the error from occurring. Research should be done on self and automatic detection of random and unanticipated errors. For self detection, displays should be developed that make the consequences of errors immediately apparent. For example, electronic map displays graphically show the consequences of horizontal flight plan entry errors. Vertical profile displays should be developed to make apparent vertical flight planning errors. Other concepts such as energy circles could also help the crew detect gross flight planning errors. For automatic detection, systems should be developed that can track pilot activity, infer pilot intent and inform the crew of potential errors before their consequences are realized. Systems that perform a reasonableness check on flight plan modifications by checking route length and magnitude of course changes are simple examples. Another example would be a system that checked the aircraft's planned altitude against a data base of world terrain elevations. Information is given in viewgraph form.

DE- *Checkout; *Detection; *Display devices; *Fault tolerance; *Man machine systems; *Monitors; *Pilot performance; *Random errors; Mental performance; Data bases; Elevation; Flight plans; Horizontal flight; Human beings; Planning; Routes; Terrain; Vertical flight

ID- NTISNASA

SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1549987

AA- <NTIS> DE90016530

TI- Prediction of helicopter simulator sickness

AU- Horn, R. D. ; Birdwell, J. D. ; Allgood, G. O.

CS- Oak Ridge National Lab., TN.

CS- <CODE> 021310000; 4832000

SP- Department of Energy, Washington, DC.

RN- CONF-901209-2

CN- AC05-84OR21400

PY- 1990

PG- 21p

NT- IEEE conference on decision and control (29th), Honolulu, HI (USA), 5-7 Dec 1990. Sponsored by Department of Energy, Washington, DC.

NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9106; ERA9109
CP- United States
AB- Machine learning methods from artificial intelligence are used to identify information in sampled accelerometer signals and associative behavioral patterns which correlates pilot simulator sickness with helicopter simulator dynamics. These simulators are used to train pilots in fundamental procedures, tactics, and response to emergency conditions. Simulator sickness induced by these systems represents a risk factor to both the pilot and manufacturer. Simulator sickness symptoms are closely aligned with those of motion sickness. Previous studies have been performed by behavioral psychologists using information gathered with surveys and motor skills performance measures; however, the results are constrained by the limited information which is accessible in this manner. In this work, accelerometers were installed in the simulator cab, enabling a complete record of flight dynamics and the pilot's control response as a function of time. Given the results of performance measures administered to detect simulator sickness symptoms, the problem was then to find functions of the recorded data which could be used to help predict the simulator sickness level and susceptibility. Methods based upon inductive inference were used, which yield decision trees whose leaves indicate the degree of simulator-induced sickness. The long-term goal is to develop a "gauge" which can provide an on-line prediction of simulator sickness level, given a pilot's associative behavioral patterns (learned expectations). This will allow informed decisions to be made on when to terminate a hop and provide an effective basis for determining training and flight restrictions placed upon the pilot after simulator use. 6 refs., 6 figs.
DE- *Helicopters; *Nausea; *Simulators; Accelerometers; Artificial Intelligence; Behavior; Computer Architecture; Data Acquisition Systems ; Engineered Safety Systems; Flowsheets; Forecasting; Human Factors Engineering; Learning; Measuring Methods; Operation; Personnel; Randomness; Real Time Systems; Sampling; Sensitivity; Vulnerability
ID- EDB/550100; EDB/420200; EDB/990200; Training; NTISDE
SH- 92A (Behavior and Society--Job Training and Career Development); 57W (Medicine and Biology--Stress Physiology)

AZ- 1547835
AA- <NTIS> TIB/B90-82198
TI- 18. internationales Hubschrauberforum. (18th international helicopter forum)
CS- Hubschrauberzentrum e.V., Bueckeburg (Germany, F.R.).
CS- <CODE> 098640000
PY- 1990
PG- 341p
NT- In German. 18. international helicopter forum on the occasion of the international aerospace technologies exhibition (ILA '90), Hannover (Germany, F.R.), 16-17 May 1990.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
DT- Conference proceeding
PC- PC$46.00
JA- GRAI9104
CP- Germany, Federal Republic of
AB- The proceedings include 15 papers dealing with the state-of-the-art of the rotary wing aircraft. The volume comprises two main chapters: 1. New technologies: Opportunities and limits. 2. the man-machine interface. The cost-efficiency of helicopters in both the military and civilian sectors is a separate topic of this 1990 forum. (HM). (Copyright (c) 1990 by FIZ. Citation no. 90:082198.)
DE- *Rotary wing aircraft; *Aircraft design; *Man-machine systems; *Cost effectiveness; Conferences; Technology utilization; International cooperation; Aerospace industry; Military helicopters
ID- *Foreign technology; *Meetings; NTISTFFIZ
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1547763
AA- <NTIS> PB91-121913
TI- Effects of Anthropometric and Postural Variables on the Transmission of Whole-Body Vertical Vibration from Seat-to-Head
TI- <NOTE> Technical rept
AU- Messenger, A. J. ; Griffin, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
CS- <CODE> 013996002
RN- ISVR-TR-172
PY- Sep 89
PG- 128p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E10/MF E10
JA- GRAI9104
CP- United Kingdom
AB- The effects of posture on the transmission of vertical seat vibration through the body have been investigated in a series of experiments. The results suggest that displays viewed frequently should be placed at or below eye level and directly in front of the observer. Variations in the posture of the spine and pelvis have also been examined. The results were applied to the design of a helicopter pilot's seat. It is concluded that emphasis should be placed on the design of seating which encourages a good posture and minimizes static discomfort.
DE- *Vibration; *Posture; *Aircraft seats; Human factors engineering; Helicopters; Design
ID- *Foreign technology; *Seat-to-head vibration transmission; NTISDFMBR
SH- 57W (Medicine and Biology--Stress Physiology); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1547154
AA- <NTIS> N90-29344/0
TI- Integration of Multiple Avionic Sensors and Technologies for Future Military Helicopters
AU- Shapiro, A. J.
CS- Singer Co., Wayne, NJ. Electronic Systems Div.
CS- <CODE> 073533002; SM101050
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cJun 90
PG- 20p
NT- In AGARD, Analysis, Design and Synthesis Methods for Guidance and Control Systems 20 p. Previously Announced in Iaa as A83-40301.
LA- English
PC- (Order as N90-29338/2, PC A21/MF A03)
JA- GRAI9104; STAR2824
CP- United States
AB- The expanding role of the helicopter in the battlefield environment has burdened the pilot with missions of greater complexity and risk with a concomitant increase in pilot workload. Navigation of the helicopter is an essential supportive element to the prime mission and has been until recent years, a significant contributor to the workload. Technological advances in navigational electronics such as Doppler navigation radar, computers, integrated avionic control and display systems, etc., now can provide automated navigation with vital benefits in cost, size, weight and power, which permit incorporation of these advances into the helicopter. Cost reductions are particularly important since helicopters are used in large quantities in modern military forces. Multisensor navigation systems already available and in use in helicopters are discussed, followed by a review of the system trade-offs and considerations leading to new systems that use more advanced digital electronic techniques to achieve the goals of reduced pilot workload and improved performance with minimum size, weight, and cost. The beneficial impact of ongoing technological advances in improving the operating capabilities of future avionics systems is indicated.
DE- *All-weather air navigation; *Avionics; *Military helicopters; *Systems integration; Technological forecasting; Doppler navigation; Helicopter performance; Pilot performance; Systems engineering; Workloads (Psychophysiology)
ID- NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 1544234
AA- <NTIS> N90-28510/7
TI- Comparison of Speech Intelligibility in Cockpit Noise Using Sph-4 Flight Helmet with and Without Active Noise Reduction
AU- Chan, J. W. ; Simpson, C. A.
CS- Army Aviation Research and Technology Activity, Moffett Field, CA. Aeroflightdynamics Directorate.
CS- <CODE> 084182001; AZ153632
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177564; A-90264; NASA-CR-177564
CN- NAS2-12425; NAS2-13188
PY- Jul 90
PG- 38p
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LA- English
PC- PC A03/MF A01
JA- GRAI9103; STAR2823
CP- United States
AB- Active Noise Reduction (ANR) is a new technology which can reduce the level of aircraft cockpit noise that reaches the pilot's ear while

simultaneously improving the signal to noise ratio for voice communications and other information bearing sound signals in the cockpit. A miniature, ear-cup mounted ANR system was tested to determine whether speech intelligibility is better for helicopter pilots using ANR compared to a control condition of ANR turned off. Two signal to noise ratios (S/N), representative of actual cockpit conditions, were used for the ratio of the speech to cockpit noise sound pressure levels. Speech intelligibility was significantly better with ANR compared to no ANR for both S/N conditions. Variability of speech intelligibility among pilots was also significantly less with ANR. When the stock helmet was used with ANR turned off, the average PB Word speech intelligibility score was below the Normally Acceptable level. In comparison, it was above that level with ANR on in both S/N levels.
DE- *Aircraft noise; *Intelligibility; *Noise reduction; *Signal to noise ratios; *Voice communication; *Cockpits; Helicopters; Helmets; Sound pressure
ID- Technology; Human factors engineering; NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45F (Communication--Verbal)

AZ- 1541223
AA- <NTIS> N90-27675/9
TI- Heliport Visual Approach Surface High Temperature and High Altitude Tests
TI- <NOTE> Technical Report, Apr. 1988
AU- Samph, S. ; Weiss, R. M. ; Wolf, C. J.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; FI751336
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DOT/FAA/CT-TN89/34
PY- May 90
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9102; STAR2822
CP- United States
AB- Flight tests were conducted at an auxiliary landing field to examine the current heliport approach/departure surface criteria under hot climate and/or high altitude conditions and to verify or modify these surfaces, if appropriate. Data were collected using a Bell UH-1 helicopter for 7.125, 8.0, and 10.0 deg. straight-in approach surfaces. Also, straight-in departure surfaces of 7.125, 10.0, and 12.0 deg. were used. In addition to these procedures, the pilots were able to choose any angle of approach and departure. All maneuvers were tracked using an onboard Global Positioning System (GPS). The flight test and evaluation methodology are described. Also, technical as well as operational issues are presented. Statistical and graphical analysis of pilot performance along with a discussion of pilot subjective opinions concerning the acceptability and perceived workload, safety, and control margins associated with the procedures flown are also provided.
DE- *Approach; *Ascent; *Flight tests; *Helicopter performance; *Heliports; *Visual flight; Atmospheric temperature; Climate; Global positioning system; High altitude tests; Landing sites; Safety; Uh-1 helicopter; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 85A (Transportation--Air Transportation)

AZ- 1538708
AA- <NTIS> TIB/B90-81677
TI- Erprobung von Messsystemen zum Auffinden radioaktiver Quellen - Dokumentation der Messfluege im September 1988. (Testing measurement systems for finding radioactive sources - documentation of aircraft measuring missions flown in September 1988)
AU- Winkelmann, I. ; Endrulat, H.J. ; Gesewsky, P. ; Schuhbeck, S. ; Schweiger, M.
CS- Bundesministerium fuer Umwelt, Naturschutz und Reaktorsicherheit, Bonn (Germany, F.R.). Bundesgesundheitsamt, Neuherberg (Germany, F.R.). Inst. fuer Strahlenhygiene.
CS- <CODE> 088412000; 9202276
RN- BMU-1989-238; ABE-318
CN- BMU ST.SCH. 1032
PY- Feb 89
PG- 62p
NT- In German. Schriftenreihe Reaktorsicherheit und Strahlenschutz, Ergebnisberichte, Untersuchungen, Studien, Gutachten.
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LA- German
PC- PC E09
JA- GRAI9101
CP- Germany, Federal Republic of
AB- The execution and results of test flights with helicopters for searching for or detecting radioactive materials are described, which were carried out to prepare for the crashing of the Kosmos 1900 satellite expected in October 1988. The results when overflying a Co 60 point source (1.1 GBq) at different altitudes and side distances are shown. To detect the radiation , 4"x5" diameter NaI (Tl) detectors, large pure germanium detectors (50% relative efficiency), a liquid scintillation counter and a dose rate measuring equipment were used. Point sources of a few 100 MBq were detected in the intergral measurement of the gamma radiation with the NaI detector when flying at an altitude of 100 m and with a speed of 100 km/hour (direct overflight). This value is increased by a factor of 3 when flying over and to one side in the same conditions at a distance of 100 m. In specific nuclide measurements with the Ge-D detector, one achieves comparable results. The radioactivities which can be detected by the various systems of measurement in various flight conditions or with various flight parameters are given for some relevant nuclides. Measurements with a liquid scintillation counter and a dose rate measuring equipment (MAB 604) have not led to any satisfactory results yet. Basically, both proved suitable for looking for radioactive sources, although with the above-mentioned flight parameters only activities from some GBq upwards could be measured. (orig./HP). (Copyright (c) 1990 by FIZ. Citation no. 90:081677.)
DE- *Kosmos satellites; *Space power reactors; *Radioactive debris; *Uncontrolled reentry (Spacecraft); Radiation distribution; Radiation measuring instruments; Radiation detectors; Airborne equipment; In-flight monitoring; Pollution monitoring
ID- *Foreign technology; NTISTFFIZ
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 84GE (Space Technology--General)

AZ- 1536337
AA- <NTIS> TIB/B90-81468
TI- Requirements of an HMS/D for a night-flying helicopter
AU- Boehm, H.D.V. ; Schranner, R.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Hubschrauber und Flugzeuge.
CS- <CODE> 064776011
RN- MBB-UD-0570-90-PUB
PY- Apr 90
PG- 15p
NT- SPIE's technical symposium on optical engineering and photonics in aerospace sensing (OE/Aerospace Sensing), Orlando, FL (USA), 16-20 Apr 1990.
NT- Microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI9024
CP- Germany, Federal Republic of
AB- Helicopter pilots prefer for the night-flying tasks a combination of electro-optical sensors with different physical principles in the Infra-Red (IR) and in the near IR spectrum: Thermal Imager (TI or FLIR), Night Vision Goggles (NVG) or Low Light Level Television (LLLTV). The limits of these three sensors are in extreme darkness with less than 1 mLux illumination or in heavy rain, fog or snow with temperature differences below 0.1 K or with cross-over effects respectively. The development goal for the near future should be an integrated, lightweight helmet with a binocular display on the visor providing two or three sensor images. The paper describes operational requirements, human engineering aspects and the requirements of an integrated light-weight helmet with two NVG-tubes and two CRTs to display superimposed NVG and TI images with flight symbologies. (orig.). (Copyright (c) 1990 by FIZ. Citation no. 90:081468.)
DE- *Helicopters; *Night flight (aircraft); *Helmet mounted displays; *Pilot visionics systems; *Optoelectronic devices; Image processing; Pilots; Sensors; Goggles; Night vision goggles; Binocular vision; Cruise flight symbology; Man-machine systems
ID- *Foreign technology; NTISTFFIZ
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 1535319
AA- <NTIS> N90-24873/3
TI- Human Response Research Update
AU- Schomer, P. D.

CS- Construction Engineering Research Lab. (Army), Champaign, IL.
CS- <CODE> 054831000; AZ587151
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Apr 90
PG- 7p
NT- In NASA, Langley Research Center, FAA/NASA en Route Noise Symposium p 303-309.
LA- English
PC- (Order as N90-24853/5, PC A14/MF A02)
JA- GRAI9024; STAR2818
CP- United States
AB- The methods, sources, instrumentation, the new facility at Aberdeen Proving Grounds, (APG) performance tests, and APG sources are briefly outlined. This presentation is represented by viewgraphs only.
DE- *Human reactions; *Noise measurement; *Noise tolerance; *Performance tests; *Measuring instruments; Aircraft noise; Helicopters
ID- NTISNASA
SH- 46A (Physics--Acoustics); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 1535226
AA- <NTIS> N90-24721/4
TI- Stichting National Lucht- en Ruimtevaartgeneeskundig Centrum, Jaarverslag 1988 (Activities Report of the National Aerospace Medical Center)
TI- <NOTE> Annual Report, 1988
CS- National Aerospace Medical Centre, Soesterberg (Netherlands).
CS- <CODE> 087106000; NE795999
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ETN-90-96936
PY- 1988
PG- 39p
NT- Text in Dutch.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
PC- PC A03/MF A01
JA- GRAI9024; STAR2818
CP- Netherlands
AB- The personnel selection examinations performed in 1988 are tabulated, and the evolution of the examinations since 1952 is given. The psychological test apparatus was extended and modernized in order to meet the strongly increased demand for psychological aptitude tests. The mental stress of civilian helicopter pilots was investigated. The study of the visual behavior of presbyopic pilots and the use of optical aids was continued. Vestibular effects of gravitational loading were examined using a human centrifuge.
DE- *Aircraft pilots; *Personnel selection; *Physical examinations; *Pilot performance; *Psychological tests; Aptitude; Helicopters; Human centrifuges; Presbyopia; Stress (Psychology)
ID- *Foreign technology; Stress(Physiology); NTISNASAE
SH- 51GE (Aeronautics and Aerodynamics--General); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92B (Behavior and Society--Psychology); 57W (Medicine and Biology--Stress Physiology)

AZ- 1534989
AA- <NTIS> N90-24265/2
TI- Evaluation of Speech Recognizers for Use in Advanced Combat Helicopter Crew Station Research and Development
AU- Simpson, C. A.
CS- Psycho-Linguistic Research Associates, Woodside, CA.
CS- <CODE> 098180000; P6255241
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177547; A-90090; NASA-CR-177547
CN- NAS2-12425
PY- Mar 90
PG- 90p
NT- Prepared in Cooperation with Army Aviation Systems Command, Moffett Field, CA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9024; STAR2818
CP- United States
AB- The U.S. Army Crew Station Research and Development Facility uses vintage 1984 speech recognizers. An evaluation was performed of newer off-the-shelf speech recognition devices to determine whether newer technology performance and capabilities are substantially better than that of the Army's current speech recognizers. The Phonetic Discrimination (PD-100) Test was used to compare recognizer performance

in two ambient noise conditions: quiet office and helicopter noise. Test tokens were spoken by males and females and in isolated-word and connected-work mode. Better overall recognition accuracy was obtained from the newer recognizers. Recognizer capabilities needed to support the development of human factors design requirements for speech command systems in advanced combat helicopters are listed.
DE- *Aircraft noise; *Combat; *Crew workstations; *Helicopters; *Human factors engineering; *Speech recognition; Aerodynamic noise; Ambience; Command guidance; Speech
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1530943
AA- <NTIS> AD-P005 990/7
TI- Development, Testing and Evaluation of a Night Vision Goggle Compatible BO-105 for Night Low Level Operation
AU- Friedericy, R. H.
CS- Royal Netherlands Air Force, Volkel.
CS- <CODE> 080291000; 414448
PY- Jun 87
PG- 8p
NT- This article is from 'Rotorcraft Design of Operations Held in Amsterdam, Netherlands on 13-16 October 1986,' AD-A199 169, p21-1 thru 21-8.
NT- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France). No copies furnished by DTIC/NTIS.
LA- English
PC- Not available NTIS
JA- GRAI9023
CP- Netherlands
AB- By request of the Royal Netherlands Army Staff, a test and evaluation program was carried out by the Royal Netherlands Airforce. The overall aim of the program was to select and integrate a package of night vision and supporting equipment for the BO-105 C helicopter that will allow round the clock operations in support of the RNL Army, specifically at night at low altitudes. An ex civil BO-105 DB helicopter was used as a testbed in the program. In addition to the original dual pilot IFR equipment (VOR, VOR/ILS, Radar Altimeter and 2 axis Stability Augmentation System), a Doppler Navigation System with Mapreader, a TACAN and recording equipment were installed in the test helicopter. In a pre-evaluation program, two types of helmet mounted Night Vision Goggles (NVG's) were selected for further evaluation. After the 2 axis SAS had been replaced by a 3 axis CSAS and NVG compatible cockpit lighting had been installed in the test helicopter, night low level operational flight trials were carried out. This paper describes the selection of the NVG's the NVG compatible lighting and presents the pilot experiences and opinions concerning the low level night flight trials. The trials indicated the feasibility of the concept. A selected equipment package will be retrofitted into the BO-105 fleet, with the aid of the airframe manufacturer, MBB. A prototype has been constructed at our Depot at Gilze Rijen Airbase. Flight tests have recently been completed. NATO.
DE- *Goggles; *Helicopters; *Night vision devices; Airframes; Army; Clocks; Cockpits; Doppler navigation; Flight testing; Lighting equipment; Low altitude; Low level; Manufacturing; Nato; Netherlands; Operation; Pilots; Radio altimeters; Recording systems; Supply depots; Tacan; Test beds; Test vehicles
ID- *Foreign technology; Component Reports; NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1530936
AA- <NTIS> AD-P005 983/2
TI- Flight Evaluation of an Advanced Engine Display and Monitoring System
AU- Adams, L.
CS- Royal Aircraft Establishment, Bedford (England).
CS- <CODE> 024589000; 414447
PY- Jun 87
PG- 9p
NT- This article is from 'Rotorcraft Design of Operations Held in Amsterdam, Netherlands on 13-16 October 1986,' AD-A199 169, p11-1 thru 11-10.
NT- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France). No copies furnished by DTIC/NTIS.
LA- English
PC- Not available NTIS
JA- GRAI9023
CP- United Kingdom
AB- A Wessex helicopter at RAE Bedford has been used to develop and evaluate a suite of advanced, integrated avionics. An important area of study has been concerned with the display of engine and transmission data, and with a system monitor which gives audio and visual warning of any problems. The system has demonstrated that the suppression of

engine and transmission data at all times except when the pilot asks for it to be displayed or the system detects a problem is an acceptable technique. The use of synthetic voice output has meant that the pilot can spend a greater proportion of his time looking out of the aircraft; the additional head-out time enables mission effectiveness and flight safety to be enhanced. NATO.

DE- *Avionics; *Display systems; *Helicopter engines; *Helicopters; *Monitoring; Aircraft; Aviation safety; Flight testing; Integrated systems; Missions; Monitors; Nato; Output; Sound; Suppression; Test and evaluation; Transmittance; Vision; Voice communications; Warning systems

ID- *Foreign technology; Component Reports; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1530933

AA- <NTIS> AD-P005 980/8

TI- Handling Qualities Criterion for Very Low Visibility Rotorcraft NOE Operations Flight

AU- Hoh, R. H.

CS- Systems Technology, Inc., Hawthorne, CA.

CS- <CODE> 022912000; 340425

PY- Jun 87

PG- 15p

NT- This article is from 'Rotorcraft Design of Operations Held in Amsterdam, Netherlands on 13-16 October 1986,' AD-A199 169, p6-1 thru 6-15.

NT- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France). No copies furnished by DTIC/NTIS.

LA- English

PC- Not available NTIS

JA- GRAI9023

CP- United States

AB- The missions proposed for the next generation helicopter involve requirements to operate in essentially zero visibility in the nap-of-the-earth (NOE) environment. Such operations will require the use of pilot vision aids, which gives rise to the question of the interaction of such displays and the required aircraft handling qualities. This research was conducted to: 1) investigate the required visual cueing for low speed and hover, and 2) determine if an increase in stabilization can effectively be used to compensate for the loss of essential cues. Two flight test experiments were conducted using a conventional helicopter, and a variable stability helicopter, as well electronically fogged lenses and night vision goggles with daylight training filters. The primary conclusion regarding the essential cues for hover was that fine grained texture (microtexture) is more important than large discrete objects (macrotexture), or field-of-view. The use of attitude command augmentation was found to be effective as a way to makeup for display deficiencies. However, a corresponding loss of agility occurred with the tested attitude command/attitude hold system resulting in unfavorable pilot comments. Hence, the favorable control display tradeoff must be interpreted in the context that the best solution would be to improve the vision aid. Such an improvement would require an increase in the visible microtexture, an advancement in display technology which is unlikely to be available in the foreseeable future. NATO.

DE- *Flight testing; *Helicopters; *Night vision devices; *Visibility; Aircraft; Attitude(Inclination); Augmentation; Control; Cueing; Daylight; Deficiencies; Display systems; Filters; Fine grained materials; Flight; Goggles; Handling; Hovering; Lenses; Low velocity; Nato; Pilots; Quality; Rotary wing aircraft; Stability; Texture; Trade off analysis; Training; Variables; Vision; Visual aids

ID- *Human factors engineering; Component Reports; Nap of the Earth; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1530630

AA- <NTIS> AD-A224 915/9

TI- Visual Performance of Contact Lens-Corrected Ametropic Aviators with the M-43 Protective Mask

TI- <NOTE> Final rept

AU- Levine, R. R. ; Lattimore, M. R. ; Behar, I.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; 404578

RN- USAARL-90-12

CN- 3M162787A879; BG

PY- May 90

PG- 61p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
PC- PC A04/MF A01
JA- GRAI9023
CP- United States
AB- This study investigated the use of extended wear soft contact lenses with the Apache aviator's M-43 protective mask. Visual functions tests (high and low contrast, visual acuity, contrast sensitivity, color vision), visually-based cognitive tests, and user-comfort questionnaires were employed with normally sighted aviators and with aviators fitted with hydrogel soft contact lenses. Tests were administered shortly before donning the mask, immediately after donning the mask, and at hourly intervals, over the course of the next four hours of continuous mask were. Physiological function (tear break-up time, tear production, slit lamp examination) was assessed before donning the mask and directly after its removal. Study results indicated, for some subjects in both groups, the presence of subjective discomfort from M-43's airflow around the eyes) and mildly the presence of subjective discomfort (from the M-43's airflow around the eyes) and mildly increased conjunctival injection ('redness'). However, no significant changes in visual function, cognitive performance, or physiological function were observed in either group as a result of wearing the mask. These data confirm previous work indicating acceptable visual performance with the M-43 mask and indicate that extended wear soft contact lenses can be worn with the M-43 protective mask without degrading selected aspects of visual performance.
DE- *Visual perception; Pilots; Visual acuity; Cognition; Color vision; Performance(Human); Physiological effects; Tearing; Irritation; Attack helicopters; Army aviation; Performance tests; Acceptability; Air flow
ID- *M-43 Protective masks; *Soft contact lenses; Discomfort; NTISDODXA
SH- 57S (Medicine and Biology--Physiology); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1529337
AA- <NTIS> N90-22930/3
TI- Helmet-Mounted Pilot Night Vision Systems: Human Factors Issues
AU- Hart, S. G. ; Brickner, M. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Jul 89
PG- 21p
NT- In Its Spatial Displays and Spatial Instruments 21 p.
LA- English
DT- Journal article
PC- (Order as N90-22918/8, PC A99/MF A04)
JA- GRAI9022; STAR2816
CP- United States
AB- Helmet-mounted displays of infrared imagery (forward-looking infrared (FLIR)) allow helicopter pilots to perform low level missions at night and in low visibility. However, pilots experience high visual and cognitive workload during these missions, and their performance capabilities may be reduced. Human factors problems inherent in existing systems stem from three primary sources: the nature of thermal imagery; the characteristics of specific FLIR systems; and the difficulty of using FLIR system for flying and/or visually acquiring and tracking objects in the environment. The pilot night vision system (PNVS) in the Apache AH-64 provides a monochrome, 30 by 40 deg helmet-mounted display of infrared imagery. Thermal imagery is inferior to television imagery in both resolution and contrast ratio. Gray shades represent temperatures differences rather than brightness variability, and images undergo significant changes over time. The limited field of view, displacement of the sensor from the pilot's eye position, and monocular presentation of a bright FLIR image (while the other eye remains dark-adapted) are all potential sources of disorientation, limitations in depth and distance estimation, sensations of apparent motion, and difficulties in target and obstacle detection. Insufficient information about human perceptual and performance limitations restrains the ability of human factors specialists to provide significantly improved specifications, training programs, or alternative designs. Additional research is required to determine the most critical problem areas and to propose solutions that consider the human as well as the development of technology.
DE- *Field of view; *Flir detectors; *Helmet mounted displays; *Human factors engineering; *Night vision; *Workloads (Psychophysiology); Brightness; Depth; Disorientation; Distance; Gray scale; Helicopter performance; Human performance; Low visibility; Target acquisition; Thermal mapping; Reprints
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1526970
AA- <NTIS> AD-A223 938/2
TI- Integration of Externally Carried Weapon Systems with Military Helicopters (L'Integration des Systemes d'Armes Transportes en Charge Externe sur les Helicopteres Militaires)

CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-AR-247
PY- Apr 90
PG- 104p
NT- Preface in English and French.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9022
CP- Other
AB- This report contains detailed discussions of the aero-mechanical aspects of helicopter weapons integration. Particular emphasis is placed on flying qualities and performance with externally mounted weapons systems as well as weapons separation characteristics. Structural mechanics topics, operational issues, and special problems are also discussed. Each technical area is discussed in terms of analytic methodology, ground testing and flight testing procedures, instrumentation, and an assessment of the state-of-the-art, where possible. Appendix I is a synoptic table which relates each particular undesirable characteristic to various effects and results, and suggests solutions; it should serve as a guideline for any new helicopter weapons integration venture at the design stage. Appendix II is a listing of known helicopter weapons integration ventures at the design stage. It lists known helicopter weapons certification programs completed to date that have either produced experimental results or a fully qualified system; thus, it should indicate a source of weapons or helicopter manufacturers which the reader could query directly. Appendix III is a compendium of case histories referred to by the test. Keywords: External stores; Weapon systems; Flight characteristics; Performance engineering/releasing. (edc)
DE- *External stores; *Helicopters; *Weapon systems; Aerodynamic characteristics; Aircraft industry; Case studies; Flight; Flight testing; Ground level; Integrated systems; Mathematical analysis; Military aircraft; Mounts; Performance(Engineering); Release; External store separation; Sources; State of the art; Structural mechanics; Test and evaluation; Weapons
ID- *Foreign technology; Aircraft weapons; Flying qualities; Aeromechanics; NATO Furnished; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 79GE (Ordnance--General)

AZ- 1526032
AA- <NTIS> N90-22242/3
TI- Ames Vision Group Research Overview
TI- <NOTE> Abstract Only
AU- Watson, A. B.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Feb 90
PG- 1p
NT- In Its Vision Science and Technology at NASA: Results of a Workshop p 52.
LA- English
PC- (Order as N90-22216/7, PC A04/MF A01)
JA- GRAI9021; STAR2815
CP- United States
AB- A major goal of the reseach group is to develop mathematical and computational models of early human vision. These models are valuable in the prediction of human performance, in the design of visual coding schemes and displays, and in robotic vision. To date researchers have models of retinal sampling, spatial processing in visual cortex, contrast sensitivity, and motion processing. Based on their models of early human vision, researchers developed several schemes for efficient coding and compression of monochrome and color images. These are pyramid schemes that decompose the image into features that vary in location, size, orientation, and phase. To determine the perceptual fidelity of these codes, researchers developed novel human testing methods that have received considerable attention in the research community. Researchers constructed models of human visual motion processing based on physiological and psychophysical data, and have tested these models through simulation and human experiments. They also explored the application of these biological algorithms to applications in automated guidance of rotorcraft and autonomous landing of spacecraft. Researchers developed networks for inhomogeneous image sampling, for pyramid coding of images, for automatic geometrical correction of disordered samples, and for removal of motion artifacts from unstable cameras.
DE- *Coding; *Color vision; *Computer vision; *Image processing; *Motion perception; *Robots; Brain; Cameras; Human beings; Mathematical models; Psychology
ID- NTISNASA

SH- 95F (Biomedical Technology and Human Factors Engineering--Bionics and Artificial Intelligence); 62F (Computers, Control, and Information Theory--Pattern Recognition and Image Processing); 62GE (Computers, Control, and Information Theory--General)

AZ- 1526027
AA- <NTIS> N90-22237/3
TI- Computer Vision Techniques for Rotorcraft Low Altitude Flight
AU- Sridhar, B.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Feb 90
PG- 2p
NT- In Its Vision Science and Technology at NASA: Results of a Workshop p 45-46.
LA- English
PC- (Order as N90-22216/7, PC A04/MF A01)
JA- GRAI9021; STAR2815
CP- United States
AB- Rotorcraft operating in high-threat environments fly close to the earth's surface to utilize surrounding terrain, vegetation, or manmade objects to minimize the risk of being detected by an enemy. Increasing levels of concealment are achieved by adopting different tactics during low-altitude flight. Rotorcraft employ three tactics during low-altitude flight: low-level, contour, and nap-of-the-earth (NOE). The key feature distinguishing the NOE mode from the other two modes is that the whole rotorcraft, including the main rotor, is below tree-top whenever possible. This leads to the use of lateral maneuvers for avoiding obstacles, which in fact constitutes the means for concealment. The piloting of the rotorcraft is at best a very demanding task and the pilot will need help from onboard automation tools in order to devote more time to mission-related activities. The development of an automation tool which has the potential to detect obstacles in the rotorcraft flight path, warn the crew, and interact with the guidance system to avoid detected obstacles, presents challenging problems. Research is described which applies techniques from computer vision to automation of rotorcraft navigtion. The effort emphasizes the development of a methodology for detecting the ranges to obstacles in the region of interest based on the maximum utilization of passive sensors. The range map derived from the obstacle-detection approach can be used as obstacle data for the obstacle avoidance in an automatic guidance system and as advisory display to the pilot. The lack of suitable flight imagery data presents a problem in the verification of concepts for obstacle detection. This problem is being addressed by the development of an adequate flight database and by preprocessing of currently available flight imagery. The presentation concludes with some comments on future work and how research in this area relates to the guidance of other autonomous vehicles.
DE- *Computer vision; *Flight paths; *Imagery; *Low altitude; *Nap-of-the-earth navigation; *Rotary wing aircraft; Data bases; Risk; Tactics; Autonomy; Contours; Preprocessing; Rotors; Terrain; Vegetation

ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51E (Aeronautics and Aerodynamics--Avionics); 76D (Navigation, Guidance, and Control--Navigation Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85A (Transportation--Air Transportation)

AZ- 1524305
AA- <NTIS> AD-P005 960/0
TI- Operation and Performance of an Integrated Helicopter Communication System
AU- Fried, W. R.
CS- Hughes Aircraft Co., Fullerton, CA.
CS- <CODE> 012365000; 172350
PY- Dec 87
PG- 8p
NT- This article is from 'The Design, Development and Testing of Complex Avionics Systems: Conference Proceedings Held at the Avionics Panel Symposium in Las Vegas, Nevada on 27 April-1 May 1987', AD-A198 666, p21-1 thru 21-8.
NT- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France). No copies furnished by DTIC/NTIS. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9021
CP- United States
AB- The unique operational and performance requirements of the Communication System for modern tactical Army helicopters are described. An integrated system architecture is described which

satisfies these requirements and incorporates very high levels of automation thereby reducing pilot workload. The automation concepts include the use of a preloaded communication data base and a centralized communication processor containing advanced control, reconfiguration and message formatting software. Link analysis and simulation results are presented which show the performance capabilities of the system with respect to the projected mission requirements. NATO Furnished. (RH)
DE- *Communication equipment; *Helicopters; *Integrated systems; Architecture; Army; Army aircraft; Automation; Centralized; Communication and radio systems; Computer programs; Control; Data bases ; Military requirements; Missions; Performance(Engineering); Pilots; Requirements; Simulation; Tactical warfare; Workload
ID- *Human factors engineering; Component Reports; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 45C (Communication--Common Carrier and Satellite); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1524300
AA- <NTIS> AD-P005 955/0
TI- Development and Testing of a Predictive Methodology for Optimization of Man-Machine Interface in Future Avionics Systems
AU- Parks, R. E.
CS- Bell Helicopter Textron, Inc., Fort Worth, TX.
CS- <CODE> 070196000; 054200
PY- Dec 87
PG- 9p
NT- This article is from 'The Design, Development and Testing of Complex Avionics Systems: Conference Proceedings Held at the Avionics Panel Symposium in Las Vegas, Nevada on 27 April-1 May 1987', AD-A198 666, p14-1 thru 14-9.
NT- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France). No copies furnished by DTIC/NTIS. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9021
CP- United States
AB- While new technologies offer the avionics designer opportunities in terms of providing systems with expanded capabilities, those opportunities are accompanied by new kinds of challenges and constraints which warrant a revision of traditional design life cycle strategies. The trend of for increasing complexity and cost in emerging avionics systems, driven by requirements for increased functional capability, has created a need for a predictive analytical methodology which: (1) accurately forecasts system performance early in the design process, and (2) treats the human operator and the equipment as a fully integrated man-machine system. A methodology which meets these needs has been developed and validated at Bell Helicopter Textron. The process is being used to provide early, accurate avionics system characterization, thereby reducing design costs. NATO Furnished. (rh)
DE- *Avionics; *Integrated systems; *Man machine systems; Accuracy; Costs; Expansion; Forecasting; Interfaces; Life cycles; Methodology; Operators(Personnel); Optimization; Predictions; Requirements; Strategy ; Validation
ID- Component Reports; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1522568
AA- <NTIS> N90-21004/8
TI- Stereopsis Cueing Effects on Hover-in-Turbulence Performance in a Simulated Rotorcraft
AU- Parrish, R. V. ; Williams, S. P.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.60:2980; L-16652; NASA-TP-2980
CN- DA PROJ. 1L1-61102-AH-45
PY- May 90
PG- 62p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9020; STAR2814
CP- United States
AB- The efficacy of stereopsis cueing in pictorial displays was assessed in a real-time piloted simulation experiment of a rotorcraft precision hover-in-turbulence task. Seven pilots endeavored to maintain a hover by visually aligning a set of inner and outer wickets (major elements

of a real-world pictorial display, thus attaining the desired hover position, in a full factorial experimental design. The display conditions examined included the presence or absence of a velocity display element (a velocity head-up display) as well as the stereopsis cueing conditions, which included non-stereo (binoptic or monoscopic - no depth cues other than those provided by a perspective, real-world display), stereo 3-D, and hyper stereo (telestereoscopic). Subjective and objective results indicated that the depth cues provided by the stereo displays enhanced the situational awareness of the pilot and enabled improved hover performance to be achieved. The velocity display element also improved the hover performance, with the best hover performance being achieved with the combined use of stereo and the velocity display element. Pilot control input data revealed that less control action was required to attain the improved hover performance with the stereo displays.
DE- *Cues; *Display devices; *Flight simulation; *Hovering; *Pilot performance; *Rotary wing aircraft; *Turbulence; Experiment design; Factorial design; Graphic arts; Head-up displays; Helicopter control; Real time operation; Stereoscopy
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1520833
AA- <NTIS> AD-A223 024/1
TI- Helicopter Aircrew Helmets and Head Injury: A Protective Effect
TI- <NOTE> Final rept. Jan-May 90
AU- Crowley, J. S.
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> 065116000; 411551
RN- USASC-TR-90-1
PY- 1 Jun 90
PG- 9p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI9020
CP- United States
AB- The effectiveness of the Army's SPH-4 flight helmet in reducing the severity of head injuries sustained during helicopter accidents was evaluated, using the accident data base at the U.S. Army Safety Center (USASC), Fort Rucker, Alabama. Analysis was restricted to severe (Class A) 1972-1988 accidents that were at least partially survivable, using USASC criteria. Occupants who were not wearing a protective helmet were significantly more likely to sustain severe and fatal head injuries than occupants wearing the SPH-4 (RR=3.8 and 6.3, respectively). Unhelmeted non-cockpit occupants faced higher risks (RR=5.3 and 7.5). All personnel regularly participating in helicopter flight, civilian or military, should be equipped with protective headgear. Keywords: Head injury, Helmet, Helicopter accidents, Impact, Safety. (sdw)
DE- *Protective clothing; *Wounds and injuries; *Flight helmets; Accidents; Alabama; Army; Data bases; Flight; Flight crews; Headgear; Head(Anatomy); Helicopters; Personnel; Protection; Safety
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 57E (Medicine and Biology--Clinical Medicine)

AZ- 1516225
AA- <NTIS> N90-19739/3
TI- Jaarverslag 1987 (Activities in Aerospace Medicine)
TI- <NOTE> Annual Report, 1987
CS- National Aerospace Medical Centre, Soesterberg (Netherlands).
CS- <CODE> 087106000; NE795999
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ETN-90-95468
PY- 1987
PG- 41p
NT- Text in Dutch.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
PC- PC A03/MF A01
JA- GRAI9018; STAR2812
CP- Netherlands
AB- The medical examinations of the personnel are tabulated and discussed. Research and development activities were performed in fields of psychodiagnostic examination and selection, ophthalmology, general medical examination, flight physiology, and the mental stress of helicopter pilots.
DE- *Aerospace medicine; *Physical examinations; Medical services; Ophthalmology; Personnel selection; Physiological tests; Pilot

performance
ID- *Foreign technology; NTISNASAE
SH- 84GE (Space Technology--General); 57E (Medicine and Biology--Clinical Medicine)

AZ- 1514808
AA- <NTIS> AD-A221 805/5
TI- Task Analysis of the CH-47D Mission and Decision Rules for Developing a CH-47D Workload Prediction Model. Volume 2. Appendixes F through I
TI- <NOTE> Interim rept. Dec 87-Dec 88
AU- Bierbaum, C. R. ; Aldrich, T. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-318(2)-88; ARI-RP-90-10B
CN- MDA903-87-C-0523; 2Q263007A798
PY- Feb 90
PG- 377p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A17/MF A02
JA- GRAI9018
CP- United States
AB- A mission scenario was used to conduct a comprehensive task analysis for CH-47D operations. The analysis used a top-down approach to identify the phases, functions, and tasks for the mission. Nine phases, 37 segments, 66 functions, and 154 tasks were identified. The crewmember performing each task was identified and estimates of the sensory, cognitive, and psychomotor workload associated with the tasks were derived. Estimates of the task times also were derived. The mission/task/workload analysis data were used to develop a computer model of workload for CH-47D crewmembers. The model used a bottom-up approach to build mission functions from tasks and mission segments from functions. Decision rules were written to specify the procedure for combining the tasks into functions and the functions into segments. The model permitted an analysis of total workload experienced by each crewmember in the performance of both sequential and concurrent tasks. Keywords: Mission analysis, Task analysis, Man-machine interface, Aviation workload, Modeling.
DE- *Man machine systems; *Workload; *Helicopters; *Flight crews; Aeronautics; Computerized simulation; Decision theory; Functions; Interfaces; Mission profiles; Missions; Psychomotor tests; Scenarios
ID- WUC6; CH-47D aircraft; NTISDODXA; NTISDODA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1514662
AA- <NTIS> AD-A221 657/0
TI- Human Factors Research in Aircrew Performance and Training
TI- <NOTE> Final rept. Oct 88-Oct 89
AU- McAnulty, M.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-326-89; ARI-TR-884
CN- MDA903-87-C-0523
PY- Mar 90
PG- 146p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI9018
CP- United States
AB- This report presents summary descriptions of the research projects performed by Anacapa Sciences, Inc., for the U.S. Army Research Institute Aviation Research and Development Activity (ARIARDA) at Fort Rucker, Alabama, under Contract No. MDA903-87-C-0523, entitled 'Human Factors Research in Aircrew Performance and Training.' From 9 October 1988 to 8 October 1989, Anacapa personnel worked on 31 research projects and 4 technical advisory services in emerging aviation weapon systems design, manpower and personnel programs, aviator training, and aviation safety research. The summary description for each project and technical advisory service contains a background section that describes the rationale for the project and specifies the research objectives; a research approach section that describes the tasks and activities required to meet the project objectives; a research findings section or, in the case of developmental activities, a research products

section; and a project status section that describes projections for future research, if any. Keywords: Aviation safety, Aviator selection testing, Aviator training, Computer-based instruction, Helicopter flight simulation, Helicopter gunnery, Maintainability, Sensors and symbology, System design, Workload prediction. (eg)
DE- *Flight crews; *Human factors engineering; *Performance(Human); Advisory activities; Aeronautics; Alabama; Army research; Aviation safety; Background; Computer aided instruction; Detectors; Flight simulation; Gunnery; Helicopters; Maintainability; Manpower; Personnel; Pilots; Predictions; Selection; Symbols; Test and evaluation; Training; Weapon systems; Workload
ID- *Military training; NTISDODXA; NTISDODA
SH- 74GE (Military Sciences--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 85A (Transportation--Air Transportation)

AZ- 1511978
AA- <NTIS> AD-A221 255/3
TI- Effects of the Chemical Defense Antidote Atropine Sulfate on Helicopter Pilot Performance: A Simulator Study
TI- <NOTE> Final rept
AU- Simmons, F. R. ; Caldwell, J. A. ; Stephens, R. L. ; Stone, L. W. ; Carter, D. J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-89-17
CN- 3M263002D995; BF
PY- Jul 89
PG- 111p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9017
CP- United States
AB- Atropine is fielded as an antidote for organophosphate poisoning where chemical nerve agents are used. However, inappropriate self-injection may lead to anticholinergic side effects detrimental to aviators in flight. To determine the scope and magnitude of these possible side effects, 12 male Army helicopter pilots in good health flew several missions in a helicopter simulator after being injected (I.M.) with either a placebo or 2mg or 4mg of atropine sulfate. Physiological effects essentially followed the classical model. The 2 mg dose of atropine caused small degradations on some of laboratory-collected measures, but often did not produce effects, which differed significantly from those produced by a placebo dose. A 4mg dose of atropine, however, exerted a variety of statistically significant effects upon flight performance, contrast sensitivity, cognitive performance, tracking accuracy, and cortical evoked responses. The flight performance evaluations (both subjective and objective) showed statistically significant changes in the subject's abilities to fly the simulator. Results obtained from other tasks in the study suggest, further, the decrements in flight performance resulted from a slowing of both information processing and psychomotor performance. Atropine effects were not of sufficient magnitude to preclude further research under actual flight conditions. Keywords: Pharmacology; Biochemistry; Visual evoked potential. (kr)
DE- *Antidotes; *Atropine; *Chemical agents; *Helicopters; *Physiological effects; *Performance(Human); *Pilots; Accuracy; Biochemistry; Cholinesterase inhibitors; Cognition; Contrast; Degradation; Dosage; Flight; Inflight; Information processing; Nerve agents; Organophosphates; Pharmacology; Physiological effects; Placebos; Poisoning; Psychomotor function; Sensitivity; Simulators; Test and evaluation; Tracking
ID- *Chemical defense; NTISDODXA
SH- 57Q (Medicine and Biology--Pharmacology and Pharmacological Chemistry); 57Y (Medicine and Biology--Toxicology); 57W (Medicine and Biology--Stress Physiology); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 74D (Military Sciences--Chemical, Biological, and Radiological Warfare)

AZ- 1508483
AA- <NTIS> N90-17235/4
TI- NASA (National Aeronautics and Space Administration) Aerodynamics Program
TI- <NOTE> Annual rept., 1989
AU- Holmes, B. J. ; Schairer, E. ; Hicks, G. ; Wander, S. ; Blankson, I.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NAS 1.15:4175; NASA-TM-4175
CN- NASW-4430
PY- Feb 90

PG- 445p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A19/MF A03
JA- GRAI9015; STAR2809
CP- United States
AB- Presented here is a comprehensive review of the following aerodynamics elements: computational methods and applications, computational fluid dynamics (CFD) validation, transition and turbulence physics, numerical aerodynamic simulation, drag reduction, test techniques and instrumentation, configuration aerodynamics, aeroacoustics, aerothermodynamics, hypersonics, subsonic transport/commuter aviation, fighter/attack aircraft and rotorcraft.
DE- *Aeroacoustics; *Aerothermodynamics; *Computational fluid dynamics; *Computerized simulation; *Drag reduction; *Hypersonics; Aerodynamic configurations; Fighter aircraft; Radio frequencies; Rotary wing aircraft; Turbulence
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 46B (Physics--Fluid Mechanics)

AZ- 1507172
AA- <NTIS> PB90-867151
TI- Anthropometry. January 1970-March 1990 (A Bibliography from the Compendex Database)
TI- <NOTE> Rept. for Jan 70-Mar 90
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- May 90
PG- 101p
NT- Supersedes PB86-873361.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9014
CP- United States
AB- This bibliography contains citations concerning modelling to predict the anthropometric, biomechanical, and work physiology parameters for age, height, and weight. The human engineering of man/equipment systems is considered. Applications include automobile, truck, and bus seating, military helicopter cockpit layout, office furniture, school furniture, and office workplace layouts. (This updated bibliography contains 208 citations, 51 of which are new entries to the previous edition.)
DE- *Bibliographies; *Anthropometry; Human factor engineering; Man machine systems
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1505475
AA- <NTIS> AD-A219 676/4
TI- Dazzling Glare: Protection Criteria Versus Visual Performance
TI- <NOTE> Interim rept. Sep 85-Aug 90
AU- Sheehy, J. B.
CS- Naval Air Development Center, Warminster, PA. Air Vehicle and Crew Systems Technology Dept.
CS- <CODE> 032381026; 416506
RN- NADC-89076-60
CN- R00001; R0000101
PY- 7 Jun 89
PG- 22p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9014
CP- United States
AB- Laser eye protection was first introduced into the U.S. Fleet when the need arose to protect aviators and aircrew from our own neodymium systems. This protection was designed to reduce the incidence energy below the maximum permissible exposure level established by the American National Standards Institute. Since range finders used an infrared wavelength, as defined and therefore not visible to the eye, there was no possibility of glare. With time more systems were developed employing lasers in both the visible and infrared portion of

the spectrum. When the lasing of the police helicopter in Los Angeles was first reported in 1981 it immediately became apparent that for wavelengths in the visible portion of the spectrum substantial losses in visual performance could be encountered at 'safe' exposure levels. The incident emphasized the need to develop laser eye protection based on criteria that encompassed both transient (glare) and permanent (burns, hemorraghic lesions) effects. The goal of this research project has been to establish protection levels based on performance rather than damage criteria. Keywords: Dazzling glare; Visual performance; Contrast sensitivity; Perimetry.
DE- *Laser safety; *Visual perception; Contrast; Damage; Energy; Exposure(Physiology); Eye; Frequency; Glare; Helicopters; Infrared radiation; Lasers; Lesions; Level(Quantity); Los angeles(California); Neodymium; Pilots; Police; Radiation protection; Range finding; Safety; Sensitivity; Standards; Visibility
ID- *Protective equipment; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 46C (Physics--Optics and Lasers); 57S (Medicine and Biology--Physiology)

AZ- 1503808
AA- <NTIS> N90-15060/8
TI- Imaging Probabilities, Geometry and Ergonomics in Limited Visibility Helicopter Operations
AU- Wright, R. H.
CS- Army Aviation Research and Development Activity, Fort Rucker, AL.
CS- <CODE> 096716000; AY826435
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cSep 89
PG- 11p
NT- In AGARD, Flight in Adverse Environmental Conditions 11 p (See N90-15041 07-01).
LA- English
PC- (Order as N90-15041/8, PC A17/MF A03)
JA- GRAI9013; STAR2807
CP- United States
AB- Helicopter pilots using night vision systems have a low probability of seeing the best visual cues that are available for flight control. Even with good visual range, the forward view of current night vision systems looks where visual cues are geometrically insensitive to changes in vehicle states and motions. At terrain flight heights, best visual cues reflecting vehicle states and motions are located directly below the helicopter. As visual range attenuates, the best vision of the terrain retreats toward the same angles below the helicopter where the best flight control cues are found. Image and symbolic cues of night vision systems both preclude effective use of normal spatial-motion visual perception, which quickly processes the entire visual array in parallel with no or very low workload. Downward viewing display concepts should allow normal spatial-motion vision to function effectively, resulting in major reductions in pilot workload and training requirements, and safer flight control with poor visibility. At terrain flight heights most tactical visual cues are visually compressed in elevation angle within just a few degrees at the horizon, but are widely dispersed in azimuth. Terrain obstacles to safe flight are also located within a few degrees of the horizon, but are well defined in azimuth by the velocity vector. It is concluded night vision systems could be improved by designing to better exploit geometric characteristics of visual cues and normal pilot spatial-motion visual processes.
DE- *Cockpits; *Flight control; *Helicopters; *Human factors engineering; *Night vision; *Pilot performance; *Visibility; Cues; Display devices; Flight safety; Height; Terrain; Visual perception; Workloads (Psychophysiology)
ID- *Ergonomics; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1499591
AA- <NTIS> DE90005537
TI- System safety management lessons learned from the US Army acquisition process
AU- Piatt, J. A.
CS- Battelle Pacific Northwest Labs., Richland, WA.
CS- <CODE> 048335000; 9512268
SP- Department of Energy, Washington, DC.
RN- PNL-SA-16940; CONF-890780-2
CN- AC06-76RL01830
PY- May 89
PG- 30p
NT- International system safety conference (9th), Long Beach, CA (USA), 17-20 Jul 1989. Sponsored by Department of Energy, Washington, DC.
NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI9012; ERA9020
CP- United States
AB- The Assistant Secretary of the Army for Research, Development and Acquisition directed the Army Safety Center to provide an audit of the causes of accidents and safety of use restrictions on recently fielded systems by tracking residual hazards back through the acquisition process. The objective was to develop "lessons learned" that could be applied to the acquisition process to minimize mishaps in fielded systems. System safety management lessons learned are defined as Army practices or policies, derived from past successes and failures, that are expected to be effective in eliminating or reducing specific systemic causes of residual hazards. They are broadly applicable and supportive of the Army structure and acquisition objectives. Pacific Northwest Laboratory (PNL) was given the task of conducting an independent, objective appraisal of the Army's system safety program in the context of the Army materiel acquisition process by focusing on four fielded systems which are products of that process. These systems included the Apache helicopter, the Bradley Fighting Vehicle (BFV), the Tube Launched, Optically Tracked, Wire Guided (TOW) Missile and the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The objective of this study was to develop system safety management lessons learned associated with the acquisition process. The first step was to identify residual hazards associated with the selected systems. Since it was impossible to track all residual hazards through the acquisition process, certain well-known, high visibility hazards were selected for detailed tracking. These residual hazards illustrate a variety of systemic problems. Systemic or process causes were identified for each residual hazard and analyzed to determine why they exist. System safety management lessons learned were developed to address related systemic causal factors. 29 refs., 5 figs.
DE- *Engineered Safety Systems; *Weapons; *Occupational Safety; Accidents; Aircraft; Communications; Documentation; Errors; Failure Mode Analysis; Health Hazards; Human Factors; Missiles; Mitigation; National Defense; Probabilistic Estimation; Program Management; Recommendations; Regulations; Research Programs; Risk Assessment; Standards; Systems Analysis; Technology Assessment; Vehicles; Meetings
ID- *Acquisition; *Military procurement; EDB/450000; Leson learned; NTISDE
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 57U (Medicine and Biology--Public Health and Industrial Medicine); 41I (Manufacturing Technology--Job Environment); 94D (Industrial and Mechanical Engineering--Job Environment)

AZ- 1499002
AA- <NTIS> AD-A218 214/5
TI- Simulator Sickness in the CH-47 (Chinook) Flight Simulator
AU- Gower, D. J. ; Fowlkes, J. ; Baltzley, D. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-89-28
PY- Sep 89
PG- 72p
NT- Prepared in cooperation with Essex Corp., Orlando, FL.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9012
CP- United States
AB- The principal goal in this field study was to assess the incidence of simulator sickness in the CH-47 flight simulator. The results show that this simulator produces a lower incidence of simulator sickness than the three other Army visually coupled flight simulators. 18 percent of the sample may be at risk for simulator-induced posteffects. Eyestrain and headache were leading symptoms of asthenopia, while fatigue and sweating were leading symptoms associated with motion sickness. Of possible impact on the results are the sample of aviators surveyed and the scenarios flown. None of the aviators sampled were in a training/qualification status. All were rated in the CH-47 and flying for continuation and proficiency. Therefore, it could be assumed the scenarios flown were less structured and flown by aviators familiar with both the aircraft that does not fly a large amount of high maneuver content missions. This could lead to lower amounts of provocative scene variables such as low-level flight, maneuvering in close proximity to the ground, and high speed turns. 48 percent of the pilots' and 37 percent of the copilots' missions were under instrument conditions. Such a large percentage of time spent with no scene content could account for some of the lower SSQ scores. The use of NVGs in the CH-47 simulator is associated with higher scores on the SSQ. (aw)
DE- *Flight simulators; *Motion sickness; Flight; Headaches; Impact; Instrumentation; Low altitude; Pilots; Risk; Scoring; Sweat cooling; Helicopters; Signs and symptoms; Proficiency; Flight simulation
ID- *Simulator sickness; *CH-47 Aircraft; Chinook aircraft; NTISDODXA

SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 1498773
AA- <NTIS> AD-A217 981/0
TI- Interaction of Switch Actuation on Tracking with a Four-Axis Flight Control (Cross-Coupling)
TI- <NOTE> Final rept
AU- DeBellis, W. B.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-17-89
CN- 1L162716AH70
PY- Dec 89
PG- 49p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9012
CP- United States
AB- This is the third in a series of investigations to generate a data base for multiaxis side arm flight controls. The purpose of this research is to determine the interaction between switch actuation and tracking performance while tracking in four axes. The research is required to specify the number and locations of switches that can be placed on the flight control. The long-range goal is to provide design recommendations and input to military specifications and standards. Tracking errors increase when switches associated with this control grip and controller mechanism are operated. Keywords: Control display; Helicopter control; Flight control; Tracking. (JHD)
DE- *Data bases; *Flight control systems; *Switches; Actuation; Axes; Control; Display systems; Errors; Helicopters; Input; Military requirements; Position(Location); Specifications; Tracking
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1498422
AA- <NTIS> TIB/B90-80129
TI- Ermittlung und Beurteilung der Schwingungsbelastung in Hubschraubern der Bundeswehr. Abschlussbericht. (Measurement and assessment of vibration load in helicopters of the Bundeswehr. Final report)
AU- Dupuis, H. ; Hartung, E.
CS- Mainz Univ. (Germany, F.R.). Inst. fuer Arbeits- und Sozialmedizin.
CS- <CODE> 016725010
RN- BMVG-FBWM-89-17
CN- INSAN I-1085-V-6388
PY- 30 Sep 89
PG- 119p
NT- In German,
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC E11
JA- GRAI9011
CP- Germany, Federal Republic of
AB- The research project comprised measurement, analysis and assessment of vibration load in x-, y- and z-direction in eight helicopters of the Bundeswehr and one helicopter of the Bundesgrenzschutz at different (up to 19) flight missions and repeated flights. Measuring places were seat mounting, seat cushion, stearing lever (only one helicopter) and forehead of the pilot. RMS-acceleration, weighted acceleration, crest-factor and small band frequency spectrum were analyzed. Also the vibration behavior of four different seat cushions of one helicopter on a vibration simulator could be proved in a reproductive manner. The results show, that the vibration load varies between the helicopter types in a range 1:3 and is also different for the flight missions. In vertical direction z vibration load generally is quite higher than in horizontal directions x and y. Typical range of weighted values of vibration intensity KZ sub eq is between 4 and 12 (=a sub ZW 0,2-0,6 m/s (2)). Considering averaged daily exposure time there seems to be no danger to health accordingly to the stage of knowledge. But additional stress factors (unfavourable posture, low temperature, current of air, weight of helmet) up to now cannot be assessed quantitatively. Vibration-induced decrease of performance may not be excluded, especially visual performance. Systematic optimization of seat design is able to decrease the vibration load of pilots. (orig./AKF). (Copyright (c) 1990 by FIZ. Citation no. 90:080129.)
DE- *Military helicopters; *Vibration effects; *Vibration measurement; *Pilot performance; Pilots(Personnel); Flight crews; Vibration perception; Human tolerances; Vision; Visual acuity; Flight tests
ID- *Foreign technology; *Human factors engineering; NTISTFFIZ

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46E (Physics--Structural Mechanics); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1498137
AA- <NTIS> PB90-190117
TI- Aeronautical Decisionmaking for Air Ambulance Administrators
TI- <NOTE> Final rept
AU- Adams, R. J. ; McConkey, E. D.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000
SP- Federal Aviation Administration, Washington, DC.
RN- SCT-90RR-5; DOT/FAA/DS-88/8
CN- DTFA01-87-C-00014
PY- Feb 90
PG- 21p
NT- See also PB90-109976. Sponsored by Federal Aviation Administration, Washington, DC.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI9011
CP- United States
AB- The manual discusses five of the most critical administrative aeronautical decision areas. The treatment is brief to ensure that the important, basic aeronautical limits will be read and understood by the largest possible audience. The concerns are: accident characteristics, pilot characteristics, weather restrictions, training needs, and risk management. Each of these concerns is discussed in a summary format. The summaries begin with a concise statement of the problem. The statement is followed by a discussion of the governing regulations, an explanation of the underlying reasons for the limitation, and recommended solutions an administrator could implement to reduce the impact of, or eliminate, the risk. The summary material is supplemented by appropriate references for use by the reader who would like to explore one or more of these areas in greater detail.
DE- *Aviation safety; *Pilots(Personnel); Safety engineering; Transportation management; Risk; Decision making; Accident prevention; Personnel development; Human factors engineering
ID- *Helicopter ambulances; *Emergency vehicles; NTISDOTFAA
SH- 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 43D (Problem Solving Information for State and Local Governments--Police, Fire, and Emergency Services); 85A (Transportation--Air Transportation)

AZ- 1497340
AA- <NTIS> NTN90-0306
TI- Interaction of a Helicopter Blade With a Vortex: Measurements in a wind tunnel yield data for validation of computations
TI- <NOTE> NTIS Tech Note
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000
PY- Mar 90
PG- 1p
NT- FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report, NTIS order number, N88-14962, price code, A03.
LA- English
PC- Not available NTIS
JA- GRAI9011
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. A report describes an experimental investigation of the three-dimensional interaction of a helicopter rotor blade with a vortex like that generated by the preceeding rotor blade. The report provides theoretical aerodynamicists with data for validation of computer simulations of aerodynamic flow. The investigation was carried out in a wind tunnel in which a vortex-generating blade was mounted vertically, and the blade under test was mounted horizontally downstream. A three-dimensional laser velocimeter measured the velocity field around the horizontal blade. Measurements of the velocity of circulation around the blade were used to calculate the span-wise distribution of lift on the blade. Mean flow velocities were measured over grids upstream of the blade. Variations of the strength and position of the vortex and of the angle of attack of the blade were examined. The report describes the test configurations and instrumentation. It tabulates and discusses measured data. Finally, it describes and quantifies such sources of error as the effects of walls, deflections of the blade with changes in lift, unsteadiness in the position of the vortex, and instrumentation-related errors.

DE- *Vortices; *Rotary wings
ID- *Wind tunnel tests; NTISNTND
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 46B (Physics--Fluid Mechanics)

AZ- 1491828
AA- <NTIS> AD-A217 606/3
TI- Flight in Adverse Environmental Condition
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-470
PY- c1989
PG- 368p
NT- Preface in French and English.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A16/MF A02
JA- GRAI9010
CP- Other
AB- Contents: The Human Element-The Key to Safe Civil Operations in Adverse Weather; Wind Shear Models for Aircraft Hazard Investigations; Analysis of Serve Atmospheric Disturbances From Airline Flight Records; Systems For Airborne Wind and Turbulence Measurement; The United States Air Force Approach to All-Weather Testing; Influence of Windshear, Downdraft and Turbulence on Flight Safety; Classification of Wind Shear Severity; How to Fly Windshear Using the Fly-By-Wire Concept; A Pitch Control Law for Compensation of the Phugoid Mode Induced by Windshears; Adverse Weather Operations During the Canadian Atlantic Storms Program; Canard Versus AFT-Tail:Ride Qualities Performance and Pilot Command Response; The Interference of Flightmechanical Control Laws with Those of Load Alleviation and Its Influence on Structural Design; Turbulence Effects on Aircraft Flight Dynamics and Control; NASA's program on Icing Research and Technology; Ice Induced Aerodynamic Performance Degradation of Rotorcraft - An Overview; Flight and Wind Tunnel Investigation of Aerodynamic Effects of Aircraft Ground Deicing/Anti-Icing Fluids; Effects of Lighting on Operations of Aerospace Vehicles; and Aircraft Testing in the Electromagnetic Environments. Symposia. (JHD)
DE- *Civil aviation; *Flight; *Deicing systems; *Fly by wire control; *Aviation safety; *Symposia; *All weather; *Wind shear; Adverse conditions; Aerodynamic forces; Aerospace craft; Airborne; Aircraft; Atmospheric disturbances; Classification; Control theory; Dynamics; Electromagnetic environments; Hazards; Ice formation; Loads(Forces); Measurement; Pilots; Pitch(Inclination); Records; Reduction; Response; Ride quality; Rotary wing aircraft; Test and evaluation; Turbulence; Wind; Wind tunnel tests
ID- *Foreign technology; *Human factors engineering; NTISDODXA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 51A (Aeronautics and Aerodynamics--Aerodynamics); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 46B (Physics--Fluid Mechanics)

AZ- 1478908
AA- <NTIS> AD-A214 670/2
TI- Survey of U.S. Army Aeromedical Equipment
TI- <NOTE> Technical rept
AU- Mitchell, G. W. ; Adams, J. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-89-21
PY- Aug 89
PG- 13p
NT- Pub. in Aviation, Space, and Environmental Medicine, v60 n8 p807-810 Aug 89.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI9006
CP- United States
AB- Medical equipment is necessary to support patients requiring air transportation, but it may not be compatible with the aviation environment. Aircraft systems may cause errors in the functioning of medical equipment, or that equipment may interfere with the aircraft. Medical equipment has been tested, primarily for fixed wing aircraft,

to military standards by the U.S. Air Force. This study reports 1986 and 1987 surveys which documents the use of such equipment of U.S. Army medical evacuation aircraft and compares items in current use to the U.S. Air Force's test results. Of the 115 different non issue items reported in use, 32 have been formally evaluated, and 9 of those were judged unacceptable for use on aircraft. Only two items reported in the survey were tested inflight in helicopters. The remaining 83 items have not been tested. Helicopters have unique requirements, and the U.S. Army has begun a program to evaluate medical equipment for helicopter use. Keywords: Aeromedical evacuation; Helicopter ambulance; MEDEVAC; Medical equipment testing. (KT)
DE- *Aeromedical evacuation; *Compatibility; *Medical equipment; *Medical evacuation; Air Force; Air transportation; Ambulances; Army aircraft; Army equipment; Environments; Fixed wing aircraft; Helicopters; Medical services; Military requirements; Patients; Standards; Test and evaluation; Reprints
ID- *Aeromedical Equipment; *Military medicine; NTISDODXR
SH- 74GE (Military Sciences--General); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology); 57U (Medicine and Biology--Public Health and Industrial Medicine)

AZ- 1477013
AA- <NTIS> AD-A214 434/3
TI- Simulator Sickness in the UH-60 (Black Hawk) Flight Simulator
TI- <NOTE> Final rept
AU- Gower, D. W. ; Fowlkes, J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-89-25
CN- 3E162777A879
PY- Sep 89
PG- 75p
NT- Prepared in collaboration with Essex Corp., Orlando, FL.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI9005
CP- United States
AB- The U.S. Army Aeromedical Research Laboratory conducted field studies of operational flight simulators to assess the incidence and severity of simulator sickness. Simulator sickness here refers to the constellation of motion sickness related symptoms that occur in simulators due to visual representation, motion base representation, or combination of the two representations of flight. The incidence rates and relative frequency of specific symptoms are presented. Correlational factors such as recent simulator experience, current state of health, overall flight expereience, mission scenario, and flight dynamics are presented. This report ranks the Army's flight simulators in comparision to the 10 Navy simulators studied by the Naval training systems Center, Orlando, Florida. The study further reinforces the need for studies to understand perceptual rearrangement, adaptation/readaptation, and pilot susceptibility to the effects of simulation. Design criteria for simulators, as well as those training guidelines necessary to cope with this phenomenon also must be addressed.
DE- *Motion sickness; *Flight simulators; *Flight training; Signs and symptoms; Vision; Rates; Perception(Psychology); Adaptation; Vulnerability; Man machine systems; Human factors engineering; Ataxia; Equilibrium(Physiology); Attack helicopters
ID- AH-64 Aircraft; Apache helicopters; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 1476679
AA- <NTIS> AD-A214 085/3
TI- Helicopter Visual Segment Approach Lighting System (HALS) Test Report
TI- <NOTE> Technical note
AU- Billmann, B. R. ; Shollenberger, S.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN89/21
PY- Aug 88
PG- 318p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A02
JA- GRAI9005
CP- United States
AB- This Technical Note reports on a test designed to obtain pilot performance subjective pilot data on the Helicopter Visual Segment

Approach Lighting System (HALS). Results identify the performance measures which correlate with the pilot's ability to visually acquire a HALS equipped heliport. Conclusions state that HALS can support existing minima to heliports. Pilots reported unacceptable Cooper-Harper ratings for rate of closure and workload without HALS. (sdw)
DE- *Landing lights; *Approach lights; *Helicopters; *Visual perception; Closures; Heliports; Pilots; Rates; Workload
ID- *Human factors engineering; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1475840
AA- <NTIS> N90-10065/2
TI- Identification of Stability and Control Parameters of a Brilliant Ammunition
AU- Doherr, K. ; Lehmann, G. ; Schilling, H.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
CS- <CODE> 029496000; IH545557
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cMar 89
PG- 16p
NT- In AGARD, Stability and Control of Tactical Missile Systems 16 p.
LA- English
PC- (Order as N90-10050/4, PC A15/MF A01)
JA- GRAI9004; STAR2801
CP- Germany, Federal Republic of
AB- The efficient defense against armored ground vehicles depends heavily on precisely delivered warheads. New terminal guided warheads are under development presently which improve the hit accuracy and therefore the effectiveness drastically. One exampe is EPHRAM which employs a sophisticated detection and control system in order to achieve optimal results. A considerable part of the development of a brilliant ammunition is spent on the determination of its aerodynamic and control characteristics. For EPHRAM static and dynamic wind tunnel experiments were performed. A recoverable instrumented version was developed for the validation of the concept and the identification of aerodynamic parameters and thrust interference effects from flight tests. The test vehicle was dropped several times from a helicopter-lifted platform. During these first tests with reduced sensor equipment, which focused on the performance of EPHRAM, the desired footprint was achieved. An analysis of one of these flights confirmed the static wind tunnel results at low angle of attack. For the system identification at high angle of attack more flight tests are scheduled with complete instrumentation and selected thrust programs to fully excite the vehicle dynamics.
DE- *Flight tests; *Precision guided projectiles; *Wind tunnel tests; Artificial intelligence; Control systems design; Mathematical models; Aerodynamic stability; Angle of attack; Automatic pilots; Equations of state; Euler equations of motion; Homing devices
ID- *Foreign technology; NTISNASAE
SH- 79A (Ordnance--Ammunition, Explosives, and Pyrotechnics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1474476
AA- <NTIS> AD-A213 432/8
TI- Backward Transfer and Skill Acquisition in the AH-1 Flight and Weapons Simulator
TI- <NOTE> Interim rept. Oct 86-Nov 88
AU- Kaempf, G. L. ; Cross, K. D. ; Blackwell, N. J.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-312-88; ARI-RR-1537
CN- MDA903-87-C-0523
PY- Aug 89
PG- 98p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI9004
CP- United States
AB- Two experiments were conducted, one to investigate the backward transfer of flight skills to the AH-1 Flight and Weapons Simulator (AH1FWS) and another to investigate the acquisition of flight skills in the AH1FWS on selected maneuvers. In the backward transfer research, 16 AH-1 instructor pilots (IPs) from the AH-1 Aircrew Qualification Course were administered checkrides in the AH1FWS and the AH-1F aircraft. Comparison of the performance data from the two checkrides indicates that, while proficient on the maneuvers in the AH-1F, all IPs performed poorly in the AH1FWS. The IPs attributed their difficulties in the

AH1FWS to deficiencies in the visual system and the handling and response characteristics of the flight controls. In the skill acquisition research, four groups of 10 operational aviators received training in the AH1FWS. Each group received training on a different set of five maneuvers. The training comprised 10 practice trials for each maneuver. Subjects received no feedback on trials 1-3; IPs provided instruction on trials 4-10. Mean performance ratings did not reach a satisfactory level of proficiency within the 10 practice trials for 17 of the 20 maneuvers investigated. Furthermore, the backward transfer data obtained during the skill acquisition research were consistent with similar data collected in a previous study. Keywords: Flight simulation; Skill acquisition; Aircrew training; Helicopter; Training effectiveness; Pilot; Performance (Human); Transfer of training. (SDW)
DE- *Flight simulation; *Flight training; *Attack helicopters; Acquisition; Flight control systems; Flight crews; Maneuvers; Mean; Operational effectiveness; Optical images; Proficiency; Response; Simulators; Skills; Transfer of training; Weapons
ID- AH-1 aircraft; H-1 aircraft; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1472626
AA- <NTIS> AD-A213 285/0
TI- Human Factors Research in Aircrew Performance and Training
TI- <NOTE> Annual summary rept. (Final) Oct 87-Oct 88
AU- Aldrich, T. B. ; McAnulty, D. M.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI-690-319-88; ARI-TR-858
CN- MDA903-87-C-0523
PY- Aug 89
PG- 139p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI9003
CP- United States
AB- This report presents summaries of the research projects performed by Anacapa Sciences, Inc., for the ARI Aviation R&D Activity (ARIARDA) at Fort Rucker, Alabama. From 9 October 1987 to 8 October 1988, Anacapa personnel worked on 25 research projects and took part in 6 technical advisory services that address emerging aviation weapon systems design, manpower and personnel programs, and aviator training research. The summary for each project and technical advisory service contains (a) a background section that describes the rationale for the project and specifies the research objectives, (b) a research approach section that describes the tasks and activities required to meet the project objectives (c) a results section that describes the research findings or, in the case of developmental activities, the research product, and (d) a project status section that describes the work completed and projections for future research, if any. Keywords: Aviator selection testing; Helicopter gunnery; Computer-based instruction; Aviator training; Sensors and symbology; Helicopter flight simulation. (SDW)
DE- *Flight crews; *Human factors engineering; *Flight training; Advisory activities; Aeronautics; Alabama; Background; Computer aided instruction; Detectors; Flight simulation; Gunnery; Helicopters; Manpower; Performance(Human); Personnel; Pilots; Selection; Symbols; Test and evaluation; Training; Weapon systems
ID- *Research projects; NTISDODXA; NTISDODA
SH- 92A* (Behavior and Society--Job Training and Career Development); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 70E (Administration and Management--Research Program Administration and Technology Transfer)

AZ- 1472590
AA- <NTIS> AD-A213 248/8
TI- Software and Hardware Description of the Helicopter Motion Equations for VAX Computers
TI- <NOTE> Final rept
AU- Lopez, M. C.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TN-8-89
CN- 1L162716AH70
PY- Aug 89
PG- 101p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A06/MF A01
JA- GRAI9003
CP- United States
AB- The Human Factors Cockpit Research, Experimentation, and Workload (CREW) Simulator is a fixed base, generic helicopter simulator that provides the flexibility to explore state-of-the-art aircrew/display/control interaction. The CREW simulator involves four major components: the visual system, the graphics system, the data collection, and the flight equations. HEL uses the UH60 Blackhawk version of the standard kinematic equations for an aircraft (herein called HAC equations) when conducting experiments on the CREW simulator. The HAC equations were acquired from NASA Ames, in Mountain View, California, with the objective of simulating aerodynamic characteristics of a helicopter in a part-task simulator for human factors studies related to displays and controls. The HAC equations also allow us to simulate nap-of-the-earth (NOE) flight. This report describes the software design and the hardware configuration used to execute the HAC equations on a MicroVAX II VAXLab computer under the VMS operating system using VAX FORTRAN. The HAC equations are not described in detail in this report. For more detailed information, refer to McFarland (1975). The objective of this report is to provide internal documentation and also to provide a description of design for others desiring to implement these or similar equations of motion under the VAX/VMS (Virtual Address extension/Virtual Memory System) operating system in a real-time, manned interactive simulation. (KR)
DE- *Helicopters; *Computer applications; *Avionics; *Flight simulators; Aerodynamic characteristics; Aircraft; Cockpits; Data acquisition; Equations of motion; Computer graphics; Human factors engineering; Interactions; Kinematics; Optical images
ID- *Computer applications; UH-60 Aircraft; CREW(Cockpit Research Experimentation and Workload); Computer architecture; NTISDODXA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1472385
AA- <NTIS> AD-A213 030/0
TI- Preliminary Airworthiness Evaluation of the AH-64A Equipped with the Air to Air Stinger (ATAS) Missile System
TI- <NOTE> Final rept. 18 Jul-28 Jul 88
AU- Lawrence, J. S. ; Lyle, J. A. ; Hopkins, G. J.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
PY- Dec 88
PG- 118p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI9003
CP- United States
AB- A Preliminary Airworthiness Evaluation was conducted for the AH-64A equipped with the Air-to-Air Stinger (ATAS) missile system. The first phase was an evaluation of the effects of the ATAS installation on the handling qualities on the AH-64A. The second phase was a human factors evaluation of the installation of a fully operational preproduction ATAS system using captive flight training Stinger missiles, Tests were flown in the eight Hellfire missile configuration. Two Stinger missiles with launcher and mounting hardware were mounted at each wing tip. Test results were compared with data obtained during previous testing and evaluated against the AH-64 System Specification. Handling qualities of the AH-64A with the ATAS system installed were quantitatively and qualitatively evaluated and found to be essentially the same as the basic AH-64A. Specific shortcomings associated with the ATAS system were: poor integration of the Air-to-Air Stinger missile system, which is not directly compatible with the MIL STD 1553 data bus of the AH-64; insufficient ATAS sighting symbology, which does not provide the copilot/gunner with accurate missile seeker line of sight relative to the selected sight line of sight except in FLIR wide field of view; reduction in storage space imposed by the ATAS installation in the aft storage bay; location of the repositioned chaff fire switch on the cyclic hand grip; and the manual reset feature of the ATAS missile sequencing logic. The absence of an altitude encoding feature in the installation of the AN/APX-100(V) transponder was a shortcoming not associated with the ATAS modification. Seven recommendations specific to the ATAS installation are made. (jhd)
DE- *Air to air missiles; *Airworthiness; *Attack helicopters; Accuracy; External stores; Chaff dispensers; Forward looking infrared systems; Guided missile components; Gunners; Handling; Homing devices; Human factors engineering; Line of sight; Mounts; Quality; Secondary; Rocket sights; Test and evaluation; Wing tips
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 75A (Missile Technology--Air and Space-launched Missiles)

AZ- 1469342
AA- <NTIS> PB90-850959
TI- Military Helicopters. April 1985-September 1989 (Citations from the Compendex Database)
TI- <NOTE> Rept. for Apr 85-Sep 89
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 89
PG- 74p
NT- Supersedes PB89-850978.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI9001
CP- United States
AB- This bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (This updated bibliography contains 145 citations, 31 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; Military aircraft; Rotary wing aircraft; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- Published Searches; NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1465793
AA- <NTIS> N89-26859/3
TI- Design of an Active Helicopter Control Experiment at the Princeton Rotorcraft Dynamics Laboratory
TI- <NOTE> Interim Report, Jan. 1988 - May 1989
AU- Marraffa, A. M. ; McKillip, R. M.
CS- Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
CS- <CODE> 009938087; P3732113
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:185490; NASA-CR-185490
CN- NAG2-415
PY- May 89
PG- 106p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8924; STAR2721
CP- United States
AB- In an effort to develop an active control technique for reducing helicopter vibrations stemming from the main rotor system, a helicopter model was designed and tested at the Princeton Rotorcraft Dynamics Laboratory (PRDL). A description of this facility, including its latest data acquisition upgrade, are given. The design procedures for the test model and its Froude scaled rotor system are also discussed. The approach for performing active control is based on the idea that rotor states can be identified by instrumenting the rotor blades. Using this knowledge, Individual Blade Control (IBC) or Higher Harmonic Control (HHC) pitch input commands may be used to impact on rotor dynamics in such a way as to reduce rotor vibrations. Discussed here is an instrumentation configuration utilizing miniature accelerometers to measure and estimate first and second out-of-plane bending mode positions and velocities. To verify this technique, the model was tested, and resulting data were used to estimate rotor states as well as flap and bending coefficients, procedures for which are discussed. Overall results show that a cost- and time-effective method for building a useful test model for future active control experiments was developed. With some fine-tuning or slight adjustments in sensor configuration, prospects for obtaining good state estimates look promising.
DE- *Active control; *Control systems design; *Helicopter control; *Vibration damping; Rotary wings; Structural vibration; Accelerometers; Aerodynamic coefficients; Bending; Data acquisition; Pitch
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1459611
AA- <NTIS> AD-A210 531/0
TI- Making MANPRINT (Manpower and Personnel Integration) Count in the

Acquisition Process
TI- <NOTE> Final rept. Jun 88-Nov 88
AU- Metzler, T. R. ; Lewis, H. V.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RN-89-37
PY- Jun 89
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8922
CP- United States
AB- The Manpower and Personnel Integration (MANPRINT) program is a comprehensive management and technical effort that focuses on the continuous integration of the six MANPRINT domains (Human factors engineering, manpower, personnel, training, system safety, and health hazards) into the Materiel Acquisition and Development Process (MADP). In this report, the implementation of MANPRINT during the acquisition of the Airborne Target Handover System/Avionics Integration (ATHS/AI) for the Apache (AH-64A) aircraft is described, and the contribution of MANPRINT concepts to the definition of the system's performance requirements is detailed. Researchers concluded that using MANPRINT concepts in the acquisition of the ATHS/AI for the AH-64A helped to define a system that should reduce crew task times, number of crew procedures, and maintenance complexity. As a historical overview of the procurement of the ATHS/AI for the AH-64A, the report describes how MANPRINT issues influenced the initial Product Improvement Program (PIP) and the Engineering Change Proposal (ECP) and describes how MANPRINT concepts were conveyed in the Request for Proposal (RFP). The application of MANPRINT in the Source Selection Process (SSP) is described and the lessons learned from this experience are summarized. These lessons are strategies that are potentially useful to other MANPRINT practitioners. (kr)
DE- *Attack helicopters; Avionics; Flight crews; Hazards; Health; Human factors engineering; Integrated systems; Integration; Lessons learned; Maintenance; Management; Manpower; Materiel; Performance(Engineering); Procurement; Requirements; System safety; Targets
ID- *AH-64 Aircraft; *Military procurement; MANPRINT(Manpower and Personnel Integration); MADP(Materiel Acquisition and Development Process); ATHS/AI(Airborne Target Handover System/Avionics Integration); PIP(Product Improvement Program); NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 70B (Administration and Management--Management Practice)

AZ- 1459583
AA- <NTIS> AD-A210 503/9
TI- Cockpit Lighting Compatibility with Image Intensification Night Imaging Systems: Issues and Answers
AU- Rash, C. E. ; Verona, R. W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-89-6
CN- 3E162787A879; BG
PY- May 89
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A03/MF A01
JA- GRAI8922
CP- United States
AB- Night imaging systems based on image intensification (I2) tubes are a major factor in the night operation capability of U.S. Army rotary-wing aircraft. A major problem associated with the use of these systems is the detrimental effect caused by internal cockpit lighting. Instrument lamps, caution lamps, utility lights, and other light sources inside the cockpit activate the bright source protection control circuits of the intensification tubes, thereby reducing their sensitivity to external natural and artificial illumination. In 1986, a Tri-Service specification, MIL-L-85762, Lighting, aircraft, interior, night vision imaging system compatible, was adopted to resolve the cockpit lighting problems. MIL-L-85762 defines the measurement instrumentation and techniques required to certify lighting components as ANVIS compatible. The specification does not address compatibility problems associated with AN/PVS-5 usage. Ongoing efforts related to MIL-L-85762 include characterization of lighting incompatibilities in current U.S. Army aircraft, implementation of programs to modify the lighting in incompatible cockpits, and certification of proposed lighting components for future aircraft systems. Additional work has been done

to provide near compatible solutions to lighting problems associated with the use of AN/PVS5-systems. Keywords: Reprints; Night vision devises. (kt)
DE- *Cockpits; *Image intensification; *Lighting equipment; *Night vision devices; Army aircraft; Compatibility; Illumination; Instrumentation; Internal; Joint military activities; Lamps; Light sources; Measurement; Operation; Problem solving; Reprints; Rotary wing aircraft; Sensitivity ; Solutions(General); Specifications
ID- NTISDODXA
SH- 63F (Detection and Countermeasures--Optical Detection); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1458164
AA- <NTIS> N89-24876/9
TI- Visibility with a Moving Point of View
AU- Bern, M. W. ; Dobkin, D. P. ; Grossman, R.
CS- Xerox Palo Alto Research Center, CA.
CS- <CODE> 051772000; XU700000
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 7 Dec 88
PG- 11p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8921; STAR2718
CP- United States
AB- The 3-D visibility problems in which the viewing position moves along a straight flightpath was investigated. Two problems were focused on: determining the points along the flightpath at which the topology of the viewed scene changes, and answering ray-shooting queries for rays with origin on the flightpath. Three progressively more specialized problems are considered: general scenes, terrains, and terrains with vertical flightpaths.
DE- *Flight paths; *Flight simulation; *Stereoscopic vision; *Visibility; Field of view; Three dimensional motion; Algorithms; Human factors engineering; Man-computer interface; Terrain analysis; Three dimensional models; Topology; Vertical flight
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1456465
AA- <NTIS> AD-A210 123/6
TI- Evaluation of Thermal Stress Induced by Helicopter Aircrew Chemical, Biological, Radiological (CBR) Protective Ensemble
TI- <NOTE> Final rept. 3 Nov 87-17 Dec 88
AU- Kaufman, J. W. ; Dejneka, K. Y. ; Morrissey, S. ; Bittner, A.
CS- Naval Air Development Center, Warminster, PA. Air Vehicle and Crew Systems Technology Dept.
CS- <CODE> 032381026; 416506
RN- NADC-89009-60
PY- 15 Jun 88
PG- 31p
NT- Prepared in cooperation with Analytics, Inc., Willow Grove, PA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8921
CP- United States
AB- The A/P22P-9(V) Chemical, Biological, Radiological (CBR) Protective Assembly for helicopter aircrews has been evaluated for the additional thermal stress it imparts to users in a hot environment. The standard aircrew life support system for helicopters, based on the CWU-27/P flight coverall, was employed as the experimental control. Two environmental conditions were studied: 1) a simulated hot aircraft interior (hot), with chamber temperatures maintained at dry bulb temperatures = 32.8C and a wet bulb temperature = 25.0C; and 2) a control environment (cool), with chamber temperatures maintained at 20.9C. Three males, aged 24-35 years, were exposed twice to each garment/environment condition combination, for a total of eight exposures each, except for one subject who was studied in cool conditions only once in each of the configurations, for a total of six runs. Heat durations were designed for 480 minutes. Comparison by ensemble show significant differences observed for exposure durations, while rectal temperatures were significantly different ($p<0.05$) between ensembles only in hot conditions. Ambient conditions significantly impacted on nearly all measured parameters. The results indicate that the CBR ensemble represents a limiting factor in performance in a hot environment. Hyperthermia; Chemical warfare; Heat tolerance; Physiology; Heat stress. (jes)
DE- *Chemical warfare; *Flight crews; *Heat stress(Physiology); *Heat

tolerance; *Thermal stresses; Aircraft; Assembly; Chambers; Comparison; Control; Cooling; Environments; Exposure(General); Helicopters; High temperature; Hot regions; Hyperthermia; Limitations; Males; Rectum; Simulation; Temperature; Time
ID- *Protective clothing; *Life support systems; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 74D (Military Sciences--Chemical, Biological, and Radiological Warfare)

AZ- 1454592
AA- <NTIS> N89-23480/1
TI- Heliport Night Parking Area Criteria Test Plan
TI- <NOTE> Technical Note, Jan. - Apr. 1989
AU- Plotka, M. S. ; Weiss, R. M.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; FI751336
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DOT/FAA/CT-TN88/45
CN- FAA-TO701-R
PY- Mar 89
PG- 14p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8920; STAR2717
CP- United States
AB- This flight test plan describes the methodology to examine the issue of heliport night parking surface separation criteria. Operational measures will be collected at the Federal Aviation Administration (FAA) Technical Center, Atlantic City International Airport, New Jersey, using an instrumented UH-1H helicopter. Flight maneuvers will be conducted at the Technical Center to identify night parking area separation criteria under various wind conditions. Wind velocity and direction data will be collected during night parking operations to determine effects at different locations around the parking area. This data will be used to create a baseline for characterizing heliport night parking area separation criteria. The test development, test equipment, data collection, data reduction, and analysis of flight data are discussed. A schedule for the completion of the associated tasks is presented.
DE- *Heliports; *Night flights (Aircraft); Aircraft landing; Aircraft maneuvers; Airport lights; Experiment design; Flight conditions; Flight safety; Low visibility; Vertical landing; Data acquisition; Pilot performance; Space perception; Uh-1 helicopter; Wind effects
ID- Helicopters; Parking; NTISNASA
SH- 85A (Transportation--Air Transportation)

AZ- 1454560
AA- <NTIS> N89-23406/6
TI- NASA (National Aeronautics and Space Administration) Aeronautics Research and Technology
TI- <NOTE> Annual Report
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NAS 1.19:259; NASA-EP-259
PY- 1986
PG- 60p
NT- Original Contains Color Illustrations.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8920; STAR2717
CP- United States
AB- The technical accomplishments and research highlights of 1986 are featured, along with information on possible areas of future research. These include hypersonic, supersonic, high performance, subsonic, and rotorcraft vehicle technology. Fundamental disciplinary research areas discussed include aerodynamics, propulsion, materials and structures, information sciences and human factors, and flight systems/safety. A description of the NASA organization and facilities is given.
DE- *Aerodynamics; *Aeronautical engineering; *Aircraft design; *Aircraft engines; Nasa programs; Research and development; Aircraft performance; Flight safety; Flight test instruments; Human factors engineering; Hypersonic vehicles; Materials science; Rotary wing aircraft; Supersonic aircraft; Test facilities
ID- NTISNASA
SH- 51GE (Aeronautics and Aerodynamics--General)

AZ- 1452816

AA- <NTIS> PB89-867261
TI- Head Up Displays. January 1975-July 1989 (Citations from the International Aerospace Abstracts Database)
TI- <NOTE> Rept. for Jan 75-Jul 89
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Aug 89
PG- 139p
NT- Supersedes PB88-866751. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC.
NT- U.S. sales only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8919
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 316 citations, 11 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices; *Pilots(Personnel); Avionics; Aircraft; Helicopters; Space shuttle
ID- *Head up displays; *Integrated systems; Published Searches; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A* (Behavior and Society--Job Training and Career Development); 88E (Library and Information Sciences--Reference Materials)

AZ- 1447479
AA- <NTIS> N89-21477/9
TI- Helicopter Flights with Night-Vision Goggles: Human Factors Aspects
AU- Brickner, M. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:101039; A-88305; NASA-TM-101039
PY- Mar 89
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8917; STAR2714
CP- United States
AB- Night-vision goggles (NVGs) and, in particular, the advanced, helmet-mounted Aviators Night-Vision-Imaging System (ANVIS) allows helicopter pilots to perform low-level flight at night. It consists of light intensifier tubes which amplify low-intensity ambient illumination (star and moon light) and an optical system which together produce a bright image of the scene. However, these NVGs do not turn night into day, and, while they may often provide significant advantages over unaided night flight, they may also result in visual fatigue, high workload, and safety hazards. These problems reflect both system limitations and human-factors issues. A brief description of the technical characteristics of NVGs and of human night-vision capabilities is followed by a description and analysis of specific perceptual problems which occur with the use of NVGs in flight. Some of the issues addressed include: limitations imposed by a restricted field of view; problems related to binocular rivalry; the consequences of inappropriate focusing of the eye; the effects of ambient illumination levels and of various types of terrain on image quality; difficulties in distance and slope estimation; effects of dazzling; and visual fatigue and superimposed symbology. These issues are described and analyzed in terms of their possible consequences on helicopter pilot performance. The additional influence of individual differences among pilots is emphasized. Thermal imaging systems (forward looking infrared (FLIR)) are described briefly and compared to light intensifier systems (NVGs). Many of the phenomena which are described are not readily understood. More research is required to better understand the human-factors problems created by the use of NVGs and other night-vision aids, to enhance system design, and to improve training methods and simulation techniques.
DE- *Goggles; *Hazards; *Human factors engineering; *Night flights (Aircraft); *Night vision; *Pilot performance; Fatigue (Biology); Flir detectors; Helicopters; Helmet mounted displays; Workloads (Psychophysiology)

ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1447278
AA- <NTIS> N89-20978/7
TI- AH-1S Communication Switch Integration Program
AU- Haworth, L. ; Szoboszlay, Z. ; Shively, R. ; Bick, F. J.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:101053; A-89005; NASA-TM-101053
PY- Mar 89
PG- 62p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8917; STAR2714
CP- United States
AB- The C-6533/ARC communication system as installed on the test AH-1E Cobra helicopter was modified to allow discrete radio selection of all aircraft radios at the cyclic radio/intercommunication system switch. The current Cobra-fleet use of the C-6533 system is cumbersome, particularly during low-altitude operations. Operationally, the current system C-6533 configuration and design requires the pilot to estimate when he can safely remove his hand from an active flight control to select radios during low-altitude flight. The pilot must then physically remove his hand from the flight control, look inside the cockpit to select and verify the radio selection and then effect the selected radio transmission by activating the radio/ICS switch on the cyclic. This condition is potentially hazardous, especially during low-level flight at night in degraded weather. To improve pilot performance, communications effectiveness, and safety, manprint principles were utilized in the selection of a design modification. The modified C-6533 design was kept as basic as possible for potential Cobra-fleet modification. The communications system was modified and the design was subsequently flight-tested by the U.S. Army Aeroflightdynamics Directorate and NASA at the NASA Ames Research Center, Mountain View, California. The design modification enables the Cobra pilot to maintain hands-on flight controls while selecting radios during nap-of-the-Earth (NOE) flight without looking inside the cockpit which resulted in reduced pilot workload ratings, better pilot handling quality ratings and increased flight safety for the NOE flight environment.
DE- *Communication equipment; *Flight tests; *Pilot performance; *Switches; Flight control; Hazards; Nap-of-the-earth navigation; Cockpits; Military helicopters; Safety factors; Workloads (Psychophysiology)
ID- NTISNASA
SH- 45C (Communication--Common Carrier and Satellite); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1446473
AA- <NTIS> AD-A207 506/7
TI- OH-58 Energy Attenuating Crew Seat Feasibility Study
TI- <NOTE> Final rept. 28 Sep 87-27 Sep 8
AU- Fox, R. G.
CS- Bell Helicopter Textron, Inc., Fort Worth, TX.
CS- <CODE> 070196000; 054200
RN- BHTI-699-099-286
CN- DAMD17-87-C-7032; 3E162777A878; AG
PY- 1 Nov 88
PG- 74p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8917
CP- United States
AB- Special energy attenuating seats are used to provide a controlled deceleration over a vertical stroking distance to keep aircraft crash loads within human tolerance. Present energy attenuating crew seats use this approach of translating the entire seat vertically. This requires an area clear of equipment and structure between the seat and the fuselage floor. Installation of an energy attenuating seat in the OH-58 could provide reduced spinal loading in some crashes. However, the OH-58 crew seat is integral with the aircraft structure with no room for an energy attenuating seat which gave rise to the belief that a stroking energy attenuating seat was not technically feasible. An innovative approach was needed to provide such seats with a minimum of OH-58 structural modification. A pivoting seat pan design was conceived

and feasibility study was performed for the U.S. Army to provide this preliminary design, fabricate test seats, and modify a dynamic test fuselage and a flyable aircraft. Dynamic testing was performed to prove the feasibility of the pivoting seat pan energy attenuating crew seat approach. This report discusses the approach which can provide energy attenuating crew seats to be installed in an OH-58, while providing a concept which could potentially provide similar solutions for other aircraft. Keywords: Crashworthiness, Aircraft seats, Army helicopters, Protective equipment evaluation, Energy absorbers. (EDC)
DE- *Aircraft seats; *Energy absorbers; Airborne; Army aircraft; Attenuation; Aviation accidents; Control; Crashes; Crashworthiness; Deceleration; Flight crews; Dynamic tests; Feasibility studies; Floors; Fuselages; Helicopters; Humans; Loads(Forces); Pivots; Protective equipment; Seats; Test and evaluation; Tolerances(Physiology)
ID- *Human factors engineering; *Safety engineering; H-58 aircraft; OH-58 aircraft; Pivoting seat pans(Aircraft); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1438023
AA- <NTIS> N89-18426/1
TI- Design of Helicopter Crashworthiness
AU- Giavotto, V. ; Caprile, C. ; Sala, G.
CS- Politecnico di Milano (Italy).
CS- <CODE> 016875000; PX565076
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cDec 88
PG- 9p
NT- In AGARD, Energy Absorption of Aircraft Structures as an Aspect of Crashworthiness 9 p.
LA- English
PC- (Order as N89-18421/2, PC A15/MF A01)
JA- GRAI8914; STAR2711
CP- Italy
AB- The extensive use of composite materials in helicopter structures has prompted research activities in crashworthiness in the last decade. A rational design of crashworthy structures requires a great deal of data and experience to be collected and organized; in particular the most efficient mechanisms of energy absorption must be understood and carefully investigated and consequently the best structural concepts and detail design can be identified. With this aim and in cooperation with Agusta Helicopters a research program was undertaken, covering many of the basic aspects of crashworthy design, i.e., dynamic experimentation on subcomponents and subassemblies, hybrid and true finite element modeling, design, and verification procedures. The paper presents some preliminary results, together with the outline of the whole program.
DE- *Aircraft reliability; *Aircraft survivability; *Helicopter design; *Human factors engineering; Finite element method; Mathematical models; Data bases; Fuel systems; Military technology; Requirements
ID- *Foreign technology; NTISNASAE
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1438020
AA- <NTIS> N89-18423/8
TI- Evolving Crashworthiness Design Criteria
AU- Carper, C. H. ; Burrows, L. T.
CS- Army Aviation Systems Command, Fort Eustis, VA. Safety and Survivability Technical Area.
CS- <CODE> 093608001; AZ152441
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cDec 88
PG- 8p
NT- In AGARD, Energy Absorption of Aircraft Structures as an Aspect of Crashworthiness 8 p.
LA- English
PC- (Order as N89-18421/2, PC A15/MF A01)
JA- GRAI8914; STAR2711
CP- United States
AB- Although significant strides were made in recent years toward improving aviation safety, mishaps involving all classes of helicopters presently are and will continue to be a major, expensive U.S. Army problem in terms of casualties, material loss, and reduction in mission effectiveness. Modern day training and tactical employment requirments for the U.S. Army helicopter dictate that a large percentage of operations occur in the low-speed, low-altitude flight regime, which contributes to the problem by reducing critical margins of safety normally associated with higher airspeed and higher altitude operations with accompanying greater time for response in case of an emergency. This increased probability of accident occurrence, coupled with the lack of in-flight egress capability, makes design for crashworthiness essential for Army helicopters. The evolution of crash survival design for rotary-wing aircraft and its application to current and new generation Army helicopters are discussed. Emphasis is given to the

need for a total systems' approach in design for crashworthiness and the necessity for considering crashworthiness early in the design phase of an aviation weapons development effort. The actual application of crashworthiness to Army helicopters is presented with statistics that show dramatic reductions in fatalities and injuries with implementation of a crashworthy fuel system. The cost effective aspects of designing helicopters to be more crash survivable are also discussed.
DE- *Aircraft reliability; *Aircraft survivability; *Structural design; Fuel systems; Human factors engineering; Cost effectiveness; Helicopters; Safety factors
ID- NTISNASAE
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1438018
AA- <NTIS> N89-18421/2
TI- Energy Absorption of Aircraft Structures as an Aspect of Crashworthiness
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; AD455458
SP- National Aeronautics and Space Administration, Washington, DC.
RN- AGARD-CP-443; ISBN-92-835-0485-2
PY- cDec 88
PG- 327p
NT- In French and English. Meeting Held in Luxembourg, 1-6 May 1988.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
DT- Conference proceeding
PC- PC A15/MF A01
JA- GRAI8914; STAR2711
CP- Other
AB- No abstract available.
DE- *Aircraft accidents; *Aircraft reliability; *Aircraft survivability; *Conferences; *Energy absorption; *Safety factors; Human factors engineering; Aircraft structures; Airframes; Helicopter design; Helicopters; Transport aircraft
ID- *Foreign technology; NTISNASAT
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1434936
AA- <NTIS> N89-18034/3
TI- Advanced Helicopter Cockpit and Control Configurations for Helicopter Combat Mission Tasks
AU- Haworth, L. A. ; Atencio, A. ; Bivens, C. ; Shively, R. ; Delgado, D.
CS- Army Aeroflightdynamics Directorate, Moffett Field, CA.
CS- <CODE> 094430000; AZ153632
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cJul 88
PG- 16p
NT- In AGARD, the Man-Machine Interface in Tactical Aircraft Design and Combat Automation 16 p. Previously Announced as N88-14988.
LA- English
PC- (Order as N89-18009/5, PC A13/MF A01)
JA- GRAI8913; STAR2710
CP- United States
AB- Two piloted simulations were conducted by the U.S. Army Aeroflightdynamics Directorate to evaluate workload and helicopter-handling qualities requirements for single pilot operation in a combat Nap-of-the-Earth environment. The single pilot advanced cockpit engineering simulation (SPACES) investigations were performed on the NASA Ames Vertical Motion Simulator, using the Advanced Digital Optical Control System control laws and an advanced concepts glass cockpit. The first simulation (SPACES I) compared single pilot to dual crewmember operation for the same flight tasks to determine differences between dual and single ratings, and to discover which control laws enabled adequate and single pilot helicopter operation. The SPACES II simulation concentrated on single pilot operations and use of control laws thought to be viable candidates for single pilot operations workload. Measures detected significant differences between single pilot task segments. Control system configurations were task dependent, demonstrating a need for inflight reconfigurable control system to match the optimal control system with the required task.
DE- *Cockpits; *Combat; *Control systems design; *Flight control; *Military helicopters; *Pilot performance; Flight characteristics; Flight simulation; Human factors engineering; Human performance; Nap-of-the-earth navigation
ID- NTISNASAE
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1434792
AA- <NTIS> N89-17579/8
TI- Tip Aerodynamics and Acoustics Test: A Report and Data Survey
AU- Cross, J. L. ; Watts, M. E.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.61:1179; A-87128; NASA-RP-1179
PY- Dec 88
PG- 463p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A20/MF A01
JA- GRAI8913; STAR2710
CP- United States
AB- In a continuing effort to understand helicopter rotor tip aerodynamics and acoustics, a flight test was conducted by NASA Ames Research Center. The test was performed using the NASA White Cobra and a set of highly instrumented blades. All aspects of the flight test instrumentation and test procedures are explained. Additionally, complete data sets for selected test points are presented and analyzed. Because of the high volume of data acquired, only selected data points are presented. However, access to the entire data set is available to the researcher on request.
DE- *Acoustic measurement; *Blade tips; *Flight tests; *Helicopters; *Rotor aerodynamics; AH-1G helicopter; Data acquisition; Surveys
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 46A (Physics--Acoustics)

AZ- 1434785
AA- <NTIS> ERATL-89/34
TI- Condition Monitoring and Safety. Seminar Proceedings Held in London, England on June 25, 1987
AU- Christie, L. F.
CS- ERA Technology Ltd., Leatherhead (England). Client and Membership Services.
CS- <CODE> 076749008
RN- ERA-87-0155; ISBN-0-7008-0372-6
PY- May 88
PG- 152p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC$103.00
JA- GRAI8913
CP- United Kingdom
AB- As part of its series of Technical Seminars, ERA Technology Ltd organized a seminar and exhibition entitled 'Condition Monitoring and Safety' on 25 June 1987 at the Regent Crest Hotel, London. The seminar provided an opportunity for delegates to review the techniques, applications, user experience and financial benefits of condition monitoring in industries where major hazards can occur. The papers covered hazard assessment, selecting a monitoring system, machinery protection through vibration based condition monitoring, ergonomic aspects of operator support systems, early warning detection of overheating using ionization chamber and computer analysis techniques, airborne engine condition monitoring on the Harrier GRMK 5/AV-8B(EMS), safety and condition monitoring through thermography, use of combinations of gas sensors as indicators of hazards, helicopter health monitoring, management of maintenance and plant safety - an insurer's view. (Copyright (c) 1988 ERA Technology Ltd.)
DE- *Safety; *Proceedings; Detectors; Warning systems; Hazards; Accident prevention; Utilization; Human factors engineering; Systems engineering ; Helicopters; Industrial plants
ID- *Foreign technology; *Occupational safety and health; *Environmental monitoring; Biomechanics; Work environments; NTISTFERA
SH- 57U* (Medicine and Biology--Public Health and Industrial Medicine); 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering); 41I (Manufacturing Technology--Job Environment); 85D (Transportation--Transportation Safety); 44G (Health Care--Environmental and Occupational Factors)

AZ- 1433602
AA- <NTIS> AD-A205 115/9
TI- Aeronautical Decision Making - Cockpit Resource Management
TI- <NOTE> Final rept
AU- Jensen, R. S.

CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- DOT/FAA/PM-86/46
CN- DTFA01-80-C-10080
PY- Jan 89
PG- 179p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8913
CP- United States
AB- Aviation accident data indicates that the majority of aircraft mishaps are due to judgment error. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates. The results of such tests were statistically significant and ranged from approximately 10% to 50% fewer mistakes. This manual is designed to explain the risks associated with flying activities involving multi-crew aircraft, the underlying behavioral causes of typical accidents, and the effects of stress on pilot decision making. The objective of this material is to enhance interpersonal communication and to facilitate effective leadership and coordination between crewmembers. It provides a sophisticated approach to developing concerted action based on optimal decision making. Several Cockpit Resources Management principles are presented in the manual; included are delegation of responsibilities, prioritization, vigilance and monitoring, joint discussion and planning, and receptive leadership techniques. This manual is one of a series on Aeronautical Decision Making prepared for the following pilot audiences: Student and Private, Instructor, Instrument, Helicopter, and Multi-crew. Keywords: Aviation training, Pilot error, Judgment, Cockpit resource management, Crew coordination, Human factors, Human performance, Aviation safety, Decision making, Communication. (sdw)
DE- *Aviation accidents; *Decision making; *Errors; *Pilots; *Resource management; Aeronautics; Aviation safety; Cockpits; Communication and radio systems; Crews; Helicopters; Human factors engineering; Instruction manuals; Interpersonal relations; Judgement(Psychology); Leadership; Optimization; Performance(Human); Training; Vigilance
ID- NTISDODXA; NTISDOTFAA
SH- 92B (Behavior and Society--Psychology); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85A (Transportation--Air Transportation)

AZ- 1427721
AA- <NTIS> AD-A204 006/1
TI- Thermal Stress in RAN (Royal Australian Navy) Sea King Helicopter Operations
TI- <NOTE> Aircraft systems rept
AU- Manton, J. G. ; Hendy, K. C.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
SP- Department of Defence, Canberra (Australia).
RN- ARL-SYS-R-40; DODA-AR-004-592
PY- Feb 88
PG- 54p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8911
CP- Australia
AB- The report deals with thermal stress in aircrew operating in the cabin and cockpit environment of the RAN's Sea King helicopter. The high thermal loads experienced in the helicopter have previously been established and various options for ameliorating the conditions have also been proposed. A review of the literature on thermal stress research is presented. The development of an Index of Thermal Stress for the Sea King (SKITS) is reported along with the results of a study to determine the ameliorating effect of blown cooled air directed at the faces of subjects in a thermal chamber. Keywords: Aircraft cabins, Heat stress(physiology), Human factors engineering, Body temperature, Protective clothing, Australia. (SDW)
DE- *Aircraft cabins; *Heat stress(Physiology); *Human factors engineering; *Thermal stresses; Body temperature; Chambers; Cockpits; Cooling; Environments; Helicopters; Indexes; Loads(Forces); Navy; Protective

clothing; Thermal properties
ID- *Foreign technology; *Aerospace medicine; Helicopters; Aircraft; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1427707
AA- <NTIS> AD-A203 992/3
TI- Simulator Design Features for Helicopter Shipboard Landings. 2. Performance Experiments
TI- <NOTE> Final technical rept. Dec 86-Jul 8
AU- Westra, D. P. ; Sheppard, D. J. ; Jones, S. A. ; Hettinger, L. J.
CS- Essex Corp., Orlando, FL
CS- <CODE> 084158000; 398322
SP- Naval Training Systems Center, Orlando, FL.
RN- NTSC-TR-87-041
CN- N61339-85-D-0026
PY- 9 Jul 87
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8911
CP- United States
AB- The Vertical Takeoff and Landing Simulator (VTOL) at the Naval Training Systems Center's (NTSC) Visual Technology Research Simulator (VTRS) was used to evaluate the effects of five simulator design features on performance for helicopter shipboard landings. The research was designed to evaluate the effect of current design features of the SH-60B Operational Flight Trainer (OFT), and other design features for training helicopter shipboard landings. The design features investigated were: 1) scene detail (SH-60B OFT scene versus an upgraded scene), 2) field of view (wide versus a smaller SH60B OFT field of view), 3) dynamic seat cueing (on versus off), 4) dynamic inflow (standard aero model available in existing trainers versus an updated aero model), and 5) visual transport delay (117 msec versus 183 msec). Twelve SH-60B helicopter pilots performed an approach, hover, and landing task on a representation of an FFG-7 frigate, and a precision hover (over the deck of the frigate) and landing task. The two tasks were performed separately and constituted two independent experiments. Two environmental factors were included. Calm and moderate seastate conditions were used to manipulate task difficulty during the approach, hover, and landing task, and vertical wind gusts were included as a standard feature in the precision hover task. Pilots were separated into low and high experience levels, defined in terms of their shipboard landing experience. (SDW)
DE- *Aircraft landings; *Helicopters; *Naval training; *Simulators; Cueing; Delay; Dynamics; Environments; Flow; Gusts; Hovering; Landing; Low level; Navy; Optical images; Pilots; Precision; Seats; Shipboard; Takeoff; Training; Transport; Vertical orientation; Vertical takeoff aircraft; Wind
ID- NTISDODXA; NTISDODN
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1426331
AA- <NTIS> PB89-131049
TI- Report of the Helicopter Human Factors Working Group
CS- Civil Aviation Authority, London (England).
CS- <CODE> 078399000
RN- CAA/PAPER-87007; ISBN-0-86039-312-7
PY- c1987
PG- 31p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E04/MF E04
JA- GRAI8910
CP- United Kingdom
AB- In response to Recommendations of the Helicopter Airworthiness Review Panel a Working Group was formed to evaluate the extent to which incidents and accidents to helicopters were due wholly or in part to human factor causes, and to suggest what steps might be taken, within the limits of current technology, to minimize or eliminate those causes. 'Human factors causes' was taken to refer only to the flight crew, and was defined as those causes in which the crew action or failure to act, for whatever reason, contributed to the occurrence or accident.

DE- *Aviation accidents; *Helicopters; *Human factors; Aircraft reliability ; Avionics; Standards; Flight crews; Flight instruments; Recommendations
ID- *Foreign technology; NTISTFCAA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1426145
AA- <NTIS> N89-15539/4
TI- Considerations Concerning the Assessment of Pilot Workload for Complex Task Conditions
AU- Vandegraaf, R. C.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-87069-U; ETN-89-93886
CN- NIVR-01406-N
PY- 25 Sep 87
PG- 19p
NT- Presented at the AGARD Joint Gcp/Fmp Symposium on the Man-Machine Concept in Tactical Design and Combat Automation, Stuttgart, Fed. Republic of Germany, 28 Sep. - 2 Oct. 1987.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8910; STAR2707
CP- Netherlands
AB- The problem of being able to draw conclusions from a variety (i.e., a matrix) of experimental measures in a complex task situation is discussed. Dealing with contradictory outcomes, the designating of artefacts, and formulating final conclusions without the (a-priori) availability of a superior method for evaluating other methods were examined in an in-flight study concerning the assessment of pilot workload under various instrument approach conditions for a fixed-wing (civil) transport aircraft. The experimental findings were compared with the results of an in-flight experiment dealing with pilot workload and performance during helicopter (instrument-flying) tasks. Subjective ratings, physiological measurements, and task performance measurements are assessed. A strategy for the formulation of final conclusions based on the outcomes of a matrix of measures is suggested.

DE- *In-flight monitoring; *Pilot performance; *Workloads (Psychophysiology); Instrument approach; Man machine systems; Ratings; Task complexity
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 1425966
AA- <NTIS> N89-15118/7
TI- In-Flight Simulation Investigation of Rotorcraft Pitch-Roll Cross Coupling
AU- Watson, D. C. ; Hindson, W. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:101059; A-89016; NASA-TM-101059
PY- Dec 88
PG- 41p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8910; STAR2707
CP- United States
AB- An in-flight simulation experiment investigating the handling qualities effects of the pitch-roll cross-coupling characteristic of single-main-rotor helicopters is described. The experiment was conducted using the NASA/Army CH-47B variable stability helicopter with an explicit-model-following control system. The research is an extension of an earlier ground-based investigation conducted on the NASA Ames Research Center's Vertical Motion Simulator. The model developed for the experiment is for an unaugmented helicopter with cross-coupling implemented using physical rotor parameters. The details of converting the model from the simulation to use in-flight are described. A frequency-domain comparison of the model and actual aircraft responses showing the fidelity of the in-flight simulation is described. The evaluation task was representative of nap-of-the-Earth maneuvering flight. The results indicate that task demands are important in determining allowable levels of coupling. In addition, on-axis damping characteristics influence the frequency-dependent characteristics of coupling and affect the handling qualities. Pilot

technique, in terms of learned control crossfeeds, can improve performance and lower workload for particular types of coupling. The results obtained in-flight corroborated the simulation results.
DE- *CH-47 helicopter; *Cross coupling; *Flight characteristics; *Pitch (Inclination); *Roll; *Simulation; Pilot performance; Proving
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1418336
AA- <NTIS> PB89-132625
TI- Noise Attenuation Properties of Headsets in a Helicopter Noise Environment
AU- Lower, M. C. ; Wheeler, P. D.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
CS- <CODE> 013996002
SP- Civil Aviation Authority, London (England).
RN- ISBN-0-86039-299-6; CAA/PAPER-87004
PY- c1987
PG- 40p
NT- Sponsored by Civil Aviation Authority, London (England).
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E04/MF E04
JA- GRAI8908
CP- United Kingdom
AB- The paper reports an experiment conducted by the Institute of Sound and Vibration Research and the Royal Aircraft Establishment for the Civil Aviation Authority. The evaluation exposed ten subjects wearing each of four headset types to two helicopter noise environments and measured the noise received at the ear. The evaluation shows the relative attenuation performance between the headset types; it also shows the effect of 'live-microphone' communication systems on the noise levels being presented to helicopter pilots. The results of the evaluation are compared with the noise environment standards given in a Health and Safety Executive Code of Practice for exposure of persons to noise.
DE- *Acoustic measurement; *Earphones; *Helicopters; Graphs(Charts); Experimental data; Flight crews; Simulation; Human factors engineering; Noise reduction
ID- *Foreign technology; *Noise pollution; NTISTFCAA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1416127
AA- <NTIS> AD-A201 486/8
TI- Task Analysis of the UH-60 Mission and Decision Rules for Developing a UH-60 Workload Prediction Model. Volume 2. Mission Analysis Appendixes A - E
TI- <NOTE> Interim rept. Dec 86-Dec 8
AU- Bierbaum, C. R. ; Szabo, S. M. ; Aldrich, T. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-302-87-VOL-2; ARI-A-88-36
CN- MDA903-87-C-0523; A793; 132
PY- Dec 87
PG- 117p
NT- See also Volume 3, AD-A201 318.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8908
CP- United States
AB- This announcement presents the appendixes to a comprehensive task analysis of the UH-60 mission conducted using a composite scenario. The analysis used a top-down approach to identify the phases, functions, and tasks for the mission. Nine phases, 34 segments, 48 functions, and 138 tasks were identified. The crew member performing each task was also identified, and estimates of the sensory, cognitive, and psychomotor workload associated with the tasks were derived. Estimates of the task times were derived as well. Man-machine interface, Aviator workload, Mission analysis, Task analysis, Modelling. (JES)
DE- *Man machine systems; Crews; Decision theory; Interfaces; Mission profiles; Pilots; Psychomotor tests; Scenarios; Workload
ID- *Job analysis; *Helicopters; *Workload; *Missions; NTISDODXA; NTISDODA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors

Engineering); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1415959
AA- <NTIS> AD-A201 317/5
TI- Task Analysis of the UH-60 Mission and Decision Rules for Developing a UH-60 Workload Prediction Model. Volume 4. Segment Decision Rules Appendixes H and I
TI- <NOTE> Interim rept. Dec 86-Dec 8
AU- Bierbaum, C. R. ; Szabo, S. M. ; Aldrich, T. B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI690-302-87-VOL-4; ARI-A-88-38
CN- MDA903-87-C-0523
PY- Oct 88
PG- 147p
NT- See also Volume 3, AD-A201 318.
LA- English
PC- Not available NTIS
JA- GRAI8908
CP- United States
AB- A composite scenario was used to conduct a comprehensive task analysis of the UH-60 helicopter mission. This analysis used a top-down approach to identify the phases, functions, and tasks of the mission. Nine phases, 34 segments, 48 functions, and 138 tasks were identified. The crew-member performing each function was identified, and estimates of the sensory, cognitive, and psychomotor workload associated with the tasks were derived. Estimates of the task times also were derived. The mission/task analysis data were used to develop a computer model of workload for UH-60 crewmembers. The model used a bottom-up approach to build mission functions from tasks and mission segments from functions. Decision rules were written to specify the procedure for combining the tasks into functions and the functions into segments. The model permitted an analysis of total workload experienced by each crewmember in the performance of both sequential and concurrent tasks. Keywords: Man-machine interface. (KR)
DE- *Helicopters; *Job analysis; *Man machine systems; *Missions; *Workload ; Computerized simulation; Predictions; Flight crews; Interfaces; Psychomotor tests; Scenarios
ID- UH-60 aircraft; NTISDODXA; NTISDODA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1414629
AA- <NTIS> N89-12570/2
TI- Design and Numerical Evaluation of Full-Authority Flight Control Systems for Conventional and Thruster-Augmented Helicopters Employed in NOE (Nap-of-the-Earth) Operations
TI- <NOTE> Interim Repor
AU- Perri, T. A. ; McKillip, R. M. ; Curtiss, H. C.
CS- Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
CS- <CODE> 009938087; P3732113
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:183311; TR-1789T; NASA-CR-183311
CN- NAG2-244
PY- Aug 87
PG- 199p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8907; STAR2704
CP- United States
AB- The development and methodology is presented for development of full-authority implicit model-following and explicit model-following optimal controllers for use on helicopters operating in the Nap-of-the Earth (NOE) environment. Pole placement, input-output frequency response, and step input response were used to evaluate handling qualities performance. The pilot was equipped with velocity-command inputs. A mathematical/computational trajectory optimization method was employed to evaluate the ability of each controller to fly NOE maneuvers. The method determines the optimal swashplate and thruster input histories from the helicopter's dynamics and the prescribed geometry and desired flying qualities of the maneuver. Three maneuvers were investigated for both the implicit and explicit controllers with and without auxiliary propulsion installed: pop-up/dash/descent, bob-up at 40 knots, and glideslope. The explicit controller proved to be superior to the implicit controller in performance and ease of design.
DE- *Aircraft maneuvers; *Automatic flight control; *Helicopter control; *Nap-of-the-Earth navigation; *Trajectory optimization; Ah-1g helicopter; Cost analysis; Dynamic control; Pilot performance; Thrust

augmentation; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1413008
AA- <NTIS> AD-A200 727/6
TI- Positive Flotation Harness (PFH) for Use by Canadian Forces Search and Rescue Technicians
TI- <NOTE> Technical rept
AU- Firth, J. A. ; Steffler, J. C.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
RN- DCIEM-88-TR-27
PY- May 88
PG- 40p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8907
CP- Canada
AB- At the request of Maritime Air Group Headquarters Halifax, National Defence Headquarters (NDHQ) tasked the Medical Life Support Division (MLSD) of this Institute (DCIEM) to research and develop a flotation system for the Canadian Forces Safety Restraint Harness, Rescue Specialist (Double Lift Harness). The system should provide sufficient independent buoyancy for the wearer to conduct water rescue exercises without relying on the use of a life preserver. Utilizing unicellular foam for buoyancy, MLSD designed four prototype flotation systems over a period of four years, for operational evaluations (OPVAL) by Helicopter Squadrons 406, 423, 443, and the Diving Team of Canadian Forces Base Shearwater, Nova Scotia. Initial test results revealed deficiencies which were rectified by MLSD, based on operator recommendations. The last prototype evaluation concluded that the tested flotation system had sufficient buoyancy to keep two persons afloat, was a suitable replacement for the Double Lift Harness/Jacket Lifesaving Combination and recommended that production models be acquired for the CH124A Helicopter fleet. A Canadian Aerospace Company is now finalizing fabrication of 70 flotation vests with inherent buoyancy and MLSD has submitted a draft Canadian Forces Modification Instruction detailing the interface of the vest and Double Lift Harness to NDHQ. (SDW)
DE- *Flotation; *Harnesses; *Life preservers; *Search and rescue; Buoyancy; Diving; Foam; Interfaces; Lift; Marine atmospheres; Military facilities ; Military forces(Foreign); Nova Scotia; Operators(Personnel); Production models; Prototypes; Specialists; Teams(Personnel); Technicians; Test and evaluation; Vests; Water; Exercise(Physiology)
ID- *Foreign technology; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 85D (Transportation--Transportation Safety); 74GE (Military Sciences--General)

AZ- 1412925
AA- <NTIS> AD-A200 629/4
TI- Impact of the U.S. Army's AH-64 Helmet Mounted Display on Future Aviation Helmet Design
TI- <NOTE> Final rept
AU- Rash, C. E. ; Martin, J. S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-88-13
CN- 3E162787A879; BG
PY- Aug 88
PG- 22p
NT- Pub. in Report of Meeting of Air Standardization Coordinating Committee Working Party 61 (28th), Appendix 3 Annex M pM-3-1 thru M-3-17, n.d.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding; Journal article
PC- PC A03/MF A01
JA- GRAI8907
CP- United States
AB- Historically, the goal of aviation helmet design has been to primarily provide impact and noise protection to the user. In 1984, the U.S. Army fielded an advanced attack helicopter which required a new helmet concept in which the role of the helmet was expanded to provide visually coupled interface between the aviator and the aircraft. This new helmet system, the Integrated Helmet and Display Sighting System (IHADSS), uses a helmet fitted with infra-red (IR) emitters and a

monocular display. The IR emitters allow a slewable IR imaging sensor, mounted on the nose of the aircraft, to be slaved to the aviator's head movements. Imagery from this sensor is presented to the aviator through the helmet mounted display. This type system generates several concerns, recognized early on, but still unresolved. These areas include questions of monocular vs. binocular imagery, eye dominance, and binocular rivalry. Additionally, the task of interfacing the aviator's head to the aircraft has introduced previously unrecognized problems relating to head anthropometry and facial anatomy. The fitting process has become a crucial factor in the aviator's ability to interface with the aircraft systems. The development and fielding of the IHADSS helmet mounted display have expanded the role and importance of the helmet. If helmet mounted displays are the design choice of future aircraft, it will be imperative to place increased emphasis on the human factors aspects of the helmet. (SDW)

DE- *Helmet mounted displays; *Flight helmets; Aeronautics; Aircraft; Anatomy; Anthropometry; Attack helicopters; Detectors; Display systems; Eye; Face(Anatomy); Fittings; Human factors engineering; Images; Integrated systems; Interfaces; Noise; Noses; Pilots; Protection; Reprints

ID- *Meetings; NTISDODXR

SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1412020

AA- <NTIS> N89-12178/4

TI- Simulator Sickness in US Army and Navy Fixed- and Rotary-Wing Flight Simulators

AU- Gower, D. W. ; Lilienthal, M. G. ; Kennedy, R. S. ; Fowlkes, J. E.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; AY826435

SP- National Aeronautics and Space Administration, Washington, DC.

PY- cJun 88

PG- 20p

NT- In AGARD, Motion Cues in Flight Simulation and Simulator Induced Sickness 20 p.

LA- English

PC- (Order as N89-12171/9, PC A09/MF A01)

JA- GRAI8906; STAR2703

CP- United States

AB- As technology has been developed to provide improved visual and motion systems in operational flight trainers and weapons tactics trainers, there have been increasing reports of the occurrence of simulator sickness. Simulator sickness here refers to one or more symptoms which can occur while in a simulator, immediately after exposure, or at some later time. Flight instructors have complained these symptoms interfere with simulator usage. More critical is the potential for in-flight problems due to prolonged physiological effects. As a result, flight activities after simulator flight have been limited in some commands. The U.S. Army Aeromedical Research Laboratory at Fort Rucker, Alabama, and the Naval Training Systems Center at Orlando, Florida, conducted field surveys to document the extent of the simulator sickness problems at operational fixed and rotary-wing simulator sites. Data are pooled from 10 different Navy flight simulators and the Army's AH-64 flight simulator. The total number of surveys is about 1500, with the number of subjects in each simulator type ranging from 18 to 280. The simulator sickness incidence rates and the relative frequency of specific symptoms are presented and correlational factors such as flight experience, simulator experience, and flight mode also are presented. Difficulties in assessing the duration of simulator sickness effects are noted, and attempts made to present the symptom duration for the Army's AH-64 combat mission simulator (CMS). Unique to this CMS is its use of the helmet display unit (HDU) in conjunction with the other visuals in the simulator.

DE- *Design analysis; *Evaluation; *Fixed wings; *Flight simulators; *Motion sickness; *Rotary wing aircraft; *Vestibular tests; Aerospace medicine; Flight simulation; Physiological effects; Pilot training; Weapon systems

ID- *Aerospace medicine; NTISNASAE

SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1408185

AA- <NTIS> TIB/B88-82063

TI- Ortungs- und Suchverfahren mit Helicoptern bei Seenot-/Luftnotfaellen. Schlussbericht. (Locating and search procedures with helicopters for sea- and/or air-emergencies. Final report)

AU- Eisbrecher, H.D.

CS- Henschel Flugzeug-Werke G.m.b.H., Kassel (Germany, F.R.). Reedereigemeinschaft Forschungsschiffahrt G.m.b.H., Bremen (Germany, F.R.);

CS- <CODE> 093307000

SP- Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.).

CN- BMFT FPN 0079

PY- Mar 87

PG- 57p
NT- In German, With 12 refs., 6 tabs., 53 figs.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC E09
JA- GRAI8904
CP- Germany, Federal Republic of
AB- The project was aimed at providing flight procedures and tables to assist locating and search procedures. The variety of problems encountered in flight tests revealed that most of the equipment available from industry sources for the intended application is either unusable or not compatible. In light of this fact, the actual values were determined in the program, followed by deliberations and, where possible, tests and trials to find the reasons for the non-satisfactory operation. These results and the instruments and equipment available are a basis for further tests to be accomplished with the possible aim of establishing the general engineering specifications for the design of such equipment. The project further included underwater sound ranging tests which yielded a positive result. (orig.). (Copyright (c) 1988 by FIZ. Citation no. 88:082063.)
DE- *Bo-105 helicopter; *Rescue operations; Procedures; Emergencies; Positioning; Searching; Searchradar; Seas; Air; Homing devices; Airborne equipment; Infrared photography; Transponders; Vests; Emergency locator transmitter; Underwater
ID- *Foreign technology; NTISTFFIZ
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 63H (Detection and Countermeasures--Radiofrequency Detection); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1406352
AA- <NTIS> AD-A200 028/9
TI- Heliport Visual Approach and Departure Airspace Tests. Volume 1. Summary
TI- <NOTE> Technical note Mar-Jul 8
AU- Weiss, R. M. ; Wolf, C. J. ; Harris, M. ; Triantos, J.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN87/40-1
PY- Aug 88
PG- 39p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8904
CP- United States
AB- During the winter and spring of 1987 flight tests were conducted at the Federal Aviation Administration (FAA) Technical Center's Concepts Development and Demonstration Heliport at the Atlantic City International Airport, N.J. The purpose of these flights was to examine and validate the current heliport approach/departure surfaces criteria as defined in the heliport Design Guide and to recommend modifications to these surfaces, if appropriate. The flight activities were conducted using aircraft representative of those in the civilian world. Data were collected using approach surfaces of 7.125, 8.00, and 10.00 deg for straight as well as curved path procedures. Also, departure surfaces of 7.125, 10.00, and 12.00 deg for straight and curved path procedures were used. All maneuvers were tracked by ground based tracking systems. This report documents the results of this activity. It describes the flight test and evaluation methodology and addresses technical as well as operational issues. It provides statistical and graphical analysis of pilot performance along with a discussion of pilot subjective opinions concerning the acceptability and perceived workload, safety, and control margins associated with the procedures flown. The results of this work will be considered in the future modifications of the FAA Heliport Design Advisory Circular, AC 150/5390-2. (FR)
DE- *Helicopters; *Approach; Air space; Angles; Takeoff; Curvature; Demonstrations; Flight; Flight testing; Graphics; Ground level; Heliports; Maneuvers; Paths; Performance(Human); Pilots; Surfaces; Test and evaluation; Tracking; Visual perception; Winter; Workload
ID- Aviation safety; NTISDODXA
SH- 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1404658
AA- <NTIS> N88-30297/1
TI- Prediction and Measurement of Human Pilot Dynamic Characteristics in a Manned Rotorcraft Simulation
AU- Hess, R. A. ; Reedy, J. T.
CS- California Univ., Davis.

CS- <CODE> 004365000; CC907079
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:183246; NASA-CR-183246
CN- NCC2-241
PY- 7 Oct 88
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8903; STAR2624
CP- United States
AB- An analytical and experimental study of the human pilot control strategies in a manned rotorcraft simulation is described. The task simulated involves a low-speed, constant-altitude maneuvering task in which a head-down display is utilized to allow the pilot to track a moving hover point. The efficacy of the display law driving an acceleration symbol is determined and the manner in which the prediction and measurement of pilot/vehicle dynamics can be made part of man/machine system evaluations is demonstrated.
DE- *Aircraft control; *Dynamical systems; *Flight simulation; *Man machine systems; *Pilot performance; *Rotary wing aircraft; Display devices; Head down tilt; Hovering; Low speed; Maneuvers
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1404391
AA- <NTIS> N88-29816/1
TI- Threat Expert System Technology Advisor
AU- Kurrasch, E. R. ; Tripp, L. R.
CS- Odetics, Inc., Anaheim, CA.
CS- <CODE> 079437000; OE968727
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177479; NASA-CR-177479
CN- NAS2-12558
PY- Aug 87
PG- 101p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8903; STAR2624
CP- United States
AB- A prototype expert system was developed to determine the feasibility of using expert system technology to enhance the performance and survivability of helicopter pilots in a combat threat environment while flying NOE (Nap of the Earth) missions. The basis for the concept is the potential of using an Expert System Advisor to reduce the extreme overloading of the pilot who flies NOE mission below treetop level at approximately 40 knots while performing several other functions. The ultimate goal is to develop a Threat Expert System Advisor which provides threat information and advice that are better than even a highly experienced copilot. The results clearly show that the NOE pilot needs all the help in decision aiding and threat situation awareness that he can get. It clearly shows that heuristics are important and that an expert system for combat NOE helicopter missions can be of great help to the pilot in complex threat situations and in making decisions.
DE- *Expert systems; *Helicopters; *Pilot performance; *Threat evaluation; *Workloads (Psychophysiology); Aircraft survivability; Combat; Decision making; Heuristic methods; Nap-of-the-earth navigation
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 62GE (Computers, Control, and Information Theory--General)

AZ- 1404344
AA- <NTIS> N88-29739/5
TI- Advances in Flying Qualities: Concepts and Criteria for a Mission Oriented Flying Qualities Specification
AU- Hoh, R. H.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; S9710660
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cMay 88
PG- 28p
NT- In AGARD, Advances in Flying Qualities 28 p.
LA- English
PC- (Order as N88-29735/3, PC A09/MF A01)
JA- GRAI8903; STAR2624

CP- United States
AB- There has been considerable activity over the past 8 years to upgrade the military flying qualities specifications for conventional aircraft, as well as for V/STOLs and helicopters. The primary objectives of these upgrades has been to account for the use of high gain, high authority augmentation, and to more directly reflect the requirements of the intended missions into the specifications. The methodologies developed to accomplish the latter objective are summarized. A brief overview of the Lower Order Equivalent Systems and Bandwidth criteria follows. Problems with the specification of control sensitivity, and potential solutions are then discussed, followed by a brief presentation of the use of time vs frequency domain criteria. An empirical method to combine the Cooper-Harper Handling Qualities Ratings (HQRs) from each axis of control into an overall rating is then presented. Finally, a proposed specification for precision flare and landing is given, followed by an example application of the method.
DE- *Aircraft control; *Flight characteristics; *Flight control; *Mathematical models; Controllability; Aircraft landing; Human factors engineering; Man machine systems; Pitch (Inclination); Roll; Stability augmentation
ID- NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1403329
AA- <NTIS> AD-A199 530/7
TI- Development of LHX (Light Helicopter Family) MANPRINT (Manpower and Personnel Integration) Issues
TI- <NOTE> Final rept. Mar-Dec 8
AU- Jones, R. E. ; Trexler, R. C. ; Barber, J. L. ; Guthrie, J. L.
CS- Allen Corp. of America, Alexandria, VA.
CS- <CODE> 057388000; 392997
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ARI-RN-88-88
PY- Sep 88
PG- 178p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8903
CP- United States
AB- This research note documents one stage in the incorporation of Manpower and Personnel Integration (MANPRINT) into the early stages of the acquisition of a major weapon system. It describes a process of identifying and analyzing the human factors, health hazard, and training issues associated with the Light Helicopter Family (LHX). The RN also describes the LHX MANPRINT Data Base Management System -- an automated data base whose structure and operation should be generally useful in any acquisition of materiel. Keywords: Manpower, Personnel integration, Human factors engineering, MANPRINT Automated Data Base, Safety, Helicopters, Training, Health hazards. (mjm)
DE- *Hazards; *Helicopters; *Human factors engineering; *Manpower; Acquisition; Automation; Data bases; Documents; Health; Integration; Lightweight; Materiel; Personnel; Weapon systems
ID- *LHX(light helicopter experimental); NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1403081
AA- <NTIS> AD-A199 274/2
TI- Proceedings of the SAFE Association Annual Symposium (22nd), Held in Las Vegas, Navada on 9-13 December 1984
CS- SAFE Association, Newhall, CA.
CS- <CODE> 093174000; 417901
PY- 1984
PG- 397p
NT- SAFE Association, 15723 Vanowen St., Suite 246, Van Nuys, CA 91406. PC $27.50. No copies furnished by DTIC/NTIS.
LA- English
DT- Conference proceeding
PC- Not available NTIS
JA- GRAI8903
CP- United States
AB- Partial contents: Examination of fire safety of commercial aircraft cabins; A new high-fidelity human analog for ejection testing; Acceleration exposure limits for escape system advanced development; Computer tools and techniques for analysis of discrete data from aircrew automated escape systems (AAES); A single point release system for the advanced concept ejection seat (ACES) II survival kit and parachute risers; Development of a zero-prebreathe spacesuit; Yaw stabilization of an open ejection seat, fact or fantasy; Development of an impermeable chemical defense protective ensemble (IMP); The future of advanced crew escape capsule technology; Development of mechanical

components for advanced aircrew seating systems; How much inherent buoyancy is acceptable in a helicopter passenger immersion suit; A scientific method for determining the useful life of explosive devices in aircraft; The use of TLX energy transfer lines on the F-16 aircraft; Altitude and acceleration protection system for high performance aircraft. Keywords: Aviation safety, Aviation accidents, Oxygen equipment, Breathing apparatus, Survival personnel, Acceleration tolerance, Accident investigations, Restraints, Life support systems, Survival equipment, Human factors engineering, Protective equipment, Wounds and injuries, Blackout physiology. (AW)

DE- *Aviation safety; *Escape systems; *Life support systems; *Protective equipment; *Survival kits; Acceleration; Acceleration tolerance; Accident investigations; Aircraft; Aircraft cabins; Analog systems; Automation; Aviation accidents; Blackout(Physiology); Breathing apparatus; Buoyancy; Commercial aircraft; Computer applications; Ejection; Ejection seats; Exposure(Physiology); Fire safety; Flight crews; High rate; Human factors engineering; Humans; Limitations; Mechanical components; Oxygen equipment; Parachutes; Performance(Engineering); Protection; Release; Safety; Seats; Stabilization; Survival equipment; Survival(Personnel); Symposia; Test and evaluation; Yaw

ID- NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1403079

AA- <NTIS> AD-A199 272/6

TI- Proceedings of the SAFE Association Annual Symposium (20th), Held in Las Vegas, Nevada on 6-10 December 1982

CS- SAFE Association, Newhall, CA.

CS- <CODE> 093174000; 417901

PY- 1982

PG- 343p

NT- SAFE Association, 15723 Vanowen St., Box 246, Van Nuys, CA 91406. PC $27.50. No copies furnished by DTIC/NTIS.

LA- English

DT- Conference proceeding

PC- Not available NTIS

JA- GRAI8903

CP- United States

AB- Partial contents: Ballistic protective headgear for Navy/Marine Corps rotary wing aircrew; Molecular sieve generation of oxygen for field hospitals; Extension of service life of rigid transfer lines (SMDC); Improving restraint system capabilities; Heat stress related to the operation of Canadian forces aircraft - a historical review and possible solution; Development of helicopter underwater escape training for aircrew and passengers; Operational readiness and the human factors environment; In-flight rescue concept for combat helicopter crews - development and groundtests; Physiological testing of a helicopter mobile aircrewman cooling system; Down in the arctic: Equipment and training for survival; Portable vacuums for controlling asbestos hazards; Unassisted through canopy ejection experience; A servo controlled rapid response anti-g valve; The AH-64 nitrogen inerting unit; The air force chemical defense program: Integration and focus; An investigation of the fatality rates for different canopy modes of ejection; Inflight loss of consciousness; A study of post-egress procedures and techniques conducted to increase aircrew survival following emergency escape over water. Keywords: Ejection seats, Oxygen equipment, Lapbelts, Prevention, Life support systems, Parachutes, Helmets, Escape systems, Wounds and injuries, Aviation accidents, Aviation safety, Accident investigations. (AW)

DE- *Escape systems; *Life support systems; *Safety; *Symposia; *Survival equipment; *Rescue equipment; *Safety equipment; Accident investigations; Aircraft; Arctic regions; Asbestos; Aviation accidents; Aviation safety; Ballistics; Canada; Canopies; Casualties; Consciousness; Death; Ejection; Ejection seats; Field equipment; Flight crews; Hazards; Headgear; Heat stress(Physiology); Helicopters; Helmets ; Hospitals; Human factors engineering; Inflight; Life expectancy(Service life); Military forces(Foreign); Molecular sieves; Operational readiness; Oxygen; Oxygen equipment; Parachutes; Passengers ; Portable equipment; Protective clothing; Rescues; Restraint; Survival(Personnel); Test and evaluation; Training; Underwater; Vacuum; Warfare

ID- NTISDODXA

SH- 85D (Transportation--Transportation Safety); 51B (Aeronautics and Aerodynamics--Aeronautics); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1403003

AA- <NTIS> AD-A199 193/4

TI- Technical and Engineering Services for Infrared Measurement Support

TI- <NOTE> Final technical rept

CS- Mesa, Inc., King George, VA.

CS- <CODE> 093169000; 398342

CN- N00014-84-C-2442
PY- 1 Oct 88
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8903
CP- United States
AB- This report summarizes the technical and engineering support to develop an overall field measurement procedure for evaluating various electronic countermeasure devices. In particular, the procedure will outline the dynamic and static calibration procedures to be used for various commercial thermal imagers, radiometers, interferometer spectrometers and anti-ship missile simulators. These procedures should be designed to utilize present and future hardware upgrades to the Infrared Simulation, Test and Calibration Laboratory. During the field measurement exercises, the contractor shall utilize and validate the software and hardware techniques developed for the equipment. A variety of field measurement programs will be performed aboard such mobile and stationary platforms as fixed wing aircraft, helicopters and instrument vans to quantify in radiometric units various infrared emitting targets.
DE- *Electronic countermeasures; *Infrared detection; *Measurement; *Radiometers; Antiship missiles; Calibration; Commerce; Computer programs; Dynamics; Electronic equipment; Emission; Engineering; Fixed wing aircraft; Guided missile simulators; Helicopters; Infrared image tubes; Infrared radiation; Instrumentation; Interferometers; Laboratories; Mobile; Platforms; Radiometry; Simulation; Spectrometers; Statics; Stationary; Targets; Vans
ID- NTISDODXA
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems)

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CZ- Comp&distr 2000 NTIS, Intl Cpyrght All Right. All rts. reserv.
AZ- 1402910
AA- <NTIS> PB89-850978
TI- Military Helicopters. April 1985-November 1988 (Citations from the Compendex Database)
TI- <NOTE> Rept. for Apr 85-Nov 88
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 88
PG- 66p
NT- Supersedes PB88-852231.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8902
CP- United States
AB- This bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (This updated bibliography contains 114 citations, 39 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- NTISNTISI; NTISNERACD
SH- 51C* (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1398313
AA- <NTIS> DE88702589
TI- Final Report of Aerial Surveying Team of the Goiania City, Brazil
AU- Barreto, P. M. C. ; Simoes, E.
CS- Instituto de Radioprotecao e Dosimetria, Rio de Janeiro (Brazil).
CS- <CODE> 067513000; 3272750
RN- INIS-BR-1005
PY- Oct 87
PG- 14p
NT- In Portuguese.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is

located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Portuguese
PC- PC A03/MF A01
JA- GRAI8901
CP- Brazil
AB- The results of the aeroradiometric survey using an helicopter, in Goiania City, Brazil, to localize focus of radioactive contamination due an accidental rupture of a capsule of Cs-137 source, are presented. The system of radiometric measurements consisted of two portable gamma spectrometers, two NaI(Tl) detectors and a graphic register. (Atomindex citation 19:050390)
DE- *Aerial Surveying; *Cesium 137; *Radiation Measuring Instruments; Brazil; Contamination; Gamma Spectrometers; NaI Detectors; Progress Report; Radiation Accidents
ID- *Foreign technology; ERDA/070200; ERDA/440101; NTISINIS
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 68F (Environmental Pollution and Control--Radiation Pollution and Control); 57V (Medicine and Biology--Radiobiology); 97Q (Energy--Selected Studies In Nuclear Technology)

AZ- 1392779
AA- <NTIS> N88-26377/7
TI- Computer Simulation of Multiple Pilots Flying a Modern High Performance Helicopter
AU- Zipf, M. E. ; Vogt, W. G. ; Mickle, M. H. ; Hoelzeman, R. G. ; Kai, F.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; ND315753
RN- NAS 1.15:100183; E-3760; NASA-TM-100183
CN- NAG3-729
PY- Jul 88
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8823; STAR2620
CP- United States
AB- A computer simulation of a human response pilot mechanism within the flight control loop of a high-performance modern helicopter is presented. A human response mechanism, implemented by a low order, linear transfer function, is used in a decoupled single variable configuration that exploits the dominant vehicle characteristics by associating cockpit controls and instrumentation with specific vehicle dynamics. Low order helicopter models obtained from evaluations of the time and frequency domain responses of a nonlinear simulation model, provided by NASA Lewis Research Center, are presented and considered in the discussion of the pilot development. Pilot responses and reactions to test maneuvers are presented and discussed. Higher level implementation, using the pilot mechanisms, are discussed and considered for their use in a comprehensive control structure.
DE- *Computerized simulation; *Helicopters; Control systems design; Human factors engineering; Pilot performance; Cockpits; Dynamic control; Feedback control; Flight control; Nonlinear systems; Transfer functions

ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1392778
AA- <NTIS> N88-26376/9
TI- Computer Simulation of a Single Pilot Flying a Modern High-Performance Helicopter
AU- Zipf, M. E. ; Vogt, W. G. ; Mickle, M. H. ; Hoelzeman, R. G. ; Kai, F.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; ND315753
RN- NAS 1.15:100182; E-3759; NASA-TM-100182
CN- NAG3-729
PY- Jul 88
PG- 25p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8823; STAR2620
CP- United States
AB- Presented is a computer simulation of a human response pilot model able to execute operational flight maneuvers and vehicle stabilization of a modern high-performance helicopter. Low-order, single-variable, human response mechanisms, integrated to form a multivariable pilot structure, provide a comprehensive operational control over the

vehicle. Evaluations of the integrated pilot were performed by direct insertion into a nonlinear, total-force simulation environment provided by NASA Lewis. Comparisons between the integrated pilot structure and single-variable pilot mechanisms are presented. Static and dynamically alterable configurations of the pilot structure are introduced to simulate pilot activities during vehicle maneuvers. These configurations, in conjunction with higher level, decision-making processes, are considered for use where guidance and navigational procedures, operational mode transfers, and resource sharing are required.
DE- *Computerized simulation; *Flight control; *Helicopters; Human reactions; Pilot performance; Aircraft guidance; Decision making; Maneuvers; Navigation
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1391324
AA- <NTIS> AD-P005 758/8
TI- NAE (National Aeronautical Establishment) Atmospheric Research Aircraft
AU- MacPherson, J. I. ; Baillie, S. W.
CS- National Aeronautical Establishment, Ottawa (Ontario).
CS- <CODE> 019035000; 240300
PY- cDec 87
PG- 19p
NT- This article is from 'The Flight of Flexible Aircraft in Turbulence - State-of-the-Art in the Description and Modelling of Atmospheric Turbulence: Meeting of the Structures and Materials Panel of AGARD (64th) Held in Athens (Greece) on 28 September-3 October 1986,' AD-A194 870, p4-1 - 4-19.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8823
CP- Canada
AB- The Flight Research Laboratory of the National Aeronautical Establishment of Canada operates a T-33 and a Twin Otter aircraft instrumented for atmospheric research studies. This paper describes the instrumentation in the aircraft with emphasis on the strapped-down inertial/Doppler system used to derived the mean and turbulent components of the atmospheric motion. Example data from several research projects are presented to demonstrate the measurement and analysis capabilities of the aircraft and their data playback facilities.
DE- *Atmospheric motion; *Turbulence; Gusts; Research aircraft; Flight instruments; Flight recorders; Fixed wing aircraft; Helicopters
ID- *Foreign technology; Atmospheric turbulence; Component reports; NATO furnished; NTISDODXA
SH- 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 51C (Aeronautics and Aerodynamics--Aircraft); 46B (Physics--Fluid Mechanics)

AZ- 1383119
AA- <NTIS> PB88-866751
TI- Head Up Displays. January 1975-July 1988 (Citations from the International Aerospace Abstracts Database)
TI- <NOTE> Rept. for Jan 75-Jul 88
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 88
PG- 139p
NT- Supersedes PB87-864674. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC.
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LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8819
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 305 citations, 21 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices; Avionics
ID- *Head up displays; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E

(Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1381905
AA- <NTIS> N88-22905/9
TI- Investigation of the Ability to Recover from Transients Following Failures for Single-Pilot Rotorcraft
AU- Mansur, M. H. ; Schroeder, J. A.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:100078; A-88113; NASA-TM-100078
PY- May 88
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8819; STAR2616
CP- United States
AB- A moving-base simulation was conducted to investigate a pilot's ability to recover from transients following single-axis hard-over failures of the flight-control system. The investigation was performed in conjunction with a host simulation that examined the influence of control modes on a single pilot's ability to perform various mission elements under high-workload conditions. The NASA Ames large-amplitude-motion Vertical Motion Simulator (VMS) was utilized, and the experimental variables were the failure axis, the severity of the failure, and the airspeed at which the failure occurred. Other factors, such as pilot workload and terrain and obstacle proximity at the time of failure, were kept as constant as possible within the framework of the host simulation task scenarios. No explicit failure warnings were presented to the pilot. Data from the experiment are shown, and pilot ratings are compared with the proposed handling-qualities requirements for military rotorcraft. Results indicate that the current proposed failure transient requirements may need revision.
DE- *Control systems design; *Military helicopters; Controllability; Failure analysis; Flight simulation; Pilot performance
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1381900
AA- <NTIS> N88-22900/0
TI- Basic Design Studies for the Realization of Liquid Crystal Display Systems in Aircraft
TI- <NOTE> Final Repor
AU- Fischer, H. W.
CS- VDO-Luftfahrtgeraete Werk, Frankfurt am Main (Germany, F.R.).
CS- <CODE> 079744000; VI140891
SP- National Aeronautics and Space Administration, Washington, DC.
RN- VA-87-001; ETN-88-92094
CN- BMFT-LFL-8376-0
PY- Feb 87
PG- 75p
NT- In German; English Summary.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC A04/MF A01
JA- GRAI8819; STAR2616
CP- Germany, Federal Republic of
AB- A project to make liquid crystal technology available for displays and display systems in the cockpit of aircraft is discussed. This requires technological studies to select the most suitable type of liquid crystal. Specifications regarding contrast and readability for day and night operation have to be met. Corresponding to the actual applications, compromise solutions have to be found by optimization in order to meet additional, partly contrary, demands on the displays. The study of conditions for realizing a complete display system is given priority. It is to represent monitoring data of engines and auxiliary systems as well as warning signals in a helicopter. The design of the displays includes the display case and electronic control allowing for error recognition and reliability. Special difficulties result from requirements for lower weight and low power input.
DE- *Aircraft equipment; *Display devices; *Flight instruments; Liquid crystals; Systems engineering; Cockpits; Crystallography; Functional design specifications; Human factors engineering; Warning systems
ID- *Foreign technology; *Liquid crystal display systems; NTISNASAT
SH- 51E (Aeronautics and Aerodynamics--Avionics); 49E

(Electrotechnology--Optoelectronic Devices and Systems)

AZ- 1378598
AA- <NTIS> AD-A192 972/8
TI- Cockpit Natural Language Study - Selected Transcripts
TI- <NOTE> Final rept. Oct 86-Dec 8
AU- Small, R. L. ; Flory, D. E. ; Munger, M. P. ; Williamson, D. T. ; Hollis, B. T.
CS- Midwest Systems Research, Inc., Dayton, OH.
CS- <CODE> 091201000; 415285
SP- Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
RN- AFWAL-TR-88-3009
CN- F33615-85-C-3623; 2403; 04
PY- Apr 88
PG- 310p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A01
JA- GRAI8818
CP- United States
AB- This third report on the Cockpit Natural Language (CNL) study contains a brief description of the purpose and methodology of the CNL study, a section on lessons learned, scenario situation descriptions, a glossary and transcripts from 9 of the 54 pilots interviewed. Pilot comments cover the issues and implementation details of automation, displays, voice interaction and artificially-intelligent computer aids. Lessons learned from the CNL study include (1) Voice interaction is best employed as a new channel of information transfer, not just as a backup mode for manual or visual channels. For example, voice should be used at the intent-level (e.g., avoid SAM which means to re-plan route, altitude, etc. to avoid enemy surface-to-air missile detection), or to command multiple aircraft subsystems simultaneously (e.g. target helicopter, which means to achieve a radar lock on the helicopter and select an air-to-air missile), not just to replace a single switch actuation (e.g. select air-to-air missile), which is done quicker manually than verbally. (2) Pilot-cockpit voice interaction requires a shared information context between the pilot and the cockpit's computer in order to ensure that pilot commands are properly understood and executed. (3) Role-playing works (even with a low-fidelity cockpit simulation) when extracting valuable information from a pilot community. And (4), voice-activated computer messages should not replace pilot-to-pilot communications (radio calls, hand signals) because of the value of knowing that the other pilot (e.g., wingman) actually received the message.
DE- *Cockpits; *Natural language; *Artificial intelligence; *Message processing; *Human factors engineering; Actuation; Air to air missiles; Aircraft; Aircraft equipment; Channels; Communities; Computers; Enemy; Guided missile detection; Hands; Helicopters; Information retrieval; Information transfer; Interactions; Optical images; Pilots; Scenarios; Sharing; Signals; Simulation; Surface to air missiles; Switches; Targets; Voice communications; Semantics; Avionics; Speech analysis
ID- NTISDODXA; NTISDODAF
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 45F (Communication--Verbal); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1372863
AA- <NTIS> AD-A191 657/6
TI- In-Flight Control Force Inputs for the US Army UH-1 Helicopter during 'Hydraulics-On' and 'Hydraulics-Off' Approaches and Landings
AU- Schopper, A. W. ; Wells, J. H. ; Kaylor, L. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-86-10
CN- 3E162777A879; BH
PY- May 86
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8816
CP- United States
AB- There is little information available regarding the magnitude of force input to helicopter controls under emergency conditions. Accordingly, 12 male US Army aviators each flew six normal and six simulated emergency condition (hydraulics-off) approaches and landings in an Army JUH-1H utility helicopter. Because there existed concern that forces applied might vary substantially with flight experience, the aviators who participated in the study were solicited from two groups differing widely in the number of hours flown. The three principal controls of

the aircraft (cyclic, collective, and pedals) were strain-gage instrumented. The outputs recorded during the last 60 seconds of flight prior to each touchdown were studied. Analyses of variance undertaken on the means of the forces recorded during successive 5-second intervals revealed significant differences in the magnitude of the forces applied as a function of hydraulics condition and time-to--touchdown; i.e., forces differentially increased as touchdown neared during hydraulics-off approaches. With the exception of inputs in the downward direction on the collective, the descriptive statistics showed the overall mean and median forces for both groups of aviators to be lower than previously reported helicopter-control-referenced maximal 4-second strength capabilities of small Army males and females.
DE- *Helicopters; *Approach; *Landing; Analysis of variance; Army personnel ; Females; Hydraulics; Inflight; Males; Pilots; Simulation; Statistics; Flight training; Human factors engineering; Army aviation; Utility aircraft; Flight control systems
ID- UH-1 aircraft; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1372862
AA- <NTIS> AD-A191 656/8
TI- Seated Eye Positions and Anthropometric Extremes of Aviators
AU- Cote, D. O. ; Schopper, A. W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-86-9
CN- 3E162777A879; BH
PY- May 86
PG- 42p
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LA- English
PC- PC A03/MF A01
JA- GRAI8816
CP- United States
AB- Seated eye positions of personnel in the 1st to 5th percentile range and 95th to 99th percentile range for male stature were examined in six US Army helicopters to determine if their seated eye positions were significantly different from those of instructor pilots. In addition, the zero azimuth, outside-the-cockpit field-of-view of anthropometrically extreme personnel and instructor pilots was measured. In all helicopters surveyed, statistically significant differences were found between the seated eye positions of aviators and that of anthropometrically extreme personnel. Large differences in viewing angles were also observed in all aircraft. However, in the case of personnel in the 1st to 5th percentile range for male stature, the differences were to their advantage. In the case of personnel in the 95th to 99th percentile for male stature, field-of-view was considerably decreased in some aircraft. Further study is needed to determine what effects the reduced field-of-view for tall personnel may have on flying performance.
DE- *Pilots; Aircraft; Angles; Anthropometry; Army aircraft; Flight; Helicopters; Human factors engineering; Instructors; Line of sight; Personnel; Reduction; Vision; Position(Location)
ID- *Eye positions; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1372859
AA- <NTIS> AD-A191 653/5
TI- Simultaneous Multiple Control Force Exertion Capabilities of Males and Females versus Helicopter Control Force Design Limits
AU- Schopper, A. W. ; Mastroianni, G. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-87-14
CN- 3E162777A879; BH
PY- Sep 87
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8816
CP- United States
AB- Military standards and design guidelines do not consider the potential for degradation in the magnitude of force which can be applied by a crewmember or operator as the result of having to perform more than one control input at the same time. In assessing helicopter-control referenced strength capabilities as a part of an overall program to update medical standards for US Army flying duty, 130 subjects

performed maximal voluntary exertions on each of the three primary helicopter controls (cyclic, collective, and pedals). These exertions were undertaken both as separate inputs to single controls and as simultaneously executed inputs to all three controls. The findings revealed substantial and significant force degradation occurred during simultaneously executed exertions (relative to the magnitudes of single control exertions). Cyclic inputs were affected least. The degree of force degradation associated with collective and pedal inputs varied with the particular combinations of direction-of-exertion employed. The resulting patterns for force degradation were similar for the collective and pedal with the extent of degradation being larger for the pedal inputs (typically 40-50 percent) than for collective inputs (typically 20-35 percent). Substantial proportions of the subjects (approximately 50 percent of the males and more than 90 percent of the females) were unable to consistently attain design-guide force levels (MIL-H-8501A, 1961) on all three controls during all of the 16 simultaneously executed exertions.
DE- *Helicopters; *Flight control systems; Control; Degradation; Females; Flight; Input; Jobs; Males; Medicine; Military requirements; Standards
ID- Performance evaluation; Human factors engineering; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1371584
AA- <NTIS> N88-19539/1
TI- Multi-Axis Control of Telemanipulators
AU- McKinnon, G. M. ; King, M. L. ; Runnings, D.
CS- CAE Electronics Ltd., Saint-Laurent (Quebec).
CS- <CODE> 091770000; CA691925
SP- National Aeronautics and Space Administration, Washington, DC.
PY- cNov 87
PG- 5p
NT- In Esa. Proceedings of the 1st European in-Orbit Operations Technology Symposium p 487-491.
LA- English
PC- (Order as N88-19484/0, PC A21/MF A01)
JA- GRAI8815; STAR2612
CP- Canada
AB- The development of multiaxis hand controllers for use in telemanipulator systems in space is described. Experience in the control of the shuttle remote manipulator system is reviewed, together with subsequent tests involving a number of simulators and configurations, including use as a side arm flight control for helicopters. Factors affecting operator acceptability are reviewed. It is shown that six degrees of freedom controllers can be used naturally and effectively for tasks requiring dexterity and performance.
DE- *Controllers; *Remote manipulator system; *Teleoperators; Canadian space program; Product development; Flight control; Helicopters; Human factors engineering; Operator performance
ID- *Foreign technology; NTISNASAE
SH- 84GE (Space Technology--General)

AZ- 1363268
AA- <NTIS> N88-17202/8
TI- Sitting Posture of Pilots in the Boelkow 105C Helicopter
AU- Osinga, D. S. C. ; Schuffel, H.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> 013273000; IK311704
SP- National Aeronautics and Space Administration, Washington, DC.
RN- IZF-1986-22; TD-86-3472
CN- A82/KLU/113
PY- Sep 86
PG- 41p
NT- In Dutch; English Summary.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
DT- Translation
PC- PC A03/MF A01
JA- GRAI8812; STAR2609
CP- Netherlands
AB- Following pilots' complaints of backpain in the Boelkow 105c, sitting posture was analyzed. Position and range of controls, seat fixations, demands for outside view and view obstructions, and available cockpit space were tested against data of the static and functional anthropometry, resulting in a specification of the desired sitting posture. For the design of the cockpit geometry the existing criteria do not appear to meet the requirement. They are based on a maximum stature of 187 cm and permit a maximum stretch of shoulder and arm muscles. A comparison of the desirable sitting posture and the actual sitting posture in the 105c shows large differences. Differences cannot be compensated by modifications of the chair only. It is recommended to use the desired sitting posture as the reference in case of the specification of aircrew station geometry in helicopters, and to use

mock-ups as a design tool.
DE- *Aircraft pilots; *Back injuries; *Bo-105 helicopter; *Posture; *Sitting position; Anthropometry; Cockpits; Comfort; Helicopter design; Human factors engineering; Seats
ID- *Foreign technology; Translations; NTISNASAT
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1363265
AA- <NTIS> N88-17195/4
TI- Refinement of Eye-Point-of-Regard Measurement with Helicopter Pilots in a Flight Experiment
AU- Uckermann, R. ; Radke, H. ; Wendiggensen, K.
CS- European Space Agency, Paris (France).
CS- <CODE> 062987000; E6854803
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ESA-TT-1073
PY- Oct 87
PG- 51p
NT- Trans. into English of Verbesserung der Blickzielerfassung bei Hubschrauberpiloten im Flugversuch (Dfvlr, Brunswick, Fed. Republic of Germany), Nov. 1986. Original language document was announced as N87-29115.
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LA- English
DT- Translation
PC- PC A04/MF A01
JA- GRAI8812; STAR2609
CP- Germany, Federal Republic of
AB- The NAC-4 Eye Mark Recorder was tested in flight in order to make eye-point-of-regard measurements in helicopters simple and accurate. Twelve pilots served as subjects. It was tested whether a helmet mounting of the apparatus improves the wearing quality without deteriorating the accuracy of the measurements. The results show that the helmet-mounted apparatus can be worn much better, while the quality of the measurements is as good as with the original equipment. The new configuration is especially suitable for use in long duration experiments.
DE- *Eye movements; *Flight test instruments; *Helicopters; *Helmet mounted displays; *Pilot performance; In-flight monitoring; Experiment design; Flight tests; Visual perception
ID- *Foreign technology; Translations; NTISNASAE
SH- 92B (Behavior and Society--Psychology); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1363006
AA- <NTIS> N88-16692/1
TI- HETAS: Hubschrauber als Erprobungstraeger fuer Avionik-Systeme (Helicopters as Test Carriers for Avionics Systems (HETAS))
TI- <NOTE> Final Report
AU- Bender, K. ; Danneberg, E. ; Dierke, R. ; Haehnlein, G. ; Mansfeld, G.

CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
CS- <CODE> 029496000; DO696666
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DFVLR-IB-112-85/18; LVL-8302-I-2
PY- 9 Oct 85
PG- 28p
NT- Text in German.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
DT- Translation
PC- PC A03/MF A01
JA- GRAI8812; STAR2609
CP- Germany, Federal Republic of
AB- The HETAS integrated test bed for avionics systems in human engineering, digital control engineering, and sensors is presented. The flight test system, including helicopter test carrier, systems concept, and integrated flight test system, is described. The ground test system, including helicopter simulation, cockpit, and redundant fly-by-wire system are described.
DE- *Airborne equipment; *Avionics; *Flight simulation; *Helicopter performance; *Helicopters; Performance tests; Cockpits; Control systems design; Flight test vehicles; Flight tests; Fly by wire control; Human factors engineering
ID- *Foreign technology; Translations; NTISNASAT
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1362979
AA- <NTIS> N88-16653/3
TI- Integrated Approach to Rotorcraft Human Factors Research
AU- Hart, S. G. ; Hartzell, E. J. ; Voorhees, J. W. ; Bucher, N. M. ; Shively, R. J.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Feb 88
PG- 22p
NT- In NASA, Washington, NASA/Army Rotorcraft Technology. Volume 3: Systems Integration, Research Aircraft, and Industry, p1167-1188.
LA- English
PC- (Order as N88-16650/9, PC A17/MF A01)
JA- GRAI8812; STAR2609
CP- United States
AB- As the potential of civil and military helicopters has increased, more complex and demanding missions in increasingly hostile environments have been required. Users, designers, and manufacturers have an urgent need for information about human behavior and function to create systems that take advantage of human capabilities, without overloading them. Because there is a large gap between what is known about human behavior and the information needed to predict pilot workload and performance in the complex missions projected for pilots of advanced helicopters, Army and NASA scientists are actively engaged in Human Factors Research at Ames. The research ranges from laboratory experiments to computational modeling, simulation evaluation, and inflight testing. Information obtained in highly controlled but simpler environments generates predictions which can be tested in more realistic situations. These results are used, in turn, to refine theoretical models, provide the focus for subsequent research, and ensure operational relevance, while maintaining predictive advantages. The advantages and disadvantages of each type of research are described along with examples of experimental results.
DE- *Helicopter design; *Human factors engineering; Computerized simulation ; Pilot performance; Workloads (Psychophysiology); Aircraft survivability; Human behavior; Visual perception; Voice control
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1362977
AA- <NTIS> N88-16651/7
TI- Status of NASA (National Aeronautics and Space Administration)/Army Rotorcraft Research and Development Piloted Flight Simulation
AU- Condon, G. W. ; Gossett, T. D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Feb 88
PG- 35p
NT- In NASA, Washington, NASA/Army Rotorcraft Technology. Volume 3: Systems Integration, Research Aircraft, and Industry, p1119-1153.
LA- English
PC- (Order as N88-16650/9, PC A17/MF A01)
JA- GRAI8812; STAR2609
CP- United States
AB- The status of the major NASA/Army capabilities in piloted rotorcraft flight simulation is reviewed. The requirements for research and development piloted simulation are addressed as well as the capabilities and technologies that are currently available or are being developed by NASA and the Army at Ames. The application of revolutionary advances (in visual scene, electronic cockpits, motion, and modelling of interactive mission environments and/or vehicle systems) to the NASA/Army facilities are also addressed. Particular attention is devoted to the major advances made in integrating these individual capabilities into fully integrated simulation environment that were or are being applied to new rotorcraft mission requirements. The specific simulators discussed are the Vertical Motion Simulator and the Crew Station Research and Development Facility.
DE- *Flight simulation; *Helicopters; Cockpit simulators; Pilot performance ; Vertical motion simulators; Computer techniques; Flight characteristics; Flight paths; Light aircraft; Mission planning; Systems integration; Visual perception
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1362970
AA- <NTIS> N88-16644/2
TI- Helicopter Human Factors Research
AU- Nagel, D. C. ; Hart, S. G.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- Feb 88
PG- 19p

NT- In NASA, Washington, NASA/Army Rotorcraft Technology. Volume 2: Materials and Structures, Propulsion and Drive Systems, Flight Dynamics and Control, and Acoustics, p929-947.
LA- English
PC- (Order as N88-16632/7, PC A25/MF A01)
JA- GRAI8812; STAR2609
CP- United States
AB- Helicopter flight is among the most demanding of all human-machine integrations. The inherent manual control complexities of rotorcraft are made even more challenging by the small margin for error created in certain operations, such as nap-of-the-Earth (NOE) flight, by the proximity of the terrain. Accident data recount numerous examples of unintended conflict between helicopters and terrain and attest to the perceptual and control difficulties associated with low altitude flight tasks. Ames Research Center, in cooperation with the U.S. Army Aeroflightdynamics Directorate, has initiated an ambitious research program aimed at increasing safety margins for both civilian and military rotorcraft operations. The program is broad, fundamental, and focused on the development of scientific understandings and technological countermeasures. Research being conducted in several areas is reviewed: workload assessment, prediction, and measure validation; development of advanced displays and effective pilot/automation interfaces; identification of visual cues necessary for low-level, low-visibility flight and modeling of visual flight-path control; and pilot training.
DE- *Helicopters; *Human factors engineering; *Man machine systems; Pilot performance; Safety; Workloads (Psychophysiology); Cues; Display devices; Flight paths; Nap-of-the-earth navigation; Pilot training; Visual signals
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1362969
AA- <NTIS> N88-16643/4
TI- Rotorcraft Flight-Propulsion Control Integration
AU- Mihaloew, J. R. ; Ballin, M. G. ; Ruttledge, D. G. C.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; ND315753
PY- Feb 88
PG- 29p
NT- In NASA, Washington, NASA/Army Rotorcraft Technology. Volume 2: Materials and Structures, Propulsion and Drive Systems, Flight Dynamics and Control, and Acoustics, p900-928.
LA- English
PC- (Order as N88-16632/7, PC A25/MF A01)
JA- GRAI8812; STAR2609
CP- United States
AB- The NASA Ames and Lewis Research Centers, in conjunction with the Army Research and Technology Laboratories have initiated and completed, in part, a joint research program focused on improving the performance, maneuverability, and operating characteristics of rotorcraft by integrating the flight and propulsion controls. The background of the program, its supporting programs, its goals and objectives, and an approach to accomplish them are discussed. Results of the modern control governor design of the T700 and the Rotorcraft Integrated Flight-Propulsion Control Study, which were key elements of the program, are also presented.
DE- *Flight control; *Helicopters; *Propulsion; *Systems integration; Aircraft design; Aircraft maneuvers; Pilot performance; Adaptive control; Flight simulation; Fuel consumption; Workloads (Psychophysiology)
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1362958
AA- <NTIS> N88-16632/7
TI- Nasa/Army Rotorcraft Technology. Volume 2: Materials and Structures, Propulsion and Drive Systems, Flight Dynamics and Control, and Acoustics
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NAS 1.55:2495-V-2; NASA-CP-2495-V-2
PY- Feb 88
PG- 587p
NT- See also Volume 1, N88-16625 and Volume 3, N88-16650. Conference held at Moffett Field, CA., 17-19 Mar. 1987.
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LA- English
DT- Conference proceeding

PC- PC A25/MF A01
JA- GRAI8812; STAR2609
CP- United States
AB- No abstract available.
DE- *Aeroacoustics; *Aircraft design; *Conferences; *Controllability; *Engine design; *Fracture mechanics; *Helicopters; *Rotor aerodynamics; Composite structures; Control theory; Crashworthiness; Fatigue (Materials); Gas turbine engines; Human factors engineering; Ice formation
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 1358792
AA- <NTIS> AD-A188 964/1
TI- Impact of Vertical Axis Characteristics on Helicopter Handling Qualities
AU- Baillie, S. W. ; Morgan, J. M.
CS- National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
CS- <CODE> 019035001; 402184
SP- National Research Council of Canada, Ottawa (Ontario).
RN- NAE-LR-619; NRC-28133
PY- Aug 87
PG- 70p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8811
CP- Canada
AB- The results of two in-flight simulation programs on the impact of vertical axis characteristics on rotorcraft handling qualities are presented. The parameters investigated were heave damping, thrust to weight ratio, and various dynamic response characteristics of the combined engine, governor and rotor system. Flight tasks included hover, hover manoeuvring and nap of the earth flight. Evaluation of 11 configurations where heave damping and thrust to weight ratio values were varied provides the basis to suggest that the amount of heave damping represented by Zw = -0.20/sec and a thrust to weight ratio of 1.08 are boundary values for Level 1 helicopter handling qualities. These results are compared with other relevant work. Stabilization and control of engine torque was found to be a major source of pilot workload for models with higher order engine-rotor system response characteristics of a 3 db resonant peak in the transfer function between collective and engine torque which is postulated as an upper limit for Level 1 handling qualities. The benefit of displacing this peak to higher frequencies, corresponding to separating the resonance from the typical pilot's bandwidth, is suggested.
DE- *Flight simulation; *Helicopters; Bandwidth; Control; Damping; Dynamic response; Flight; Frequency; Handling; Heaving; Hovering; Inflight; Limitations; Peak values; Pilots; Quality; Ratios; Rotary wing aircraft ; Rotors; Sources; Thrust; Torque; Transfer functions; Vertical orientation; Weight; Workload; Man machine systems; Flight control systems; Computer programs; Turning flight; Pitch(Motion); Ground role(Aeronautics); Helicopter engines; Flight maneuvers
ID- *Foreign technology; Heave damping; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1358362
AA- <NTIS> AD-A188 519/3
TI- User Perceptions of Side-Arm Flight Control in Rotary-Wing Aircraft
TI- <NOTE> Final rept
AU- Schmidt, J. K. ; Elliott, P. E. ; DeBellis, W. B.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TN-7-87
CN- 1L162716AH70
PY- Oct 87
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8811
CP- United States
AB- It is anticipated that conventional primary flight controls will be replaced by side-arm devices in future rotary-wing aircraft. Side-arm controls are projected to have certain ergonomic advantages that will greatly enhance a helicopter pilot's mission capability. Several studies have been conducted to test their feasibility, their handling

qualities, and the optimal configuration; but little work has been done to anticipate what human factors implications side-arm controls will have once integrated into the cockpit. Sixteen scout and attack helicopter pilots were interviewed regarding side-arm primary flight controls. Interviewee responses reflected some new as well as already identified problem areas. The authors suggest that these issues be addressed before actual implementation is made.
DE- *Flight control systems; Attack aircraft; Attack helicopters; Cockpits; Helicopters; Human factors engineering; Optimization; Perception; Pilots; Rotary wing aircraft; User needs; Control sticks
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1351412
AA- <NTIS> N88-13857/3
TI- Sitting Posture of Helicopter Pilots of the Royal Netherlands Air Force; Preliminary Recommendations
AU- Osinga, D. S. C. ; Schuffel, H.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> 013273000; IK311704
SP- National Aeronautics and Space Administration, Washington, DC.
RN- IZF-1986-16; TD-86-3428-II
CN- A82/KLU/113
PY- Aug 86
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8808; STAR2605
CP- Netherlands
AB- Ergonomic recommendations emphasizing helicopter pilot sitting posture are provided. The recommendations are based on an anthropometric survey and a study on causes of helicopter pilot back pain complaints. Sitting posture dimensions of male military personnel with guidelines for the location of displays and controls, and a checklist for evaluating future cockpit lay-out are included.
DE- *Aircraft pilots; *Helicopter design; *Human factors engineering; *Posture; *Sitting position; Anthropometry; Cockpits; Control sticks; Display devices; Layouts; Pain; Spine
ID- *Foreign technology; NTISNASAE
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1348795
AA- <NTIS> N88-12932/5
TI- CGI (Computer-Generated Graphics) Delay Compensation
AU- McFarland, R. E.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:86703; REPT-85168; NASA-TM-86703
PY- Jan 86
PG- 30p
NT- Previously announced in IAA as A86-37194.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8807; STAR2604
CP- United States
AB- Computer-generated graphics in real-time helicopter simulation produces objectionable scene-presentation time delays. In the flight simulation laboratory at Ames Research Center, it has been determined that these delays have an adverse influence on pilot performance during aggressive tasks such as nap-of-the-earth (NOE) maneuvers. Using contemporary equipment, computer-generated image (CGI) time delays are an unavoidable consequence of the operations required for scene generation. However, providing that magnitide distortions at higher frequencies are tolerable, delay compensation is possible over a restricted frequency range. This range, assumed to have an upper limit of perhaps 10 or 15 rad/sec, conforms approximately to the bandwidth associated with helicopter handling qualities research. A compensation algorithm is introduced here and evaluated in terms of tradeoffs in frequency responses. The algorithm has a discrete basis and accommodates both a large, constant transport delay interval and a periodic delay interval, as associated with asynchronous operations.
DE- *Computer graphics; *Flight simulation; *Instrument compensation; *Pilot performance; Time lag; Algorithms; Error analysis; Helicopter performance; Man machine systems; Real time operation; Task complexity; Transfer functions

ID- NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1348624
AA- <NTIS> N88-12493/8
TI- Some Data Processing Requirements for Precision Nap-of-the-Earth (NOE) Guidance and Control of Rotorcraft
AU- Clement, W. F. ; McRuer, D. T. ; Magdeleno, R. E.
CS- Systems Technology, Inc., Mountain View, CA.
CS- <CODE> 100938000; S9813870
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177453; TR-1239-1; NASA-CR-177453
CN- NAS2-12364
PY- Feb 87
PG- 224p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A01
JA- GRAI8807; STAR2604
CP- United States
AB- Nap-Of-the-Earth (NOE) flight in a conventional helicopter is extremely taxing for two pilots under visual conditions. Developing a single pilot all-weather NOE capability will require a fully automatic NOE navigation and flight control capability for which innovative guidance and control concepts were examined. Constrained time-optimality provides a validated criterion for automatically controlled NOE maneuvers if the pilot is to have confidence in the automated maneuvering technique. A second focus was to organize the storage and real-time updating of NOE terrain profiles and obstacles in course-oriented coordinates indexed to the mission flight plan. A method is presented for using pre-flight geodetic parameter identification to establish guidance commands for planned flight profiles and alternates. A method is then suggested for interpolating this guidance command information with the aid of forward and side looking sensors within the resolution of the stored data base, enriching the data content with real-time display, guidance, and control purposes. A third focus defined a class of automatic anticipative guidance algorithms and necessary data preview requirements to follow the vertical, lateral, and longitudinal guidance commands dictated by the updated flight profiles and to address the effects of processing delays in digital guidance and control system candidates. The results of this three-fold research effort offer promising alternatives designed to gain pilot acceptance for automatic guidance and control of rotorcraft in NOE operations.
DE- *Aircraft guidance; *Automatic control; *Helicopters; *Nap-of-the-earth navigation; *Pilot performance; *Tasks; Aircraft maneuvers; Display devices; Flight control; Real time operation; Terrain analysis
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

AZ- 1347620
AA- <NTIS> AD-P005 640/8
TI- Assessment of Workloads in Helicopters
AU- Muir, H. C. ; Elwell, R.
CS- Cranfield Inst. of Tech. (England).
CS- <CODE> 051303000; 389533
PY- c1987
PG- 7p
NT- This article is from 'The Practical Assessment of Pilot Workload: Flight Mechanics Panel of AGARD,' AD-A184 834, p83-89.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8807
CP- United Kingdom
AB- The value of inflight assessment of pilot workload has been recognised by aviation researchers and designers for over a decade (1) (2). Initially the subjective reporting of workload by experienced test pilots was based upon an application of the Handling Qualities Rating Scale of Cooper and Harper. This subjective reporting led to the development of rating scales for the assessment of workload (4). These subjective techniques were later augmented by the recording of physiological variables which could be interpreted as indices of workload. In the last decade, rather than restrict the assessment of workload in aviation to data obtained from test pilots, studies have been reported in which small samples of professional pilots have been used. A more recent development has been the employment of workload

measures for exploring differences between pilots and to look for correlations between these measures and performance, and success in training. Workload estimation has additionally been used to assist in the ergonomic design systems including crew station geometry, and control and display location.
DE- *Pilots; *Workload; *Performance(Human); Helicopters; Human factors engineering; Ratings; Physiological effects; Decision making.
ID- *Foreign technology; Component Reports.; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology); 85A (Transportation--Air Transportation); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1347488
AA- <NTIS> AD-A187 075/7
TI- Helicopter External Vision Requirements and Visual Display Characteristics: A Report/Bibliography. Revision A
TI- <NOTE> Final rept
AU- Hale, S.
CS- Essex Corp., Alexandria, Va.
CS- <CODE> 062975000; 391122
SP- Human Engineering Lab., Aberdeen Proving Ground, MD.
RN- EFR-010-REV-A; HEL-TN-6-87-REV-A
CN- DAAK11-85-C-0031; 1L162716AH70
PY- Oct 87
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC A03/MF A01
JA- GRAI8807
CP- United States
AB- A literature review was conducted to examine helicopter external vision requirements and related visual display characteristics. Several articles are summarized in annotated bibliography format. A subsequent discussion section addresses the information contained in those articles as well as relevant information contained in other documents. Suggestions are made for future research.
DE- *Bibliographies; *Helicopters; *Helmet mounted displays; Display systems; External; Formats; Literature surveys; Mounts; Panels; Requirements; Rotary wing aircraft; Vision; Visual aids
ID- Field of view; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1347351
AA- <NTIS> AD-A186 934/6
TI- Comparison of Alphanumeric Data Entry Methods for Advanced Helicopter Cockpits
TI- <NOTE> Final rept
AU- Malkin, F. J. ; Christ, K. A.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-17-87
CN- 1L162716AH70
PY- Sep 87
PG- 51p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8807
CP- United States
AB- In this study, three methods of data entry were compared for entering navigation coordinate sets: a) connected-word voice recognition, b) keyboard, and c) thumb-controlled switch. The subjects, 12 active Army aviators, entered the data as a sole task and also while flying a helicopter simulator equipped with a computer-generated, external scene. The different data entry methods were compared for time to enter the data, for errors, and for the effect on flight performance. Results showed that the keyboard was faster and resulted in fewer errors than the other two data entry methods. The time to enter data by voice was increased by the high nonrecognition rate (12 percent) and the error correction procedure. An overall 81 percent recognition accuracy rate was achieved in this study, with individual rates varying from 58 percent to 99 percent. Based on a subjective questionnaire, the majority of subjects still preferred to enter data by voice.
DE- *Alphanumeric data; *Cockpits; *Data processing; *Helicopters; *Input; *Man machine systems; Accuracy; Coordinates; Corrections; Errors; External; Flight; Human factors engineering; Navigational aids; Pilots;

Questionnaires; Rates; Recognition; Simulators; Speech recognition; Voice communications; Word recognition; Workload; Keyboards; Control systems; Display systems; Switches
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1346240
AA- <NTIS> N88-12246/0
TI- Integrated Voice and Visual Systems Research Topics
AU- Williams, D. H. ; Simpson, C. A.
CS- Psycho-Linguistic Research Associates, Menlo Park, CA.
CS- <CODE> 090747000; P6249806
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177417; NASA-CR-177417
CN- NAS2-11341
PY- Jun 86
PG- 6p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8806; STAR2603
CP- United States
AB- A series of studies was performed to investigate factors of helicopter speech and visual system design and measure the effects of these factors on human performance, both for pilots and non-pilots. The findings and conclusions of these studies were applied by the U.S. Army to the design of the Army's next generation threat warning system for helicopters and to the linguistic functional requirements for a joint Army/NASA flightworthy, experimental speech generation and recognition system.
DE- *Display devices; *Helicopters; *Human performance; *Input/output routines; *Speech recognition; *Voice communication; *Voice control; *Human factors engineering; *Pilots (Personnel); Design analysis; Linguistics; Threat evaluation
ID- NTISNASA
SH- 45F (Communication--Verbal); 45C (Communication--Common Carrier and Satellite); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1345982
AA- <NTIS> N88-11655/3
TI- MBB (Messerschmitt-Boelkow-Blohm) Simulation Facilities Applied for Rotorcraft Research
AU- Krausep, P. ; Vangaasbeek, J. ; Borchert, H.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
CS- <CODE> 064776000; MT618891
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Jun 87
PG- 17p
NT- In AGARD, Rotorcraft Design for Operations, 17p.
LA- English
PC- (Order as N88-11649/6, PC A14/MF A01)
JA- GRAI8806; STAR2603
CP- Germany, Federal Republic of
AB- The increasing pilot workload and environmental conditions of modern military helicopters necessitate detailed assessment of cockpit designs with regard to controls and displays. The optimization must be performed at the initialization of the concept to insure a harmonic design with minimum pilot workload. The status of the MBB Munich flight simulation facility is examined closely in light of these challenging requirements. Projections of the future development of the simulation center components are depicted, as well as priorities.
DE- *Aircraft design; *Cockpits; *Display devices; *Flight characteristics; *Flight simulators; *Military helicopters; *Research facilities; Controllers; Human factors engineering; Optimization; Specifications; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 85A (Transportation--Air Transportation)

AZ- 1338887
AA- <NTIS> PB88-852231
TI- Military Helicopters. April 1985-November 1987 (Citations from the Engineering Index Database)
TI- <NOTE> Rept. for Apr 85-Nov 87
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 87
PG- 39p
NT- Supersedes PB85-856367.

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LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8803
CP- United States
AB- This bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (This updated bibliography contains 75 citations, all of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; Military aircraft; Rotary wing aircraft; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1338886
AA- <NTIS> PB88-852223
TI- Military Helicopters. January 1970-March 1985 (Citations from the Engineering Index Database)
TI- <NOTE> Rept. for Jan 70-Mar 85
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 87
PG- 241p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8803
CP- United States
AB- This bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (This updated bibliography contains 346 citations, none of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 88E (Library and Information Sciences--Reference Materials)

AZ- 1335463
AA- <NTIS> N87-29541/6
TI- Piloted Simulation of Helicopter Air Combat to Investigate Effects of Variations in Selected Performance and Control Response Characteristics
AU- Lewis, M. S. ; Mansur, M. H. ; Chen, R. T. N.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:89438; A-87147; NASA-TM-89438
PY- Aug 87
PG- 98p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8802; STAR2524
CP- United States
AB- A piloted simulation study investigating handling qualities and flight characteristics required for helicopter air to air combat is presented. The Helicopter Air Combat system was used to investigate this role for Army rotorcraft. Experimental variables were the maneuver envelope size (load factor and sideslip), directional axis handling qualities, and pitch and roll control-response type. Over 450 simulated, low altitude, one-on-one engagements were conducted. Results from the experiment indicate that a well damped directional response, low sideforce caused

by sideslip, and some effective dihedral are all desirable for weapon system performance, good handling qualities, and low pilot workload. An angular rate command system was favored over the attitude type pitch and roll response for most applications, and an enhanced maneuver envelope size over that of current generation aircraft was found to be advantageous. Pilot technique, background, and experience are additional factors which had a significant effect on performance in the air combat tasks investigated. The implication of these results on design requirements for future helicopters is presented.
DE- *Combat; *Control stability; *Flight simulation; *Helicopter control; *Pilot performance; Controllability; Aerodynamic loads; Aircraft design ; Flight envelopes; Pilot training; Roll; Sideslip; Weapon systems; Workloads (Psychophysiology)
ID- NTISNASA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 51B (Aeronautics and Aerodynamics--Aeronautics); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1327024
AA- <NTIS> AD-P005 603/6
TI- Voice Interactive Systems in Severe Noise Conditions
AU- Steeneken, H. J. ; Langhout, G.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> 013273000; 179820
PY- c1987
PG- 6p
NT- This article is from 'Information Management and Decision Making in Advanced Airborne Weapon Systems: Conference Proceedings of the Aerospace Medical Panel Symposium Held in Toronto, Canada on 15-18 April 1986,' AD-A184 044, p29-1-29-6.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8724
CP- Netherlands
AB- In a comparison of word recognition performance between human listeners and automatic speech recognition systems (ASR), the human listeners performs much better, especially in severe noise conditions. An application engineer can try to optimize the performance of an ASR system by selecting the optimal noise cancelling microphone and vocabulary for voice input. Some results from a study on the effect of signal handling and vocabulary configuration on the performance of voice input and voice output systems will be discussed.
DE- *Speech recognition; *Man machine systems; *Aircraft noise; Speech transmission; Interactions; Optimization; Cancellation; Helicopters; Cockpits; Input; Output
ID- *Foreign technology; Component Reports; NATO furnished; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 45F (Communication--Verbal); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1324475
AA- <NTIS> DE87702209
TI- Development of Aerial gamma Radiation Survey System. 1. Measuring Instruments of gamma Radiation and Position Data, and Data Processing Method
AU- Tsutsumi, M. ; Saito, K. ; Sakamoto, R. ; Nagaoka, T. ; Moriuchi, S.
CS- Japan Atomic Energy Research Inst., Tokyo.
CS- <CODE> 014802000; 3413000
RN- JAERI-M-86-072
PY- May 86
PG- 102p
NT- In Japanese.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Japanese
PC- PC A06/MF A01
JA- GRAI8723; NSA1200
CP- Japan
AB- JAERI has started to develop an aerial gamma radiation survey system by a helicopter in 1980. The development of measuring instruments, the experiments in the field of natural and artificial radiation sources, and the imaginary emergency survey at a real site, were executed. This report describes mainly about the hardware and software of this system. The system consists of gamma-ray measuring instruments with NaI(Tl) scintillation detectors, microwave positioning instruments, and a data processing system for postflight data. A foreign-made geological survey system is improved on for radiation measurements. For covering the wide radiation range, detectors of various shapes and sizes are prepared, from a large volume detector, DET-1024 - four 4" x 4" x 16" crystals

assembly - to a 2" diameter x 2" NaI(Tl) crystal. Radiation and position data are recorded on a magnetic tape, and computer-processed afterwards. Moreover, scene below flight courses and internal communication are recorded on video tape with the information of clock and position superimposed. In consequence of field experiments carried out five times, basic radiation data for evaluating airborne acquired data are accumulated, and flight survey procedures are established. As more practical use, a system has been produced more compactly and functionally. Exposure rates (> 1 mR/h), energy distribution spectra, and energy window counts are obtained for radiation data. Using the Spectrum-Dose Conversion Method, the accurate exposure rates are directly calculated from pulse height spectra. Numerical tables of G(E) function converting pulse height spectra into exposures are shown in this report. As regards the analysis of survey data, process codes have been completed with either large-computer or mini-computer. (ERA citation 12:031692)

DE- *Gamma Radiation; Aerial Monitoring; Aircraft; Data Processing; Emergency Plans; JAERI; NaI Detectors; Positioning; Radiation Monitors

ID- *Foreign technology; ERDA/500300; NTISDEE

SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 68F (Environmental Pollution and Control--Radiation Pollution and Control); 68GE (Environmental Pollution and Control--General)

AZ- 1323905

AA- <NTIS> AD-A183 954/7

TI- Flight Evaluation of the UH-60A Helicopter with the Pitch Bias Actuator Centered and Electrically Disconnected

TI- <NOTE> Final rept. 4 Apr 85-2 Jul 86

AU- Murrell, R. C. ; Lockwood, R. A. ; Williams, R. A. ; Herbst, M. K. ; Skinner, G. L.

CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.

CS- <CODE> 061576000; 409025

RN- USAAEFA-84-28

PY- Sep 86

PG- 279p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A13/MF A01

JA- GRAI8723

CP- United States

AB- Testing was conducted to evaluate handling qualities of the UH-60A helicopter with the pitch bias actuator (PBA) centered and electrically disconnected and with various modes of automatic flight control system (AFCS) degradation. A total of 46.4 productive flight hours were flown between 4 April 1985 and 2 July 1986. Two shortcomings and two Prime Item Development Specification noncompliances were identified. The handling qualities of the UH-60A helicopter with the PBA centered and electrically disconnected are essentially unchanged from those with the PBA operational, except for; (1) slightly degraded static longitudinal stability, (2) slightly degraded dynamic stability, and (3) a shortcoming, the poor maneuvering stability characteristics. One additional shortcoming is the strong pitch-due-to-sideslip coulping, which is unrelated PBA centered and electrically disconnected are satisfactory to continue flight under both visual and instrument meteorological conditions with any degradation of the AFCS.

DE- *Flight control systems; *Actuators; Automatic pilots; Bias; Degradation; Dynamics; Flight; Flight testing; Handling; Instrumentation; Maneuverability; Meteorology; Pitch(Motion); Quality; Stability; Static stability; Test and evaluation; Vision

ID- UH-60A aircraft; H-60 aircraft; Pitch bias actuators; UH-60A helicopter ; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1319408

AA- <NTIS> N87-25760/6

TI- Workshop on Workload and Training, and Examination of Their Interactions: Executive Summary

AU- Donchin, E. ; Hart, S. G. ; Hartzell, E. J.

CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657

RN- NAS 1.15:89459; A-87212; NASA-TM-89459

PY- Jul 87

PG- 40p

NT- Workshop held in Carmel, CA., 5-10 Jan 86.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A03/MF A01

JA- GRAI8721; STAR2519
CP- United States
AB- The goal of the workshop was to bring together experts in the fields of workload and training and representatives from the Dept. of Defense and industrial organizations who are reponsible for specifying, building, and managing advanced, complex systems. The challenging environments and requirements imposed by military helicopter missions and space station operations were presented as the focus for the panel discussions. The workshop permitted a detailed examination of the theoretical foundations of the fields of training and workload, as well as their practical applications. Furthermore, it created a forum where government, industry, and academic experts were able to examine each other's concepts, values, and goals. The discussions pointed out the necessity for a more efficient and effective flow of information among the groups respresented. The executive summary describes the rationale of the meeting, summarizes the primary points of discussion, and lists the participants and some of their summary comments.
DE- *Education; *Human performance; *Mental performance; *Workloads (Psychophysiology); Flight characteristics; Helicopters; Human factors engineering; Microcomputers; Space stations
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development); 92B (Behavior and Society--Psychology)

AZ- 1318211
AA- <NTIS> AD-A182 611/4
TI- Aeronautical Decision Making for Instructor Pilots
TI- <NOTE> Final rept
AU- Buch, G. D. ; Lawton, R. S. ; Livack, G. S.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- DOT/FAA/PM-86/44
CN- DTFA01-80-C-10080
PY- May 87
PG- 73p
NT- See also AD-A117 508, AD-A117 509 and AD-A117 667.
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8721
CP- United States
AB- Aviation accident data indicate that the majority of aircraft mishaps are due to judgment error. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates. The results of such tests were statistically significant and ranged from approximately 10% to 50% fewer mistakes. This manual is designed to explain the risks associated with flight instruction activities, the underlying behavioral causes of typical accidents, and the effects of stress on pilot decision making. This instructor manual explains the unique aspects of teaching judgement concepts in contrast with the imparting of knowledge and the development of airmanship skills in conventional flight training. It also provides detailed explanations of pre-flight and in-flight stress management techniques. The assumption is that CFI's receiving this training will develop a positive attitude toward safety and the ability to effectively manage stress while recognizing and avoiding unnecessary risk. This manual is one of a series on Aeronautical Decision Making prepared for the following pilot audiences: (1) Student and Private (2) Commercial (3) Instrument (4) Instructor (5) Helicopter (6) Multi-Crew.
DE- *Aviation safety; *Flight training; *Decision making; *Pilots; *Judgement(Psychology); Aircraft; Flight; Instructors; Human factors engineering; Aviation accidents; Aeronautics; Training; Helicopters; Performance(Human); Manual operation; Inflight; Management; Stresses; Attitudes(Psychology); Instructional materials; Manuals; Errors; Risk
ID- NTISDODXA; NTISDOTFAA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92B (Behavior and Society--Psychology); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1318152
AA- <NTIS> AD-A182 549/6
TI- Aeronautical Decision Making for Student and Private Pilots
TI- <NOTE> Final rept
AU- Diehl, A. E. ; Hwoschinsky, P. V. ; Lawton, R. S. ; Livack, G. S.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585

SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- DOT/FAA/PM-86/41
CN- DTFA01-80-C-10080
PY- May 87
PG- 111p
NT- Prepared in cooperation with AOPA Air Safety Foundation, Frederick, MD.

NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8721
CP- United States
AB- Aviation accident data indicate that the majority of aircraft mishaps are due to judgment error. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates. The results of such tests were statistically significant and ranged from approximately 10% to 50% fewer mistakes. This manual is designed to explain the risks associated with Student and Private pilot flying activities, the underlying behavioral causes to typical accidents, and the effects of stress on pilot decision making. It provides a means for the individual pilot to develop an attitude profile through a self-assessment inventory and provides detailed explanations of preflight and in-flight stress management techniques. The assumption is that pilots receiving this training will develop a positive attitude toward safety and the ability to manage stress effectively while recognizing and avoiding unnecessary risk. This manual is one of a series on Aeronautical Decision-Making prepared for the following pilot audiences: (1) Student and Private; (2) Commercial; (3) Instrument; (4) Instructor; (5) Helicopter; and (6) Multi-Crew.
DE- *Aviation safety; *Judgement(Psychology); *Decision making; *Pilots; *Flight training; Aircraft; Helicopters; Performance(Human); Errors; Aeronautics; Aviation accidents; Training; Human factors engineering; Flight; Risk; Instructional materials; Manuals; Attitudes(Psychology)
ID- NTISDODXA; NTISDOTFAA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 92B (Behavior and Society--Psychology); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1317685
AA- <NTIS> PB87-864674
TI- Head Up Displays. January 1975-July 1987 (Citations from the International Aerospace Abstracts Database)
TI- <NOTE> Rept. for Jan 75-Jul 87
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 87
PG- 123p
NT- Supersedes PB86-871100. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC.
NT- U.S. sales only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8720
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 284 citations, 26 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices; Avionics
ID- *Head up displays; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1314055
AA- <NTIS> N87-24391/1
TI- Research and Technology (Ames Research Center 1986 Annual Report)
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.

CS- <CODE> 019045001; NC473657
RN- NAS 1.15:89411; A-87031; NASA-TM-89411
PY- Apr 87
PG- 184p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8719; STAR2517
CP- United States
AB- Selected achievements at the Ames-Moffett and Ames-Dryden sites of the Ames Research Center are illustrated. The challenging work that was accomplished in the past year is presented for the following areas: engineering and technical services, aerospace systems, flight operations and research, aerophysics, and space research.
DE- *Aeronautical engineering; *Human factors engineering; *Research and development; *Research facilities; *Rotor aerodynamics; *Systems engineering; Active control; Computational fluid dynamics; Data management; Expert systems; Noise reduction; Spacelab payloads; Tilt rotor aircraft
ID- NTISNASA
SH- 84GE (Space Technology--General)

AZ- 1313785
AA- <NTIS> N87-23660/0
TI- Collected Flight and Simulation Comparisons and Considerations
AU- Ashkenas, I. L.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; S9710660
SP- National Aeronautics and Space Administration, Washington, DC.
PY- c1986
PG- 34p
NT- In AGARD Flight Simulation 34p.
LA- English
PC- (Order as N87-23633, PC A16/MF A01)
JA- GRAI8719; STAR2517
CP- United States
AB- Government-sponsored research at Systems Technology, Inc. dealing with simulation fidelity and utility is reviewed, starting with some generic effects of motion and vision system characteristics and computational artifacts. Diagnostic methods and tools useful in discovering and delineating significant qualitative and quantitative differences between simulation and flight are then exposed and illustrated. Finally, examples of both fixed and moving simulation successes and shortcomings are reviewed and examined as to root causes of either. The research-simulator equipment involved in the above comparisons ranges from modern large-scale motion systems and computer-generated imagery to fixed-base with simple CRT-generated displays.
DE- *Display devices; *Feedback control; *Flight simulation; *Flight simulators; Flight tests; Motion simulation; Accuracy; Cockpits; Comparison; Computation; Helicopters; Pilot performance; Space shuttle orbiters; Systems engineering; Tracking (Position)
ID- NTISNASAE
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1313759
AA- <NTIS> N87-23634/5
TI- Visual and Motion Cueing in Helicopter Simulation
AU- Bray, R. S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
PY- c1986
PG- 16p
NT- In AGARD Flight Simulation 16p. Previously announced as N86-11208.
LA- English
PC- (Order as N87-23633, PC A16/MF A01)
JA- GRAI8719; STAR2517
CP- United States
AB- The visual cues presented in the simulator are compared with those of flight in an attempt to identify deficiencies. For the low-amplitude maneuvering tasks normally associated with the hover mode, the unique motion capabilities of the Vertical Motion Simulator (VMS) at Ames Research Center permit nearly a full representation of vehicle motion. Especially appreciated in these tasks are the vertical-acceleration responses to collective control. For larger-amplitude maneuvering, motion fidelity must suffer diminution through direct attenuation through high-pass filtering washout of the computer cockpit accelerations or both. Experiments were conducted in an attempt to determine the effects of these distortions on pilot performance of height-control tasks.
DE- *Flight simulation; *Flight simulators; *Helicopters; Cockpits; Controllability; Motion simulators; Visual signals; Field of view; Pilot performance; Visual flight rules

ID- NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 85A (Transportation--Air Transportation); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1313462
AA- <NTIS> N87-23162/7
TI- 2GCHAS (Second Generation Comprehensive Helicopter Analysis System): A High Productivity Software Development Environment
AU- Babb, L.
CS- Computer Sciences Corp., Mountain View, CA. System Sciences Div.
CS- <CODE> 060119001; CZ791244
SP- National Aeronautics and Space Administration, Washington, DC.
PY- Oct 86
PG- 13p
NT- In NASA. Goddard Space Flight Center Annual Users' Conference (6th), p111-123.
LA- English
PC- (Order as N87-23156, PC A11/MF A01)
JA- GRAI8719; STAR2516
CP- United States
AB- To the user, the most visible feature of the Transportable Applications Executive (TAE) is its very powerful user interface. To the programmer, TAE's user interface, proc concept, standardized interface definitions, and hierarchy search provide a set of tools for rapidly prototyping or developing production software. The 2GCHAS (Second Generation Comprehensive Helicopter Analysis System) project has extended and enhanced these mechanisms, creating a powerful and high productivity programming environment where the 2GCHAS development environment is 2GCHAS itself and where a sustained rate for certified, documented, and tested software above 30 delivered source instructions per programmer day has been achieved. The 2GCHAS environment is not limited to helicopter analysis, but is applicable to other disciplines where software development is important.
DE- *Applications programs (Computers); *Computer programming; *Computerized simulation; *Helicopter performance; *Operating systems (Computers); *Software engineering; *Software tools; *Productivity; Computer systems programs; Run time (Computers)
ID- *TAE computer program; *Computer aided software engineering; *Mancomputer interface; Interfaces; User needs; NTISNASA
SH- 62B (Computers, Control, and Information Theory--Computer Software); 51E (Aeronautics and Aerodynamics--Avionics); 84C (Space Technology--Manned Spacecraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1312018
AA- <NTIS> AD-A181 434/2
TI- Effects of Helicopter Vibration on the Spinal System
TI- <NOTE> Final rept. 15 Apr 84-14 Apr 85
AU- Pope, M. H. ; Wilder, D. G. ; Seroussi, R. E. ; Donnermeyer, D. D.
CS- Vermont Univ., Burlington. Dept. of Orthopaedics and Rehabilitation.
CS- <CODE> 015229004; 417542
CN- DAMD17-84-C-4140; 3E162777A878; AD
PY- Aug 85
PG- 145p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8719
CP- United States
AB- The UH-1H specific seating environment was studied in both static and vibration modes to assess its contribution to the production of backache in pilots. Subjective measures of pain and objective measures of lumbar muscle fatigue were used to determine a subject's response to a 2-hour exposure to the UH-1H seated posture. Another outcome measure was the change in the characteristic motion of the back surface as a result of exposure to 2 hours of typical UH-1H vertical vibration. Subjects were also tested for their mechanical response to each of three axes of vibration. Major findings included: 1) a marginally significant level of lumbar muscle fatigue due to a statically held posture in men; 2) in men there was a marginal significantly greater lumbar musculature fatigue due to a sustained static posture than that found due to sitting and vibrating un and down; 3) all subjects (male and female) indicated significant increase in pain due to sustained sitting in either static or vibrating UH-1H cockpit conditions; 4) the males exhibited significantly greater pain due to a sustained static seated posture than due to the same posture held while being vibrated either side to side or up and down; and 5) there were significant changes in the way the surface of the back moved during up and down vibration as a result of exposure to the UH-1H, vertically vibrated seated posture. Keywords: Helicopter pilot seats; Flight crew posture; Low back pain; Lumbar spine; Muscle fatigue; Electromyography; Power spectrum; Mechanical properties; Surface motion.

DE- *Spinal column; *Posture(Physiology); *Stress(Physiology); Axes; Flight crews; Helicopters; Males; Mechanical properties; Muscles; Pain; Pilot seats; Pilots; Response; Statics; Surfaces; Vibration; Fatigue(Physiology)
ID- UH-1H aircraft; H-1 aircraft; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 44G (Health Care--Environmental and Occupational Factors); 94D (Industrial and Mechanical Engineering--Job Environment); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1307896
AA- <NTIS> NTN87-0198
TI- Minimizing Spinal Injuries in Helicopter Crashes: Effect of energy-absorbing seats is examined
TI- <NOTE> NTIS Tech Note
CS- Department of Agriculture, Washington, DC.
CS- <CODE> 000584000
SP- Department of the Army, Washing
PY- Feb 87
PG- 1p
NT- FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report order number: AD-A164828/NAA, price code: A06.
LA- English
PC- Not available NTIS
JA- GRAI8717
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. The threshold of spinal injury for seated humans subjected to vertical impact loads has been investigated in a study for the U.S. Army Aviation Research and Technology Activity (AVSCOM). The loads were induced by simulating conditions typical of helicopter crashes. Fifteen tests were conducted with unembalmed cadavers as human surrogates at various load-limit settings to identify the load threshold causing spinal injury. Bone-strength analysis was used to normalize the results so that they would be applicable to young, physically fit aviators. The goal of the study was to minimize the potential for spinal injury. Total elimination of spinal injuries is not achievable: a small percentage of spinal injuries will always occur, because of such spinal injuries will always occur, because of such factors as pre-existing spinal conditions, posture, and objects striking the seat. The study found that reducing the energy-absorber limit load to a low value may actually increase the spinal-injury rate, because the seat will bottom out in a greater number of accidents.
DE- *Protective equipment; *Helicopters; *Spinal cord
ID- *Injuries; NTISNTND
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 1306171
AA- <NTIS> AD-A180 325/3
TI- Aeronautical Decision Making for Helicopter Pilots
AU- Adams, R. ; Thompson, J.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> 086949000; 416585
SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- DOT/FAA/PM-86/45
CN- DTFA01-80-C-10080
PY- Feb 87
PG- 133p
NT- Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8717
CP- United States
AB- Avaition accident data indicate that the majority of aircraft mishaps are due to judgment errors. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates. The results of such tests were statistically significant and ranged from approximately 10% to 50% fewer mistakes. This manual is designed to explain the risks associated with helicopter flying activities, the underlying behavioral causes of typical accidents, and the effects of stress on pilot decision making. It provides a means for the individual pilot to develop an Attitude Profile through a self-assessment inventory and provides detailed explanations of pre-flight and in-flight stress management techniques. The assumption is that pilots receiving this training will develop a positive attitude toward safety and the ability to effectively manage stress while recognizing and avoiding unnecessary risk. The examples used are taken from real

accident and incident reports. This manual is one of a series on Aeronautical Decision Making prepared for the following pilot audiences: (1) Student and Private (2) Commercial (3) Instrument (4) Instructor (5) Helicopter (6) Multi-Crew.
DE- *Decision making; *Pilots; Aeronautics; Aviation safety; Helicopters; Performance(Human); Accidents; Flight; Human factors engineering; Inflight; Management; Stresses; Aviation accidents; Flight training; Instruction manuals; Judgement(Psychology); Errors; Rates; Attitudes(Psychology); Rotary wing aircraft; Training
ID- NTISDODXA; NTISDOTFAA
SH- 92B (Behavior and Society--Psychology); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1305625
AA- <NTIS> PB87-185765
TI- Journees d'Ergonomie Militaire, 29 et 30 Septembre 1986, Operations Soutenues (Sessions of Military Ergonomy, 29 and 30 September 1986)
CS- Centre Technique Mobilite, Montreuil-Juigne (France).
CS- <CODE> 088591000
PY- 1986
PG- 334p
NT- Text in French.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
DT- Conference proceeding
PC- PC E13/MF E13
JA- GRAI8716
CP- France
AB- A resume of the sessions deals with aerial and spatial space, naval combat, field of aeroterrestrial battle. Some of the topics under discussion are the psychophysiological problems posed by operations in the Air Force, stress and operations undertaken, chemical defense in the Air Force, ergonomy and contribution of data on psychophysics and auditive neurophysiology to submarine detection and acoustic classification, experimental psychology and deep dive, determination of carbon dioxide concentrations admissible aboard nuclear submarines, integration of ergonomy in the conception and evaluation of weapons systems, ergonomy problems posed by the intervention of helicopters in sustained operations, command posts in continuous operations, and related topics.
DE- *Military psychology; *Human factors engineering; Meetings; Aerial warfare; Naval operations; Physiological psychology; Stress(Psychology) ; Psychophysics; Environmental engineering; Auditory perception; Underwater environments; Weapon systems; Man machine systems
ID- *Foreign technology; NTISTFCDA
SH- 74GE (Military Sciences--General); 92B (Behavior and Society--Psychology); 57W (Medicine and Biology--Stress Physiology)

AZ- 1293252
AA- <NTIS> DE87002860
TI- Status of Aerial Survey Emergency Preparedness and Ground Support Equipment, Calibration, and Sensitivities
AU- Dahlstrom, T. S.
CS- EG and G Energy Measurements, Inc., Las Vegas, NV. Aerial Measurements Operations.
CS- <CODE> 082175002; 9521409
SP- Department of Energy, Washington, DC.
RN- EGG-10282-1126; CONF-8609147-5
CN- AC08-83NV10282
PY- 1986
PG- 6p
NT- American Nuclear Society annual meeting, Bethesda, MD, USA, 15 Sep 1986.
NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI8712; NSA1200
CP- United States
AB- During the course of EG and G Energy Measurements, Inc. history in aerial surveillance, the scope of response has broadened from routine surveys and accident response with aerial systems, to being prepared to respond to any radiological incident with aerial, ground mobile, and hand-held instrumentation. The aerial survey system presently consists of four MBB BO-105 helicopters outfitted with gamma pods and specialized navigation systems (MRS or URS) that allow the operator and pilot to fly well-defined survey lines. Minimum detectable activities (MDA) for various isotopes range from a few tenths of a mCi to 100 mCI

for point sources and from 1 to 200 pCi/g for volume sources. (ERA citation 12:009911)
DE- *Radiation Accidents; *Aerial Monitoring; Helicopters; NaI Detectors; Survey Monitors
ID- ERDA/500300; Emergency preparedness; NTISDE
SH- 68F (Environmental Pollution and Control--Radiation Pollution and Control); 68A (Environmental Pollution and Control--Air Pollution and Control)

AZ- 1291497
AA- <NTIS> NTN87-0221
TI- Procedures for Laboratory Vibration Tests: Lab simulations of transportation and service conditions are detailed
TI- <NOTE> NTIS Tech Note
CS- Army Materiel Development and Readiness Command, Alexandria, VA.
CS- <CODE> 047809000
SP- Department of the Army, Washington, DC.
PY- Feb 87
PG- 1p
NT- FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report, order number: AD-A155856/NAA, price code: A11.
LA- English
PC- Not available NTIS
JA- GRAI8711
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. A document presents procedures for laboratory vibration tests. It presents two types of tests: (1) simulation of the vibration enviornment experienced by such equipment as cargo during transportation and (2) simulation of vibration undergone by the equipment in service after installation in a truck or a helicopter. The document, which was prepared for the U.S. Army Test and Evaluation Command, describes facilities, instrumentation, conditions, and procedures. Schedules are provided for the exposure of a test item to the various combinations of cargo and in-service vibration environments that can be expected. An appendix provides guidance in selecting an appropriate combination of schedules. The overall objective of laboratory vibration tests is to produce the same force-dependent damage as the specimen would incur during its life. The severity of a test -- that is, its acceleration magnitude, frequency, and exposure time-- must be related to the environment and the distance of transport of the test item in its intended field use.
DE- *Vibration tests
ID- *Transportation sector; NTISNTND
SH- 85GE (Transportation--General)

AZ- 1291105
AA- <NTIS> N87-17306/8
TI- Remote Sensing of Tree Attenuation at 870 Mhz Along Simulated Earth-Satellite Paths
AU- Vogel, W. J. ; Torrence, G. W. ; Goldhirsh, J. ; Rowland, J. R.
CS- Texas Univ. at Austin.
CS- <CODE> 043127000; TT636128
SP- National Aeronautics and Space Administration, Washington, DC.
CN- JPL-956520; N00024-85-C-5301
PY- Aug 86
PG- 6p
NT- In Esa Proceedings of the 1986 International Geoscience and Remote Sensing Symposium (Igarss '86) on Remote Sensing: Today's Solutions for Tomorrow's Information Needs, Volume 2 p 861-866. Prepared for JPL.
LA- English
PC- (Order as N87-17283, PC A17/MF A01)
JA- GRAI8711; STAR2509
CP- United States
AB- Tree attenuation at 870 MHz was studied using a helicopter as a source platform and a van with receiver and data acquisition instrumentation. Tree attenuation results were obtained with the van stationary and in motion to determine land mobile satellite systems link parameter requirements (expected fading due to roadside trees for mobile and stationary vehicles). Single tree attenuation results give worst case median fades as high as 15 dB although roadside tree values produce fades greater than 20 dB for small percentages of time. The cumulative fade distributions and their relative contributions as a function of path elevation angle, right side versus left side driving, and different road types are derived from the field measurements.
DE- *Land mobile satellite service; *Radio attenuation; *Trees (Plants); Signal fading rate; Systems simulation; Ultrahigh frequencies; Automobiles; Helicopters; Multipath transmission
ID- NTISNASA
SH- 45C (Communication--Common Carrier and Satellite); 46H (Physics--Radiofrequency Waves)

AZ- 1286659
AA- <NTIS> AD-A176 587/4

TI- Hover Performance of a Remotely Piloted Helicopter
TI- <NOTE> Master's thesis
AU- Cotten, R. P.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Dec 86
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A04/MF A01
JA- GRAI8710
CP- United States
AB- This paper discusses the hover performance of a remotely piloted helicopter (RPH) and the suitability of the use of this RPH in the academic environment of the Naval Postgraduate School Aeronautical Engineering Department. The methods used are those used in the Helicopter Performance Test Manual of the U.S. Navy Test Pilot School. When testing remotely piloted aircraft for use with the military, there is a necessity to test a product to specifications. These specifications may be similar to those of a full sized aircraft. The test methods used are adequate for the testing of RPH's for specification but the use of this equipment in an academic environment is not safe enough without major modification. The RPH has enough excess lift to carry a small test instrumentation package in forward flight. If the RPH is used only in a laboratory environment for the demonstration of hover performance; the gas engine can be replaced with an electric motor and a plexiglas shield can be used between the students and the RPH to satisfy necessary safety precautions. (Theses).

DE- *Hovering; *Remotely piloted vehicles; *Helicopters; Aircraft; Demonstrations; Electric motors; Engines; Environments; Gases; Laboratories; Level flight; Navy; Performance(Engineering); Pilots; Plexiglas; Production control; Safety; Schools; Shielding; Specifications; Students; Test methods; Theses; Aviation safety
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1284337

AA- <NTIS> AD-A176 099/0
TI- Human Factors Research in Aircrew Performance and Training
TI- <NOTE> Annual summary rept. Sep 83-Aug 84
AU- Cross, K. D.
CS- Anacapa Sciences, Inc., Fort Rucker, AL
CS- <CODE> 081141000; 414866
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ASI-479-061-84; ARI-RN-86-97
CN- MDA903-81-C-0504; 2Q263731A792; 2Q263739A793
PY- Nov 86
PG- 139p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8709
CP- United States
AB- This report presents a summary of the work performed by Anacapa Sciences, Inc. (ASI) for the Army Research Institute (ARI) Field Unit at Fort Rucker Alabama, under the contract 'Human Factors Research in Aircrew Performance and Training'. This research note contains summary descriptions of each of the projects on which ASI personnel worked during the third contract year -- September 1983 to August 1984. Each summary description contains: a background section that described the rationale for the research and the research objectives; a research approach section that described the tasks and activities required to fulfill the project objectives; and a project status section that describes the work completed, the preliminary findings (if available), and the anticipated project completion date.
DE- *Flight crews; *Performance(Human); *Flight training; Human factors engineering; Alabama; Army aircraft; Army personnel; Army research; Army training; Attrition; Background; Contracts; Flight; Flight simulators; Helicopters; Maintenance; Military requirements; Personnel retention; Pilots; Skills; Stations; Validation; Work
ID- NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1282990

AA- <NTIS> N87-14304/6
TI- Emergency Exits for Underwater Escape from Rotorcraft
AU- Allan, J. R. ; Ward, F. R. C.
CS- Royal Air Force, Farnborough (England). Inst. of Aviation Medicine.
CS- <CODE> 024586001; R1446220
SP- National Aeronautics and Space Administration, Washington, DC.
RN- AEG-REPT-528; BR98781
PY- Jan 86
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8708; STAR2506
CP- United Kingdom
AB- An experimental adjustable escape exit was used to determine the smallest rectangular exit compatible with underwater escape by passengers in the upper range of shoulder widths and wearing standard immersion protection. An exit 432 mm (17 in) x 356 mm (14 in) is considered to be the smallest acceptable size. Recommendations in respect to swimming goggles, hand-holds, and opening systems, and for a review of the advantages of a larger number of smaller escape exits for ditching emergencies are made.
DE- *Doors; *Emergencies; *Escape systems; *Rotary wing aircraft; *Underwater tests; *Width; Aircraft design; Egress; Human factors engineering
ID- *Foreign technology; NTISNASAE
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 1282147
AA- <NTIS> AD-A175 717/8
TI- Comparison of the Acoustic and Aerodynamic Measurements of a Model Rotor Tested in Two Anecholic Wind Tunnels
TI- <NOTE> Technical memorandum rept
AU- Boxwell, D. A. ; Schmitz, F. H. ; Splettstoesser, W. R. ; Schultz, K. J. ; Lewy, S.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; 388090
SP- National Aeronautics and Space Administration, Washington, DC.; Army Aviation Systems Command, St. Louis, MO.
RN- NASA-A-86417; NASA-TM-88364; USAAVSCOM-TM-86-A-6
CN- FHWA-8-3-0187; 4A762730AT42; BS
PY- Nov 86
PG- 77p
NT- See also Part 1, AD-A171 541.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8708
CP- United States
AB- Two aeroacoustic facilities--the CEPRA 19 in France and the DNW in the Netherlands--are compared. The two facilities have unique acoustic characterists that make them appropriate for acoustic testing of model-scale helicopter rotors. An identical pressure-instrumented model-scale rotor was tested in each facility and acoustic test results are compared with full-scale rotor test results. Blade surface pressures measured in both tunnels were used to correlate nominal rotor operating conditions in each tunnel, and also used to assess the steadiness of the rotor in each tunnel's flow. In-the-flow rotor acoustic signatures at moderate forward speeds (35-50 m/sec) are presented for each facility and discussed in relation to the differences in tunnel geometries and aeroacoustic characteristics.
DE- *Helicopter rotors; *Wind tunnels; Acoustic coatings; Acoustic measurement; Acoustic properties; Acoustics; Aerodynamic characteristics; Aerodynamics; Blades; Flow; France; Geometry; Instrumentation; Models; Pressure; Scale models; Sound transmission; Surface properties; Test methods; Velocity; Rotor blades(Turbomachinery); Acoustic signatures; Netherlands
ID- Aeroacoustics; NTISDODXA; NTISNASA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1280245
AA- <NTIS> AD-A175 407/6
TI- Evaluation of Sikorsky S-76A 24 Missed Approach Profiles Following Precision MLS Approaches to a Helipad at 40 KIAS (Knots Indicated Airspeed)
TI- <NOTE> Technical note. Aug 85-Jul 86
AU- Webb, M. M.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.

CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-TN86/31
CN- T0701B
PY- Oct 86
PG- 100p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8707
CP- United States
AB- This report describes the trend analysis evaluation of the Sikorsky S-76A missed approach profiles following precision microwave landing system (MLS) approaches at glidepath angles of 3 deg, 6 deg, and 7.5 deg at a minimum instrument meteorology conditions airspeed (V sub mini) of 40 knots indicated airspeed (KIAS). It describes the flight test facilities, methodology, and addresses topics such as how flight test data are collected and what is done with it. It also describes each of the helicopter procedures flown during the project and provides an analysis of the pilots subjective opinions concerning the acceptability and workload associated with these procedures. It was concluded that the trend indicates that no current terminal instrument procedures (TERPS) criteria would be violated by reducing V sub mini to 40 KIAS. The plots indicated that there wer no penetrations of the 20:1 surface missed approach surface. The maximum deviation allowed by TERPS for the height loss at missed approach rises along a 20:1 plane which begins at the surface or 250 feet below surface began at ground level. At most, only a 40-foot fly under at decision height (DH) was noticed during the 24 missed approaches flown. However, this information should be considered indicative rather than conclusive due to the small sample size (24 approaches). Additional testing would be required to provide TERPS quality data.
DE- *Approach; *Microwave landing systems; *Instrument landings; Acceptability; Airspeed; Decision making; Experimental data; Flight testing; Ground level; Height; Helicopters; Instrumentation; Losses; Patterns; Quality; Surfaces; Test and evaluation; Test facilities; Workload; Precision; Helipads; Glide path systems
ID- S-76 Aircraft; TERPS(Terminal Instrument Procedures); Decision Heights; Helicopter Landings; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1280188
AA- <NTIS> AD-A175 349/0
TI- Airworthiness and Flight Characteristics Test (A&FC) of the BHTI (Bell Helicopter Textron, Inc.) 214ST Helicopter
TI- <NOTE> Final rept. 1 Jul-27 Aug 85
AU- Williams, R. A. ; Cason, R. W. ; Buckanin, R. M.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-85-10
PY- Feb 86
PG- 180p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8707
CP- United States
AB- The Airworthiness and Flight Characteristics Test of the Bell 214ST helicopter (S/N N3186W) was conducted by the US Army Aviation Engineering Flight Activity (USAAEFA). The test was conducted at Edwards Air Force Base (elevation 2302 feet), Bakersfield (elevation 488 feet), Bishop (elevation 4120 feet) and Coyote Flats (elevation 9980 feet), California. A total of 62.6 hours (27.5 productive hours) were flown between 1 July and 27 August 1985. Hover, level flight and autorotational descent performance tests were conducted. Handling qualities tests included static and dynamic stability, maneuvering stability, power management, systems failures, mission maneuvers and flight in simulated Instrument Meteorological Conditions (IMC). The airspeed for best glide distance determined from the autorotational descent performance test results of this evaluation was significantly less than the best glide distance airspeed presented in the flight manual. The out-of-ground effect hover test results when compared to the flight manual indicated less hover capability at standard day conditions and altitude below 8060 feet but better hover capability at higher altitudes. The maximum difference between the flight manual and the test results of this evaluation was 250 pounds, below 8060 feet. Two major conclusions reached were: the 214ST is an excellent IMC aircraft with its IMC capabilities exceeding those of any US Army helicopters and its cockpit design significantly reduces pilot workload in most modes of flight.
DE- *Helicopters; *Flight testing; *Airworthiness; Aerodynamic characteristics; Aircraft; Airspeed; Army aircraft; California;

Cockpits; Day; Dynamics; Flight; High altitude; Hovering; Instrumentation; Level flight; Management; Maneuverability; Maneuvers; Manuals; Meteorology; Missions; Pilots; Power; Simulation; Stability; Workload
ID- Flight Characteristics; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1279253
AA- <NTIS> N87-13146/2
TI- Bewertung von Mensch-Maschine-Systemen. Methoden und Problematik (Proceedings of a Symposium on the Evaluation of Man-Machine Systems: Methods and Problems)
CS- Deutsche Gesellschaft fuer luft- und Raumfahrt e.V., Bonn (Germany, F.R.).
CS- <CODE> 085248000; DP399183
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DGLR-85-04; ISBN-3-922010-30-X
PY- 1985
PG- 277p
NT- Partly in German and English. Symposium Held in Cologne, West Germany, 14-15 Nov. 1985.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A13/MF A01
JA- GRAI8706; STAR2504
CP- Germany, Federal Republic of
AB- No abstract available.
DE- *Anthropometry; *Conferences; *Human factors engineering; *Man machine systems; Air conditioning equipment; Cockpits; Helicopter design; Navigation; Nuclear power plants; Operators (Personnel); Process control (Industry); Vibration tests; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1277096
AA- <NTIS> N87-12327/9
TI- Introduction au Bruit des Helicopteres (Introduction to Helicopter Noise)
AU- Haertig, J.
CS- Institut Franco-Allemand de Recherches, Saint-Louis (France).
CS- <CODE> 012819000; IH382936
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ISL-NB-401/84; ETN-86-98405
PY- 7 Feb 84
PG- 25p
NT- Text in French.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
DT- Bibliography
PC- PC A02/MF A01
JA- GRAI8705; STAR2503
CP- Other
AB- Literature on the intensity and characteristics of the external noise produced by helicopters was reviewed. Several types of noise are described and illustrated by measurements and calculations.
DE- *Aircraft noise; *Helicopters; *Noise measurement; Aerodynamic noise; Bibliographies; Human factors engineering
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46A (Physics--Acoustics)

AZ- 1276908
AA- <NTIS> N87-11785/9
TI- Systems, Avionics and Instrumentation of Transport Category Helicopters
AU- Abbink, F. J.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-85066-U; B8667703
PY- Aug 85
PG- 37p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A03/MF A01
JA- GRAI8705; STAR2503
CP- Netherlands
AB- The development of helicopters for passenger transport is reviewed. The systems, avionics, and instrumentation of an S-76 transport helicopter used for offshore services are described. Developments in helicopter avionics are discussed.
DE- *Airline operations; *Avionics; *Offshore platforms; *Passenger aircraft; *Sikorsky aircraft; Air navigation; Aircraft communication; Aircraft equipment; Automatic flight control; Flight instruments; Navigation aids
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1276539
AA- <NTIS> DE86016101
TI- Analysis of Shock and Vibration Environments for Cargo on C9B Transport Aircraft
AU- Baca, T. J. ; Doggett, J. W. ; Davidson, C. A.
CS- Sandia National Labs., Albuquerque, NM.
CS- <CODE> 068123000; 9511100
SP- Department of Energy, Washington, DC.
RN- SAND-86-1238C; CONF-8610140-2
CN- AC04-76DP00789
PY- 1986
PG- 15p
NT- 57. shock and vibration symposium, New Orleans, LA, USA, 14 Oct 1986.
NT- Portions of this document are illegible in microfiche products. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI8705; NSA1100
CP- United States
AB- The definition of shock and vibration environments on the floor of cargo aircraft is of prime interest to designers of hardware which must be transported on these planes and helicopters. The DOE/DOD Environmental Data Bank at Sandia National Laboratories maintains an extensive collection of environmental definitions for aircraft. This paper describes the process involved in acquiring and analyzing shock and vibration data on the cargo floor of a C9B turbojet aircraft for incorporation into the DOE/DOD Environmental Data Bank. The dual objectives of this paper are to show the procedure by which the environmental definition is created and to compare the results with existing definitions of shock and vibration environments on fixed wing aircraft. Special emphasis is placed on instrumentation considerations which help ensure data integrity. (ERA citation 11:054502)
DE- *Aircraft; Cargo; Dynamic Loads; Impact Shock; Mechanical Vibrations
ID- ERDA/420100; ERDA/420200; NTISDE
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1275913
AA- <NTIS> AD-A174 284/0
TI- Effect of Helicopter Vibration on the Accuracy of a Voice Recognition System
TI- <NOTE> Final rept
AU- Dennison, T. W. ; Malkin, F. J. ; Smyth, C. C.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-11-86
PY- Sep 86
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8705
CP- United States
AB- Speech recognition technology could be especially advantageous to single-crewmember helicopters like the Light Helicopter Family (LHX). Before speech recognition can be considered a viable technology for helicopters, several issues remain to be resolved. One of these is changes in the voice that occur as a result of stress, noise, and vibration. This paper reports the results of an investigation conducted to determine the effect of vibration-induced changes in the voice on the accuracy of a speech recognition system. A series of flight tests were conducted using 12 participants and 8 different flight maneuvers. Data were collected with the participants speaking 50 phonetically balanced words into the speech recognizer while seated in the copilot's seat of a UH-1H helicopter during each of the 8 flight maneuvers. The results indicate that speech recognition system accuracy is not

affected by helicopter vibration.
DE- *Speech recognition; *Voice communications; *Helicopters; *Vibration; Human factors engineering; Avionics; Flight crews; Stresses; Noise; Flight testing; Flight maneuvers; Phonetics
ID- Voice recognition; UH-1H aircraft; H-1 aircraft; NTISDODXA
SH- 45F (Communication--Verbal); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1275688
AA- <NTIS> AD-A174 057/0
TI- Human Factors Affecting Pilot Performance in Vertical and Translational Instrument Flight
TI- <NOTE> Final technical rept
AU- Roscoe, S. N.
CS- New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
CS- <CODE> 012643033; 412156
RN- BEL-86-1/ONR-86-1
CN- N00014-81-K-0439
PY- 1986
PG- 31p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8705
CP- United States
AB- This report is a review of a program to apply the best aircraft control and display ideas and principles generated since World War II to an integrated, computer-based system for vertical and translational instrument flight. A generic thrust-borne aircraft capable of vertical takeoff and landing (VTOL) and six degrees of maneuvering freedom was simulated, as were a forward-looking contact analog display and a downward-looking horizontal situation display. Features incorporated in these displays included command guidance symbology, directionally compatible frequency-separated quasi-pursuit flight path predictors with vernier-deviation indications and uniquely integrated presentations of altitude and vertical speed in the horizontal situation display. Features of the simulated control system included automatic stabilization of position and velocity vector against air mass movements and reduced orders of maneuvering performance control. A holistic experimental approach was applied to screen critical dynamic design variables, optimize their response surfaces, and investigate direction of display motion relationships, all leading to multiple-regression models of pilot performance in vertical and translational instrument flight.
DE- *Display systems; *Human factors engineering; *Flight instruments; *Performance(Human); Vertical takeoff aircraft; Helicopters; Mission profiles; Performance(Engineering); Screens(Displays); Head up displays ; Flight crews; Flight simulators; Maneuverability; Flight paths; Predictions; Military requirements
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1274163
AA- <NTIS> AD-A173 764/2
TI- Summary of Artificial and Natural Icing Tests Conducted on U.S. Army Aircraft from 1974 to 1985
TI- <NOTE> Final summary rept
AU- Chambers, H. W. ; Adams, J. Y.
CS- Army Aviation Systems Command, St. Louis, MO.
CS- <CODE> 027529000; 404318
SP- Federal Aviation Administration Technical Center, Atlantic City, NJ.
RN- USAAVSCOM-TR-85-F-11; DOT/FAA/CT-85/26
CN- DTFA03-80-A-00199
PY- Jul 86
PG- 223p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A01
JA- GRAI8704
CP- United States
AB- The U.S. Army Aviation Systems Command (USAAVSCOM) conducts airworthiness qualification testing on aircraft under artificial and natural icing conditions. A JCH-47C helicopter with Helicopter Icing Spray System (HISS) installed is used for generating a simulated natural icing environment. The artificial icing tests are followed by natural icing tests to assure a wide variety of flight conditions are tested and to verify artificial icing test results. The JCH-47C/HISS

has been used since 1974 for conducting research, engineering, development, and qualification testing for U.S. Army, Navy, NASA, and various contractor aircraft. The USAAVSCOM has compiled an extensive artificial and natural icing test data base which is summarized in this report. This report documents unclassified U.S. Army, other U.S. Government agencies, and commercial icing test programs. Also discussed is the use of deice and anti-ice systems; the impact of ice accretion and shedding characteristics, performance considerations, stability and control, and vibration characteristics; and the cloud parameters measurement equipment and test aircraft instrumentation used for documenting test data. The test methodology and requirements used for qualifying aircraft for flight into icing conditions, instrumentation, and special equipment are summarized, and the details for test conducted are contained in the references. The report documents, in part, 14 years of U.S. Army experience in conducting in-flight aircraft icing tests.

DE- *Ice formation; *Army aircraft; *Helicopters; Test and evaluation; Airworthiness; Qualifications; Clouds; Supercooling; Moisture content; Liquids; Sprays; Water; Accumulation; Deicing systems; Ice prevention; Aerodynamic stability; Vibration; Flight testing

ID- H-47 Aircraft; JCH-47C Aircraft; Certification; HISS(Helicopter Icing Spray System); Supercooled Clouds; Antice Systems; Ice Accretion; Ice Shedding; Liquid Water Content; NTISDODXA; NTISDOTFAA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1271346

AA- <NTIS> NTN86-1284

TI- Real-Time Terrain-Image Generator: A multiprocessor system displays changing views from a helicopter

TI- <NOTE> NTIS Tech Note

CS- Army Materiel Development and Readiness Command, Alexandria, VA.

CS- <CODE> 047809000

SP- Department of the Army, Washington, DC.

PY- Dec 86

PG- 1p

NT- FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report order number: AD-A159316/NAA, price code: A03.

LA- English

PC- Not available NTIS

JA- GRAI8702

CP- United States

AB- This citation summarizes a one-page announcement of technology available for utilization. A system generates images of terrain in real time. The system, called HELICON, was developed for the U.S. Army Human Engineering Laboratory. It has been installed in a human-factors research system and integrated with a motion-based helicopter simulator, a helicopter crew-station simulator, and air-defense crew-station mockup. HELICON receives location and attitude data from one of the crew stations and provides stylized representations of terrain as it would be seen from the crew station for various flight conditions. The system displays two-dimensional terrain features of roads, rivers, lakes, and fields. It provides three dimensional terrain features of trees, buildings, and hills.

DE- *Human factors engineering; *Computer graphics; *Terrain; *Helicopters

ID- *Image processing; *Display systems; NTISNTND

SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 48I (Natural Resources and Earth Sciences--Cartography); 62F (Computers, Control, and Information Theory--Pattern Recognition and Image Processing)

AZ- 1264971

AA- <NTIS> N86-29811/4

TI- Feasibility Study for Ergonomic Analysis and Design of Future Helicopter Cockpit Systems

AU- Hawkins, H. L.

CS- Bio-Dynamics Research and Development Corp., Eugene, OR.

CS- <CODE> 086979000; BO758819

SP- National Aeronautics and Space Administration, Washington, DC.

RN- NAS 1.26:176942; NASA-CR-176942

CN- NAS2-12056

PY- May 85

PG- 52p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A04/MF A01

JA- GRAI8625; STAR2421

CP- United States

AB- The Army's light scout-attack helicopters (LHXs), planned for deployment in the 1990's, will fly nap-of-the-earth (NOE) missions in high threat environments, often under poor visibility and adverse atmospheric conditions, and probably with a one man crew. A procedure

for the analysis of pilot workload that will identify and explicate the main characteristics of those LHX mission components holding overload potential is described. A principled, in-depth, explication of the cognitive demans of LHX piloting is essential to any effective effort to address the human factors issues. A task-analytic procedure that will yield the detail and organizstion needed to achieve these goals is examined.
DE- *Aircraft design; *Display devices; *Human factors engineering; *Military helicopters; *Pilot performance; Workloads (Psychophysiology) ; Cognition; Computerized simulation; Data processing; Flight simulation; Nap-of-the-earth navigation; Tasks
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1264259
AA- <NTIS> AD-A171 226/4
TI- Backache and Back Discomfort
TI- <NOTE> Conference proceedings
AU- Landolt, J. P. ; Troup, J. D. ; Zerlett, G. ; Boulanger, R. ; Donati, P.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-378
PY- Jun 86
PG- 281p
NT- Presented at the Aerospace Medical Panel Specialists' Meeting, 8-10 Oct 85, Pozzuoli, Italy.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A13/MF A01
JA- GRAI8625
CP- France
AB- The purpose of the symposium was to bring military and civilian specialists working in different disciplines together to consider the problems of back pain and back discomfort in vehicular environments; in particular, as they relate to the discomfort of aircrew in current and emerging aircraft. The scope was broad, in that it covered several aspects of the back-pain problem. Idiopathic low-back pain in the general population was considered from the point of view of posture and vehicular vibration as contributory factors, the conditions of the spine which predispose individuals to backache, the spine and task ergonomics, the methodology for predicting spinal instability, and back-school programmes for the prevention or treatment of recurrent back pain. The topics discussed under backache and back discomfort in the cockpit environment included methods of measurement, the effects of whole-body vibration and sitting posture on the spine, and the use of passive lumbar supports, improved seat cushions, and active anti-vibration seat cushions as preventative measures. The participants included military and civilian experts in epidemiology, orthopaedic medicine, pathophysiology, biomechanics, mechanical vibrations, process modelling, anthropometry, task ergonomics, and design and operations engineering.
DE- *Pain; *Posture(Physiology); *Seats; Stress(Physiology); Spinal column; Fatigue(Physiology); Military personnel; Civilian personnel; Helicopters; Aircraft; Ground vehicles; Human body; Vibration; Exposure(Physiology); Drivers(Personnel); Cockpits; Flight crews; Musculoskeletal system; Human factors engineering; Canada
ID- *Foreign technology; *Backache; Back(anatomy); NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1262390
AA- <NTIS> AD-A170 793/4
TI- Aircraft Avionics Suitable for Advanced Approach Applications. Volume 1. Aircraft Fleet Equipage
TI- <NOTE> Avionics study
AU- Kowalski, S. ; Croswell, T. H.
CS- RJO Enterprises, Lanham, MD.
CS- <CODE> 086808000; 416339
SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- DOT/FAA/PM-86-25/1
CN- DTFA01-84-Y-01051
PY- Jul 86
PG- 117p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A06/MF A01
JA- GRAI8624
CP- United States
AB- This report catalogs the aircraft avionics suitable for advanced approach applications. The configuration and model numbers of avionics used in navigation and approached for landing are provided for 79 different types of aircraft. Aircraft are grouped into five used communities which cover Major Air Carriers, Regional Air Carriers, Executive Jets, General Aviation Aircraft, and IFR Helicopters. Avionics evaluation includes VOR NAVs, ADFs, DMEs, RNAVs, AFCS, weather radar and the associated display instruments. These navigation systems are the most popular units for navgiation and landing in todays aircraft. ILS glideslope receivers, marker beacon systems, navigation management systems, vertical navigation systems, and long range navigation systems are not covered.
DE- *Cockpits; *Instrumentation; *Display systems; *Avionics; *Radar; *Commercial aircraft; Helicopters
ID- *Navigational radar; Glide slope receivers; Display panels; NTISDODXA; NTISDOTFAA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components); 63H (Detection and Countermeasures--Radiofrequency Detection)

AZ- 1261280
AA- <NTIS> NTN86-0404
TI- Electro-optical System Measures Aircraft Deflections: A digital system offers accuracy and convenience
TI- <NOTE> NTIS Tech Note
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000
PY- Apr 86
PG- 1p
NT- FOR ADDITIONAL INFORMATION: Contact: NASA Technology Transfer Div., PO Box 8757 BWI Airport, MD 21240; (301) 621-0100 ext 241. For licensing information, contact: Stanley A. Miller, Ames Research Center, Mail Code 234-B, Moffett Field, CA 94035; (415) 694-6471. Refer to ARC-11454./TN.
LA- English
PC- Not available NTIS
JA- GRAI8623
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. In-flight deflections of aircraft surfaces are measured accurately over a wide range of airspeeds and attitudes by an electro-optical instrumentation system. Deflections caused by aerodynamic and acceleration forces are measured on wings, stabilizers, helicopter rotors, and other surfaces. The electro-optical system replaces the 70-millimeter motor-driven camera previously used to observe deflections. As shown in the figure, its major components are optical targets attached to the deflecting structure, a control unit, receivers, target drivers, a telemetry unit, and a ground unit. The targets are infrared LED's in aerodynamically-shaped aluminum fixtures bonded to the aircraft surface. The system uses up to 48 targets and up to 6 receivers.
DE- *Aircraft; *Electrical measurement; *Optical tests
ID- NTN/B; NTISNTND
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1260926
AA- <NTIS> N86-28051/8
TI- Development and Validation of the Crew-Station System-Integration Research Facility
AU- Nedell, B. ; Hardy, G. ; Lichtenstein, T. ; Leong, G. ; Thompson, D.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:86841; A-85410; NASA-TM-86841
PY- May 86
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8623; STAR2419
CP- United States
AB- The various issues associated with the use of integrated flight management systems in aircraft were discussed. To address these issues a fixed base integrated flight research (IFR) simulation of a helicopter was developed to support experiments that contribute to the understanding of design criteria for rotorcraft cockpits incorporating advanced integrated flight management systems. A validation experiment was conducted that demonstrates the main features of the facility and the capability to conduct crew/system integration research.
DE- *Flight management systems; *Flight simulation; *Helicopters; *Human

factors engineering; *Man machine systems; *Systems integration; Systems engineering; Cockpits; Flight safety; Structural design criteria; Workloads (Psychophysiology); Workstations
ID- NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1259730
AA- <NTIS> AD-A169 947/9
TI- Technical Requirements for Benchmark Simulator-Based Terminal Instrument Procedures (TERPS) Evaluation
TI- <NOTE> Final contractor rept
AU- Phatak, A. V. ; Sorensen, J. A.
CS- Analytical Mechanics Associates, Inc., Mountain View, CA.
CS- <CODE> 030966000; 413735
SP- National Aeronautics and Space Administration, Washington, DC.; Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.
RN- AMA-86-2-1; NASA-CR-177407; DOT/FAA/PM-86/14
CN- NAS2-11973
PY- May 86
PG- 121p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8623
CP- United States
AB- In order to take full advantage of the helicopter's unique flight characteristics, enhanced terminal instrument procedures (TERPS) need to be developed for a variety of non-standard operational situations. These include non-standard landing navigation aids, precision and non-precision approach profiles, landing sites, and avionics systems. Currently, TERPS criteria are largely established by extensive flight testing. This study examined the requirements for using helicopter cockpit simulators in place of flight testing to generate data necessary for enhanced TERPS development.
DE- *Landing aids; *Approach; *Simulators; Helicopters; Navigational aids; Cockpits; Avionics; Visual signals; Motion; Instrument landings; Microwave landing systems; Flight simulation; Test and evaluation
ID- TERPS(Terminal Instrumentation Procedures); NTISDODXA; NTISNASA; NTISDOTFAA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 51E (Aeronautics and Aerodynamics--Avionics); 76A (Navigation, Guidance, and Control--Control Devices and Equipment)

AZ- 1251574
AA- <NTIS> AD-A168 193/1
TI- U.S. Civil Airmen Statistics, 1981
AU- Carter, P. W.
CS- Federal Aviation Administration, Washington, DC. Office of Management Systems.
CS- <CODE> 009020038; 403600
PY- 31 May 82
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8619
CP- United States
AB- This report furnishes detailed airmen statistics. It contains a calender year statistics on pilots and nonpilots and the number of certificates issued.
DE- *Civil aviation; *Pilots; *Flight crews; Commerical aviation; Transport ; Statistics; Helicopters; Flight; Instructors; Instrumentation; Ratings; Aviation personnel; Tables(Data); Statistical data; Gliders; Airships; Instrument flight; Air transportation
ID- NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1251248
AA- <NTIS> PB86-871100
TI- Head Up Displays. 1975-July 1986 (Citations from the International Aerospace Abstracts Database)
TI- <NOTE> Rept. for 1975-Jul 86
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 86
PG- 110p

NT- Supersedes PB85-864197. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8618
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 258 citations, 24 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices; Avionics
ID- *Head up displays; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1248985
AA- <NTIS> AD-A167 945/5
TI- Task and Training Requirements Analysis for Advanced Army Helicopters
TI- <NOTE> Final summary rept. Jul 81-Apr 83
AU- Siegel, A. I. ; Madden, E. G. ; Pfeiffer, M. G.
CS- Applied Psychological Services, Inc., Wayne, PA. Science Center.
CS- <CODE> 061395001; 402774
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ARI-RN-85-105
CN- MDA903-81-C-0439; 2Q263739A793
PY- Dec 85
PG- 68p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8618
CP- United States
AB- A series of interrelated analytical tasks was completed in order to support the training development of the AHIP scout, AH-64, and AH-1S(MC) helicopters. The tasks were: (1) mission profile analysis, (2) time series analysis, (3) allocation of functions, (4) detailed task analysis, and (5) training requirements development. Each task resulted in an individual set of end products which provide required information in themselves and which formed the basis of later tasks. The need for coordination training, both within helicopter team training courses and between team training courses, and for training in problem solving are pointed out, along with the possible need for selection standards methods which are based on the crew members' ability to solve problems while under high levels of collateral perceptual-motor load.
DE- *Flight training; Army training; Flight crews; Army aircraft; Helicopters; Integration; Workload; Human factors engineering; Perception; Simulation; Allocations; Functions; Courses(Education); Teams(Personnel); Mission profiles; Problem solving; Systems analysis; Training; Time series analysis; Requirements
ID- NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1248851
AA- <NTIS> AD-A167 811/9
TI- Design of a Vertical Thrust Stand for a Remotely Piloted Model Helicopter
TI- <NOTE> Master's thesis
AU- Urda, T. J.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Mar 86
PG- 42p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A03/MF A01
JA- GRAI8618

CP- United States
AB- This paper discusses the necessary functional characteristics for the design of a test stand to measure the vertical thrust of a remotely piloted model helicopter as a functions of power output, in different degrees of ground effect. A number of potential design choices are presented along with possible instrumentation schemes to obtain both the power output and the lifting force generated by the Heli-Star model helicopter equipped with a Gold Cup HP.61 engine. Included are the results of preliminary validation testing of the test stand design chosen and a discussion of the methods used to eliminate or control vibrations which hampered the utility of the test stand. Recommendations for possible future modifications are also included.
DE- *Test stands; *Remotely piloted vehicles; Control; Experimental design; Functions; Helicopters; Instrumentation; Lift; Models; Output; Power; Test methods; Theses; Thrust; Validation; Vertical orientation; Vibration; Vertical takeoff aircraft; Hovering
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1241667
AA- <NTIS> AD-A166 423/4
TI- U.S. Civil Airmen Statistics. 1982
AU- Carter, P. W.
CS- Federal Aviation Administration, Washington, DC. Office of Management Systems.
CS- <CODE> 009020038; 403600
PY- 31 May 83
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8615
CP- United States
AB- The U.S. Civil Airmen statistics is an annual study published to meet the demands of FAA, other government agencies, and industry for more detailed airmen statistics than those published in other FAA reports. Statistics pertaining to airmen, both pilot and nonpilot, were obtained from the official airman certification records maintained at the FAA Aeronautical Center, Oklahoma City, Oklahoma. An active Airmen is one who holds both an airmen certificate and a valid medical certificate. Airmen who must have a valid medical to exercise the privileges of their certificate are all airplane pilots, control tower operators, flight navigators, flight engineers, and flight instructors.
DE- *Medical examination; *Pilots; *Civil aviation; Statistical data; Tables(Data); Air transportation; Air traffic controllers; Health surveys; Gliders; Aircraft; Operators(Personnel); Flight; Instructors; Helicopters; Instrumentation; Ratings; Statistics; Engineers; Flight crews; Navigators; Oklahoma; Urban areas
ID- Certification; Lighter than air; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1233314
AA- <NTIS> AD-A164 678/5
TI- Proceedings of the U.S. Army Corps of Engineers Surveying Conference Held at Jacksonville, Florida on 4-8 February 1985
AU- Hart, E. D. ; Fagerburg, T. L. ; Downing, G. C. ; Boyd, M. B. ; Herrmann, F. A.
CS- Army Engineer Waterways Experiment Station, Vicksburg, MS.
CS- <CODE> 002621000; 038100
PY- Feb 85
PG- 313p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A14/MF A01
JA- GRAI8612
CP- United States
AB- This conference considered both land and hydrographic surveying. Session topics included: Hydrographic Equipment Developments--Digital signal proessor techniques as an aid to hydrographic and dredging surveys; and the next generation survey echo sounder; Hydrographic Sweep Systems and Vessel Design--Multi-transducer survey sweep system; and SWATH vessel test and evaluation; Beach and Nearshore Surveys--Surf zone and nearshore surveying with helicopter and a total station; and A method for adjusting beach profile lines for offshore closure; Tides--Application of water level data to sounding reducers; and Intercomparison of bubbler gauges and pressure transducers; Hydrographic Positioning Systems and Data Processing--Portable acoustic navigation system for hydrographic surveys; Hydrographic data

processing using Hewlett Packard-200 series computers; and Parallel line hydropgraphic surveying; Remote Sensing; Control--The North American Datum of 1983 Project status; North American Vertical Datum update; and Vertically stable benchmarks; Topographic Development--Determining an azimuth with a north seeking gyro; and Field to finish surveying with the Wild surveying system; Airborne Lasers--Profiling, mapping, and terrain profiling; Global Positioning System; and Photogrammetry.
DE- *Hydrographic surveying; *Symposia; *Surveying(Geographic); Global positioning system; Dredging; Gyroscopes; Engineers; Homing; North(Direction); Surveys; Helicopters; Data processing; Closures; Offshore; Inshore areas; Army corps of engineers; Signal processing; Oceanographic ships; Beaches; Instrumentation; Navigation; Geodetic surveys; Topography; Position finding; Laser applications; Parallel orientation; Pressure transducers; Reduction; Sounding; Water; Photogrammetry; Remote detectors; Echo ranging; Ships; Hydrography; Position(Location)
ID- SWATH ships; Benchmarks; Survey instruments; NTISDODXA
SH- 85G (Transportation--Marine and Waterway Transportation); 48G (Natural Resources and Earth Sciences--Hydrology and Limnology); 47C (Ocean Technology and Engineering--Physical and Chemical Oceanography); 48I (Natural Resources and Earth Sciences--Cartography)

AZ- 1231066
AA- <NTIS> AD-A164 011/9
TI- Review of the Pilot Backache Problem in the CH113 Labrador Helicopter
AU- Beach, A.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
RN- DCIEM-85-R-49
PY- Dec 85
PG- 26p
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8611
CP- Canada
AB- In response to an Unsatisfactory Condition Report, complaints of back pain and discomfort induced by the pilots' seat of the CH113 Labrador helicopter were investigated. Several published reports dealing with the problem are reviewed and summarized in terms of incidence and prevalence rates, frequency, intensity, duration, location and time to pain onset. A questionnaire was developed and distributed to CH113 Labrador helicopter pilots in order to determine how closely the backache characteristics of the pilots match the characteristics reported by the general population. In addition, an evaluation of the size and shape of the Labrador seat was conducted and results were compared to published seat design guidelines and recommendations. Questionnaire results indicate that the typical backache reported by Labrador pilots is similar to the backache reported by other helicopter pilots. It is usually a dull pain in the lumbar area, most often experienced during flight and usually lasting after the mission ends. Subjective results also indicate that backache may be negatively correlated with regular exercise. Based on the symptoms identified in the questionnaire and the causes identified by other investigators, design principles for an improved seat incorporating an inflatable lumbar support and a more effective load bearing seat cushion were established.
DE- *Spinal column; *Aircraft seats; *Stress(Physiology); *Pilots; Cushioning; Helicopters; Inflatable structures; Instructions; Loads(Forces); Missions; Pain; Population; Signs and symptoms; Supports ; Time; Orthopedics
ID- *Foreign technology; CH-113 aircraft; Backaches; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1229798
AA- <NTIS> N86-17996/7
TI- Helicopter Cockpit Organization for Night Vision
AU- Veve, M. A.
CS- Societe Nationale Industrielle Aerospatiale, Marignane (France).
CS- <CODE> 071754000; SQ446513
SP- National Aeronautics and Space Administration, Washington, DC.
RN- SNIAS-852-210-103
PY- 1985
PG- 8p
NT- Presented at European Rotorcraft Forum (11th), London, England, 10-13 Sep. 1985.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8610; STAR2408
CP- France
AB- Ultraviolet lighting associated with a yellow-green fluorescent paint was selected as a cockpit night vision system compatible with the use of light intensification goggles, when performing military missions at night. The characteristics of night vision goggles are reviewed. Ergonomic and safety aspects are discussed. The system proposed optimizes the cockpit lighting with regard to physiological properties of the human eye. The spectral output of the lighting system is separated from the spectral response of the image intensifier photocathode.
DE- *Cockpits; *Human factors engineering; *Illuminating; *Image intensifiers; *Military helicopters; *Night vision; Fluorescence; Goggles; Microchannels; Ultraviolet radiation
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1228241
AA- <NTIS> AD-A163 479/9
TI- Reverse Engineering of the BLACK HAWK (UH-60A) Helicopter: Human Factors, Manpower, Personnel, and Training in the Weapons System Acquisition Process
TI- <NOTE> Research note, Jul 83-Jun 84
AU- Hartel, C. R. ; Kaplan, J.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RN-84-100
CN- 2Q263731A792
PY- Jun 84
PG- 109p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8610
CP- United States
AB- In a briefing format, this report on the BLACK HAWK (UH-60A) Helicopter summarizes an examination of human factors, manpower, personnel and training (HMPT) issues during the systems acquisition process. The report is one of four reverse engineering studies prepared at the request of GEN M. R. Thurman, Army Vice Chief of Staff. The four systems were studied as a representative sample of Army weapons systems. They serve as the basis for drawing conclusions about aspects of the weapon system acquisition process which most affect HMPT considerations. A synthesis of the four system studies appears in the final report of the Reverse Engineering Task Force, U.S. Army Research Institute.
DE- *Helicopters; Army research; Engineering; Reversible; Black(Color); Reports; Task forces; Acquisition; Weapon systems; Army equipment; Systems analysis; Human factors engineering; Synthesis; Military procurement; Systems engineering
ID- UH-60A aircraft; H-60 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1225981
AA- <NTIS> AD-A163 245/4
TI- Comparison of Voice and Keyboard Data Entry for a Helicopter Navigation Task
TI- <NOTE> Final rept
AU- Malkin, F. J. ; Christ, K. A.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-17-85
PY- Dec 85
PG- 42p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8609
CP- United States
AB- The Doppler navigation set, AN/ASN 128 was used to compare manual keyboard data entry of navigation map coordinates with an isolated-word speech recognition system. Twelve male Army aviators entered data by

keyboard and by voice while controlling a helicopter flight simulator. The results indicated that although the keyboard mode was faster than the voice mode of data entry, the aviators preferred using voice. Voice data entry was perceived as requiring less effort and reducing pilot workload. However, the relative slowness and low accuracy (85.5 percent) of voice data entry highlight the limitations that may exist for speech recognition systems in performing time or task critical functions. Keywords: automatic speech recognition; human factors; controls and displays; aviation.
DE- *Voice communications; *Data processing; *Keyboards; *Doppler navigation; *Navigational aids; *Word recognition; Flight simulators; Criticality(General); Functions; Helicopters; Human factors engineering ; Input; Comparison; Isolation; Males; Manual operation; Accuracy; Army personnel; Automatic; Navigation; Pilots; Speech recognition; Workload
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 1222504
AA- <NTIS> N86-14266/8
TI- Avionics System for Future Civil Helicopters
TI- <NOTE> Final rept.
AU- Formica, B.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
CS- <CODE> 064776001; MT620643
SP- National Aeronautics and Space Administration, Washington, DC.
RN- BMFT-FB-W-85-005; MBB-UD-426/84
PY- May 85
PG- 168p
NT- In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
PC- PC A08/MF A01
JA- GRAI8607; STAR2405
CP- Germany, Federal Republic of
AB- Avionics and visual aids systems were tested to determine their applicability to civil helicopters. Economical uses, compatibility with the cockpit layout, the effects on the crew regarding work strain, and their reliability and mission capability were studied. Visual aids based on infrared imagery and light amplifying devices; central displays; autonomous navigation systems; obstacle warning radar; and central control and display units were considered.
DE- *Avionics; *Bo-105 helicopter; *Civil aviation; *Navigation aids; *Visual aids; Feasibility analysis; Aircraft reliability; Cockpit simulators; Display devices; Human factors engineering; Human performance; Infrared imagery; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1218320
AA- <NTIS> AD-A161 949/3
TI- U.S. Army's LHX (Light Helicopter Family) Program
TI- <NOTE> Final rept. 1983-1984
AU- Harris, W. L. ; Blair, J. ; Decker, G. F. ; McDaniel, R. L.
CS- Army Science Board, Washington, DC.
CS- <CODE> 057317000; 411068
PY- Dec 84
PG- 50p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8606
CP- United States
AB- This report describes some of the observations, analysis, conclusions and recommendations of the AHSG on selected critical issues related to the Army's LHX aircraft program. The basis of LHX, LHX program management, technology risk assessment, speed, and one versus two-man flight crew are discussed in the initial sections of this report. These issues constitute the more fundamental aspects of the Army's LHX program which were reviewed by the AHSG. Primary and secondary conclusions and recommendations are presented. Finally, a discussion of specific technologies and Army aviation programs is given in the appendices to this report. The discussion of each of these technologies and programs includes the AHSG's recommendations and conclusions on the same. A set of attachments follows the appendices.
DE- *Helicopters; Airframes; Army aviation; Attachment; Composite structures; Flight crews; Integration; Integrated circuits; Tilt rotor

aircraft; Lightweight; Management; Risk; Rotary wing aircraft
ID- V-15 aircraft; VHSIC(Very High Speed Integrated Circuits); ARTI(Advanced Rotorcraft Technology Integration); ACAP(Advanced Composite Airframe Program); SCAT(Scout Attack); MEP(Mission Equipment Packages); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1215952
AA- <NTIS> AD-A161 364/5
TI- Multiple-Regression Model of Pilot Performance in Vertical and Translational Flight
TI- <NOTE> Tecnical rept
AU- Wiedemann, J. ; Roscoe, S. N.
CS- New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
CS- <CODE> 012643033; 412156
RN- BEL-85-2/ONR-85-2
CN- N00014-81-K-0439
PY- May 85
PG- 102p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8605
CP- United States
AB- An experiment was conducted to advance the development of a multiple regression model of VTOL pilot performance as a function of various control/display system and flight mission variables. Second-order response surfaces as a function of two control system design variables (translational control order and vertical control gain reduction factor) and three downward-looking display design variables (horizontal position error magnification, translational prediction time, and translational tracking mode) were derived from Pilot performances on each of three mission scenarios. The optimum values for each of the five system design variables were determined for each scenario independently using the same central composite experimental design with three groups of four subjects each. Comprehensive analyses of variance and canonical analyses were used to refine the fitted surfaces to determine the true nature of the pilot performance effects for each flight scenario and to select a single set of system design parameters that would yield near-optimum performances on all three scenarios.
DE- *Flight instruments; *Display systems; *Flight simulators; *Vertical takeoff aircraft; Analysis of variance; Control; Flight; Missions; Variables; Helicopters; Optimization; Value; Performance(Human); Pilots ; Computer graphics; Scenarios; Errors; Horizontal orientation; Magnification; Predictions; Time; Parameters; Flight control systems; Vertical landings; Takeoff; Man machine systems; Navigation
ID- Control displays; Contact analog displays; Frequency separated displays ; Predictor displays; Horizontal situation displays; Vertical situation displays; Translational flight; Vertical flight; NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1215908
AA- <NTIS> AD-A161 320/7
TI- Spinal Injury in a US Army Light Observation Helicopter
AU- Shanahan, D. F. ; Mastroianni, G. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-85-12
CN- 3E162777A878
PY- Sep 85
PG- 13p
NT- Pub. in Aviation, Space and Environmental Medicine, v55 n1 p32-40 1984.

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LA- English
DT- Journal article
PC- PC A02/MF A01
JA- GRAI8605
CP- United States
AB- All accident reports involving U. S. Army OH-58 series helicopters were analyzed to determine vertical and horizontal velocity change at impact and the relationship of this kinematic data to the production of spinal injury. This analysis determined that spinal injury is related primarily to vertical velocity change. The dramatic increase in the rate of spinal injury is related primarily to vertical velocity change at impact and is relatively independent of horizontal velocity change. The dramatic increase in the rate of spinal injury occurring just above

the design sink speed of the aircraft landing gear (3.7 m/s) suggests that the fuselage and seat provide little additional impact attenuation capability above that of the gear alone. It is concluded that if this aircraft were modified to provide protection to the occupants for impacts up to 9.1 m/s (30 ft/s), approximately 80% of all spinal injury incurred in survivable accidents could be substantially mitigated. The incorporation of energy absorbing seats is recommended. Keywords: Aircraft accident; Crashworthiness. (Reprints)
DE- *Aviation accidents; *Spinal column; *Wounds and injuries; *Stress(Physiology); Aircraft; Aircraft landings; Landing gear; Energy absorbers; Horizontal orientation; Velocity; Production; Accidents; Reports; Army aircraft; Helicopters; Fuselages; Kinematics; Survivability; Vertical orientation; Flight crews; Crashworthiness; Aircraft seats; Reprints
ID- OH-58 aircraft; H-58 aircraft; NTISDODXR
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1214144
AA- <NTIS> AD-A161 234/0
TI- Helicopter-Referenced Single Control, Center-Position Force Exertion Capabilities of Males and Females
TI- <NOTE> Final rept
AU- Schopper, A. W. ; Mastroianni, G. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-85-4
CN- 3E162777A879; BH
PY- Aug 85
PG- 60p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8604
CP- United States
AB- In response to the need for reevaluation of anthropometric criteria contained in the US Army medical standards for flying duty, an assessment was made of helicopter-control-referenced force exertion capabilities of a sample of Army males and females. Males (N=74) ranged from 159 cm through 196 cm in stature; females (N=66) ranged from 152 cm through 183 cm. The force-exertion data were compared to values cited in MIL-H-8501A as upper force limits for the design of helicopter controls. The focuses of the analyses were upon the force exertion capabilities of individuals 167 cm (65.7 inches) and below in stature since, by virtue of their relatively small size, they represent the portion of the population which are most apt to evidence inabilities to exert forces which equal or exceed control force design limits. The comparison revealed that, overall, the presently existing limits (published in 1961) for other-than-the normal operational flight envelope exceeded the force exertion capabilities of 10% of the 39 small males evaluated and 27% of the 56 females evaluated. Most failures to achieve esisting or proposed control force design limits occurred because of inabilities to attain criterion-level exertion data from the small individuals of this study, various combinations of specific control force design limits were evaulated to develop estimations of overall 'set-wise' failure rates likely to be encountered during possible future strength testing/screening.
DE- *Strength(Physiology); *Flight control systems; *Anthropometry; *Pilots ; *Army personnel; *Aviation medicine; *Human factors engineering; Males; Females; Personnel selection; Sizes(Dimensions); Force(Mechanics); Women; Helicopters; Army aircraft
ID- Control force requirements; Short stature; Small personnel; Exertion; NTISDODXA
SH- 57S (Medicine and Biology--Physiology); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1214141
AA- <NTIS> AD-A161 231/6
TI- Helicopter Pilot Back Pain: A Preliminary Study
AU- Shanahan, D. F. ; Reading, T. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-85-13
CN- 3E162777A878
PY- 1984
PG- 9p
NT- Pub. in Aviation, Space, and Environmental Medicine, v55 n2 p117-121 1984.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A02/MF A01
JA- GRAI8604
CP- United States
AB- Because of the high prevalence of back pain experienced by U.S. Army helicopter pilots, a study was conducted to ascertain the feasibility of reproducing these symptoms in the laboratory. A mock-up of a UH-1H seat and control configuration was mounted to a multi-axis vibration simulator (MAVS). Eleven subjects were tested on the apparatus for two 120-min periods. During one period, the MAVS was programmed to reproduce vibrations recorded from a UH-1H in cruise flight. The subjects received no vibration during the other test period. All subjects reported back pain reported back pain which they described as identical to the pain they experience during flight, during one or more of their test periods. There was no statistical difference between the vibration and nonvibration test conditions (p>0.05) in terms of time of onset of pain or intensity of pain as measured by a visual analog scale. It appears the vibration at the frequencies and amplitudes tested plays little or no role in the etiology of the back symptoms reported by these pilots. It is proposed that the primary etiological factor for these symptoms is the poor posture pilots are obliged to assume for extended periods while operating helicopters.
DE- *Pain; *Pilot seats; *Posture(Physiology); *Helicopters; *Pilots; Analog systems; Control systems; Etiology; Frequency; Scale; Signs and symptoms; Simulators; Vibration; Flight crews; Human body; Reprints
ID- *Back pain; MAVS(Multiaxis Vibration Simulators); Back(Anatomy); UH-1H aircraft; H-1H aircraft; NTISDODXR
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1214024
AA- <NTIS> AD-A161 113/6
TI- Horizontal Display for Vertical Flight: A Direction of Motion Experiment
TI- <NOTE> Technical rept
AU- Trujillo, E. J. ; Roscoe, S. N.
CS- New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
CS- <CODE> 012643033; 412156
RN- BEL-85-1/ONR-85-1
CN- N00014-81-K-0439
PY- May 85
PG- 48p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8604
CP- United States
AB- As a part of a research program to investigate advanced concepts for downward- and forward-looking integrated displays, an experiment was conducted to determine optimum direction-of-motion relationships for a new way of presenting altitude and vertical rate information superposed on a downward-looking navigation and tactical situation display. Altitude was represented by the size of an octagon that could either dilate or constrict to indicate increasing altitude, and vertical rate was indicated by the outward or inward flow of four rate-field patterns emanating from the center of the display toward the 45, 135- 225-, and 315-degree compass positions. The five factors in this experiment were altimeter and vertical rate-field direction of motion, subject ability level, aircraft vertical control order, and vertical flight course. Performance on four vertical flight profiles indicated that the 'out is up' relationship yields superior vertical control, both in terms of control reversals and log RMS tracking precision, whereas the 'out is down' mode results in more accurate control in the horizontal plane. The most clearcut findings was that, whichever direction in altimeter motion is adopted, the vertical rate-field motion should be in the same direction.
DE- *Flight instruments; *Flight simulators; *Display systems; Flight control systems; Man machine systems; Navigation; Pilots; Helicopters; Vertical takeoff aircraft; Hovering; Altitude; Altimeters; Motion; Takeoff; Vertical landings; Computer graphics
ID- *Vertical flight; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1210715
AA- <NTIS> NTN85-0782
TI- Assessing Helicopter Ride Quality: The NASA model was the best metric for predicting ride comfort
TI- <NOTE> NTIS Tech Note

CS- Army Materiel Development and Readiness Command, Alexandria, VA.
CS- <CODE> 047809000
SP- Department of the Army, Washington, DC.
PY- Jul 85
PG- 1p
NT- Write NTIS for information about Tech Notes subscriptions and back issue packages available.
LA- English
PC- Not available NTIS
JA- GRAI8602
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. Several methods, including a NASA discomfort model, for predicting passenger/crew ride comfort in helicopters were compared in a simulator study that had been supported in part by the U.S. Army Aviation Systems Command. Selected combinations of simulated helicopter interior noise and vibration, typical of routine flights, were applied to a group of pilots, and their subjective impressions of discomfort were recorded. Tests showed that passenger/crew discomfort results from a complex interaction between vibration and interior noise. Reducing either noise or vibration alone provided little improvement in ride quality; reductions in both were required. The best metric for predicting passenger/crew comfort to the combined noise and vibration environment was the NASA discomfort index. ...FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report order number: AD-A139367/NAA, price code: A03.
DE- *Helicopters; *Human factors engineering
ID- NTN/D; NTISNTND
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1210419
AA- <NTIS> N85-35185/6
TI- Planetary-Gear-Support Bearing Test Rig Design
TI- <NOTE> Contractor rept. 8 Feb 83-8 Jan 85
AU- Rosenlieb, J. W.
CS- SKF Technology Services, King of Prussia, PA.
CS- <CODE> 066784000; SM426484
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:174927; AT85T004; NASA-CR-174927
CN- NAS3-23702
PY- Mar 85
PG- 81p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8602; STAR2324
CP- United States
AB- A test rig was designed to evaluate the performance of a spherical roller bearing with a geared outer ring operating under conditions similar to those of a planet bearing in a helicopter transmission. The configuration is an extension of the widely accepted four-square gearbox arrangement. It provides for testing of two bearings simultaneously with outer ring rotation, misalignment, diametrically opposed loading through the gear teeth, and under race lubrication. Instrumentation permits the measurement of inner and outer ring temperature, bearing drag torque, degree of misalignment, outer ring speed, cage speed, and applied load.
DE- *Gear teeth; *Gears; *Roller bearings; Performance tests; Alignment; Helicopters; Lubrication; Temperature measurement; Torque; Transmissions (Machine elements)
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1198900
AA- <NTIS> AD-A158 076/0
TI- Light Helicopter Family Trade-Off Analysis. Volume 7. Appendix R
TI- <NOTE> Final rept
AU- Hickman, P. W. ; Armstrong, R. N. ; Cleek, N.
CS- Army Training and Doctrine Command, Fort Monroe, VA.
CS- <CODE> 042964000; 408082
PY- 15 May 85
PG- 613p
NT- See also Volume 8, AD-A158 077.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A99/MF A01
JA- GRAI8524
CP- United States

AB- Thirteen subanalyses were performed and reported in Annexes found within this HF/MMI volume. Their titles follow and are fairly descriptive of both the substudy's emphasis and contents: (1) Projective Application of the Subjective Workload Assessment Technique to Advance Helicopter Crew System Designs; (2) Human Factors Engineering Review of the Integrated Crewstation for the LHX; (3) Tactical Implications of One-Man Versus Two-Man Aircrews for the LHX; (4) A Computer Analysis to Predict Crew Workload During LHX Scout-Attack Missions; (5) Visually Coupled Airborne Systems Simulator (VCASS) LHX Cockpit Simulation; (6) Human Factors Assessment of Voice Technology of the LHX Cockpit Simulation; (7) Issues for a Trade-Off Analysis of Conventional; Versus Advanced Cockpit Controllers for the LHX; (8) Biomedical Analysis of Visual Displays and Cockpit Design Options for the LHX; (9) NBC Contamination Protection, Detection, and Decontamination Concepts Analysis fo the LHX; (10) Human Factors Engineering Assessment of Navigation Systems fo the LHX; (11) The Integration of Voice and Visual Displays for Aviation Systems; and (12)Theory and Measurement of Human Workload; (13) Pilot Workload, Performance, and Aircraft Control Automation.
DE- *Trade off analysis; *Helicopters; *Human factors engineering; Automation; Control; Biomedicine; Cockpits; Simulation; Contamination; Protection; Decontamination; Aeronautics; Crews; Workload; Detection; Test and evaluation; Integration; Voice communications; Navigation; Work measurement; Display systems; Visual aids; Pilots
ID- LHX(Light Helicopter Analysis); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1197376
AA- <NTIS> N85-31051/4
TI- L'Helicoptere, Instrument d'Election pour l'Evacuation Sanitaire (The Helicopter, Instrument of Choice for Health Evacuation)
CS- Societe Nationale Industrielle Aerospatiale, La Courneuve (France).
CS- <CODE> 075804000; SQ444405
SP- National Aeronautics and Space Administration, Washington, DC.
RN- SNIAS-851-220-101
PY- 20 Dec 84
PG- 12p
NT- Text in French. Submitted for publication.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
PC- PC A02/MF A01
JA- GRAI8523; STAR2320
CP- France
AB- The advantages of the use of helicopters for the evacuation and transportation of persons in danger, injured, or with severe health problems are discussed. The transport time reduction is reduced by a factor of 4 to 5 times when using the Dauphin SA-365N helicopter compared to surface transportation. The economic justification and the effectiveness in saving human lives are analyzed.
DE- *Economic analysis; *Evacuating (Transportation); *Helicopters; *Injuries; Delay; Economic factors; Hospitals; Human factors engineering
ID- *Foreign technology; NTISNASAE
SH- 85A (Transportation--Air Transportation); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 43D (Problem Solving Information for State and Local Governments--Police, Fire, and Emergency Services)

AZ- 1197375
AA- <NTIS> N85-31050/6
TI- Research Flight Simulator for Helicopters (RFSH): Description and Application to Fire Control System Design
AU- Hecketsweiler, C.
CS- Societe Nationale Industrielle Aerospatiale, Marignane (France).
CS- <CODE> 071754000; SQ446513
SP- National Aeronautics and Space Administration, Washington, DC.
RN- SNIAS-851-210-106
PY- 1984
PG- 8p
NT- Presented at 10th European Rotorcraft Forum, The Hague, 28-31 Aug. 1984.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8523; STAR2320
CP- France
AB- A helicopter flight simulator consisting of a cabin with conventional

instrumentation, cathode-ray tube and four axis flight controls; an outside environment visual system; an acceleration and vibrations simulation system; a noise generation system; and computers with real time software was built. It was used in the design of an air-to-air combat helicopter system. Piloted simulations included adjustment of the controls and the symbologies; adjustment of the fire sequence and evaluation of its practical feasibility (crew workload); evaluation of the interactions between fire control and flight control; and study of the system's operation in back-up modes.
DE- *Cockpit simulators; *Control systems design; *Fire control; *Military helicopters; Control simulation; Man machine systems; Pilot performance

ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 1196607
AA- <NTIS> DE85011519
TI- Regional Wind Energy Assessment Program. Progress Report, October 1983-September 1984
AU- Baker, R. W. ; Wade, J. E. ; Wittrup, R. J.
CS- Oregon State Univ., Corvallis. Wind Resources Assessment Lab.
CS- <CODE> 013388091; 9519198
SP- Department of Energy, Washington, DC.
RN- DOE/BP-387
PY- Feb 85
PG- 106p
NT- Report BPA 84-18.
NT- Portions of this document are illegible in microfiche products. Original copy available until stock is exhausted. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8523; NSA1000
CP- United States
AB- The focus of the FY84 Wind Energy Assessment Program was to continue assessment of the wind power potential in the Pacific Northwest as well as perform a helicopter survey of Eastern Oregon. New study sites were established in Montana, Idaho, eastern and southwestern Oregon, northeast Nevada and eastern Washington to broaden the area wide coverage in this assessment. The FY84 wind power site data network included 105 sites. Ninety-three sites were specifically sited to assess wind power potential. During FY84 32 new sites were established and 28 sites were decommissioned from the 1983 site network. The climatological analysis for the period June 1983 through May 1984 indicated that fall was the only season that was consistently stronger than normal throughout the region. Winter had weaker than normal winds in Montana and Idaho, whereas the winds were stronger than normal in northeast Nevada. A large area wind prospecting survey was conducted in eastern Oregon to identify promising wind power locations. Fifty sites were observed and of these eight were recommended for instrumentation. Analysis of the network data over the period June 1983 through May 1984 indicated 24 sites had good wind power potential and 14 sites had fair wind power potential. A good rating was given to sites where the mean annual wind speed (anti V) was greater than or equal to14 mph and/or the power density value exceeded 300 W/m exp 2 . A fair rating was given to sites where anti V=12 to 14 mph and/or the power density value was in the 200 to 300 W/m exp 2 range. (ERA citation 10:027337)
DE- *Idaho; *Montana; *Nevada; *Oregon; *Washington; *Wind Power; Data Analysis; Resource Assessment
ID- ERDA/170100; NTISDE
SH- 97O (Energy--Miscellaneous Energy Conversion and Storage); 97A (Energy--Reserves)

AZ- 1196366
AA- <NTIS> AD-A995 252/4
TI- OPERATION GREENHOUSE
TI- <NOTE> Final rept. May 50-May 51
CS- Task Group 3.4, APO San Francisco 96555.
CS- <CODE> 084252000; 415337
PY- May 51
PG- 104p
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8523
CP- United States
AB- The prime responsibility of Task Group 3.4 was the positioning of manned and unmanned aircraft as specified by the scientific programs in order to observe and record phenomena associated with the atomic blast.

Directly related functions included the development and operation of adequate air base facilities at Kwajalein and Eniwetok, the installation, maintenance, and operation of the airborne and some of the surface instrumentation, in support of the scientific task group, the development of procedures, and the training of personnel. Included also was the responsibility for installation and operation of communications and electronics systems for monitoring and displaying the air situation, for air warning and control, and for navigational aids. Corollary and support functions included the operation of air surveillance and limited air defense, the provision for administrative and proficiency flying for all JOINT TASK FORCE THREE personnel, the operation of an air intra-island transport using liaison aircraft and helicopters, and in conjunction with Task Group 3.3. a Search and Rescue activity. Additional responsibilities involved the provision for weather reconnaissance, analysis and forecasting, and for documentary film coverage for all JOINT TASK FORCE THREE activities.
DE- *Nuclear explosions; flight; Proficiency; Warning systems; Helicopters; Navigational aids; Airborne; Surveillance; Logistics support; Military facilities; Electronic equipment; Air defense; Limitations; Communication and radio systems; Reconnaissance; Weather; Unmanned
ID- Greenhouse operation; NTISDODXA; NTISDODWT
SH- 77D (Nuclear Science and Technology--Nuclear Explosions and Devices)

AZ- 1191646
AA- <NTIS> AD-A156 580/3
TI- Tropic Test of Bradley Fighting Vehicle Systems
TI- <NOTE> Final test plan
CS- FMC Corp., San Jose, CA. Ordnance Group.
CS- <CODE> 017350009; 140580
CN- DAAE07-84-C-R006
PY- 23 May 85
PG- 57p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8521
CP- United States
AB- The Bradley Fighting Vehicle System (BFVS) is the follow-on program which resulted from a March 1977 DA decision to terminate the Mechanized Infantry Combat Vehicle (MICV) program and to develop a vehicle that mounted a two-man turret which incorporates a 25-mm cannon and a tube-launched, optically-tracked, wire-guided (TOW) antitank missile. The two primary vehicles of the BFVS are an Infantry Fighting Vehicle (IFV), designated the M2, and the Calvary Fighting Vehicle (CFV), the M3. For the 25mm (hardstand test) PQG, Program Manager (PM), BFVS was directed to test and evaluate two candidate 25mm weapons for the role as the main armament for the IFV/CFV. The Hughes Helicopters externally powered gun was selected as the main armament for the IFV/CFV. The OT-1A test was an OTEA-directed separate operational test of the two competing 25mm guns installed in BFVS turrets to provide preliminary data on the relative operational capability of the gun systems. Such data were submitted to the selection board for consideration in gun selection. This test provided the operational tester insight into issues relating to reliability, availability, maintainability (RAM), human factors, training, personnel selection, system capability, and operational effectiveness of the 25mm gun candidates. The vehicles were operated for approximately 806km (500Mi) each, and approximately 5000 rounds were fired from each of the 25mm guns.
DE- *Guns; *Combat vehicles; Antitank missiles; Infantry; Human factors engineering; Operational effectiveness; Test and evaluation; Selection; Maintainability; Personnel selection; Reliability; Tropical tests; Gun turrets; Firing tests(Ordnance)
ID- Bradley fighting vehicles; 25-mm guns; TOW missiles; NTISDODXA
SH- 79D (Ordnance--Combat Vehicles); 79G (Ordnance--Guns)

AZ- 1191393
AA- <NTIS> AD-A156 326/1
TI- U.S. Civil Airmen Statistics for Calendar Year 1984
TI- <NOTE> Annual rept
CS- Federal Aviation Administration, Washington, DC. Office of Management Systems.
CS- <CODE> 009020038; 403600
PY- 31 May 85
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8521
CP- United States

AB- The U.S. Civil Airmen Statistics is an annual study published to meet the demands of FAA, other government agencies, and industry for more detailed airmen statistics than those published in other FAA reports. Statistics pertaining to airmen, both pilot and nonpilot, were obtained from the official airman certification records maintained at the FAA Aeronautical Center, Oklahoma City, Oklahoma. An active airmen is one who hold both an airmen certificate and a valid medical certificate. Airmen who must have a valid medical to exercise the privileges of their certificate are all airplane pilots, control tower operators, flight navigators, flight engineers, and flight instructors. The glider and lighter-than-air pilots are not required to have a medical examination but the numbers represent only those who had a valid medical certificate. Mechanics, parachute riggers, ground instructors, and dispatchers certificates represent all certificates on record at the aeronautical center.
DE- *Civil aviation; *Pilots; *Statistics; Aeronautics; Air force personnel ; Aircraft; Commercial aviation; Engineers; Exercise(Physiology); Flight; Flight crews; Ground level; Helicopters; Industries; Instructors; Instrumentation; Medical examination; Medicine; Navigators ; Ratings; Air traffic controllers; Airships
ID- NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1191170
AA- <NTIS> AD-A156 102/6
TI- Guide to USAF Helicopter Instrument Flight Procedures
TI- <NOTE> Student rept
AU- Stendahl, L. O.
CS- Air Command and Staff Coll., Maxwell AFB, AL.
CS- <CODE> 029160000; 405502
RN- ACSC-85-2610
PY- Apr 85
PG- 36p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8521
CP- United States
AB- This report presents information concerning USAF helicopter instrument procedures. This guide consolidates existing and new guidance into an up-to-date, single-source document for use by USAF helicopter pilots. If approved by HQ USAF Instrument Flight Center (IFC), portions of this guide will be incorporated into AFM 51-37. The paper first discusses the need for consolidated guidance, unique helicopter characteristics requiring changes to instrument procedures and how airspace design has been adjusted to accommodate helicopter operations. It then outlines procedures for performing basic helicopter instrument flight, and concludes with a chronological approach to helicopter instrument mission planning and accomplishment. Also included are proposed future changes to helicopter airspace design.
DE- *Helicopters; *Instrument flight; Air force operations; Flight instruments; Air space; Flight; Instrumentation; Pilots; Mission profiles
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 92A (Behavior and Society--Job Training and Career Development); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1190726
AA- <NTIS> PB85-864197
TI- Head Up Displays. 1975-July 1985 (Citations from the International Aerospace Abstracts Data Base)
TI- <NOTE> Rept. for 1975-Jul 85
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Aug 85
PG- 188p
NT- Supersedes PB84-871516. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8520
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an

integrated avionics system with the pilot in the loop. (This updated bibliography contains 234 citations, 17 of which are new entries to the previous edition.)
DE- *Bibliographies; Display devices
ID- *Head up displays; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88E (Library and Information Sciences--Reference Materials)

AZ- 1189713
AA- <NTIS> N85-27857/0
TI- Preliminary Investigation of Handling Qualities Requirements for Helicopter Instrument Flight During Decelerating Approach Maneuvers and Overshoot
AU- Kekeliuk, S. ; Morgan, M.
CS- National Research Council of Canada, Ottawa (Ontario).
CS- <CODE> 003429000; NL210403
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NRC-24173; NAE-AN-26
PY- Feb 85
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8520; STAR2317
CP- Canada
AB- A preliminary flight investigation was carried out to highlight deficiencies of helicopters handling qualities when performing low speed instrument approaches. Steep decelerating microwave landing system approaches to a decision height of 50 feet, simultaneously decelerating to 20 knots, were performed in the NAE Airborne Simulator, a variable-stability Bell 205A helicopter. Tracking performance, in terms of height, azimuth and speed errors was of an acceptable standard, but pilot workload was extremely high, especially during the overshoot phase. Benefits of different levels of control system augmentation were not readily apparent in this high workload environment. A follow-on program is proposed where further attempts will be made to determine the effects of display and control sophistication on pilot workload during slow speed helicopter instrument procedures.
DE- *Controllability; *Flight instruments; *Flight tests; *Helicopter control; Deceleration; Instrument landing systems; Landing simulation; Microwave landing systems; Pilot performance; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1189703
AA- <NTIS> N85-27843/0
TI- Investigation of Imaging and Flight Guidance Concepts for Rotorcraft Zero Visibility Approach and Landing
AU- Mckeown, W. L.
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> 055558000; TV739419
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166571; T-3771; NASA-CR-166571
CN- NAS2-11364
PY- Aug 84
PG- 172p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8520; STAR2317
CP- United States
AB- A simulation experiment to explore the use of an augmented pictorial display to approach and land a helicopter in zero visibility conditions was conducted in a fixed base simulator. A literature search was also conducted to determine related work. A display was developed and pilot in-the-loop evaluations were conducted. The pictorial display was a simulated, high resolution radar image, augmented with various parameters to improve distance and motion cues. Approaches and landings were accomplished, but with higher workloads and less accuracy than necessary for a practical system. Recommendations are provided for display improvements and a follow on simulation study in a moving based simulator.
DE- *Airborne radar approach; *Aircraft guidance; *Helicopters; *Landing radar; *Radar approach control; *Radar imagery; Aircraft safety; Hovering; Landing simulation; Low visibility; Pilot performance; Touchdown; Workloads (Psychophysiology)

ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85A (Transportation--Air Transportation)

AZ- 1186779
AA- <NTIS> N85-26691/4
TI- Navigation and Flight Director Guidance for the NASA/FAA Helicopter Mls Curved Approach Flight Test Program
AU- Phatak, A. V. ; Lee, M. G.
CS- Analytical Mechanics Associates, Inc., Mountain View, CA.
CS- <CODE> 030966000; AU945491
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:177350; NASA-CR-177350
CN- NAS2-10850
PY- May 85
PG- 133p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8519; STAR2316
CP- United States
AB- The navigation and flight director guidance systems implemented in the NASA/FAA helicopter microwave landing system (MLS) curved approach flight test program is described. Flight test were conducted at the U.S. Navy's Crows Landing facility, using the NASA Ames UH-lH helicopter equipped with the V/STOLAND avionics system. The purpose of these tests was to investigate the feasibility of flying complex, curved and descending approaches to a landing using MLS flight director guidance. A description of the navigation aids used, the avionics system, cockpit instrumentation and on-board navigation equipment used for the flight test is provided. Three generic reference flight paths were developed and flown during the test. They were as follows: U-Turn, S-turn and Straight-In flight profiles. These profiles and their geometries are described in detail. A 3-cue flight director was implemented on the helicopter. A description of the formulation and implementation of the flight director laws is also presented. Performance data and analysis is presented for one pilot conducting the flight director approaches.
DE- *Aircraft instruments; *Avionics; *Flight tests; *Navigation aids; *Navigation instruments; *Uh-1 helicopter; Flight control; Flight optimization; Flight paths; In-flight monitoring
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 76GE (Navigation, Guidance, and Control--General)

AZ- 1184446
AA- <NTIS> N85-26150/1
TI- Activities Report for Foa 53: Laboratory for Man and Information Systems
TI- <NOTE> Annual rept. 1983 - 84
CS- Foersvarets Forskningsanstalt, Stockholm (Sweden).
CS- <CODE> 063330000; RR628060
SP- National Aeronautics and Space Administration, Washington, DC.
RN- FOA-C-53019-H
PY- Oct 84
PG- 17p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8518; STAR2315
CP- Sweden
AB- Research concerning color graphics and coding; image quality in graphical displays; a hand sized terminal for coded combat orders; mental models in information seeking; reading textual information from VDU's; dynamic decision making; a computer aided display system for surveillance; user centered design and the computers of 1990; electronic displays of flight information; and analyses of helicopter pilot performance is summarized.
DE- *Computer graphics; *Human factors engineering; *Man machine systems; Computer systems design; Decision making; Display devices; Image resolution; Pilot performance
ID- *Foreign technology; Color; Coding; NTISNASAE
SH- 62B (Computers, Control, and Information Theory--Computer Software); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1184285

AA- <NTIS> N85-25237/7
TI- Rotorcraft Digital Advanced Avionics System (RODAAS) Functional Description
AU- Peterson, E. M. ; Bailey, J. ; Mcmanus, T. J.
CS- Honeywell, Inc., St. Louis Park, MN. Military Avionics Div.
CS- <CODE> 063579005; HY521592
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166611; NASA-CR-166611
CN- NAS2-11695
PY- Jan 85
PG- 188p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8518; STAR2315
CP- United States
AB- A functional design of a rotorcraft digital advanced avionics system (RODAAS) to transfer the technology developed for general aviation in the Demonstration Advanced Avionics System (DAAS) program to rotorcraft operation was undertaken. The objective was to develop an integrated avionics system design that enhances rotorcraft single pilot IFR operations without increasing the required pilot training/experience by exploiting advanced technology in computers, busing, displays and integrated systems design. A key element of the avionics system is the functionally distributed architecture that has the potential for high reliability with low weight, power and cost. A functional description of the RODAAS hardware and software functions is presented.
DE- *Architecture (Computers); *Avionics; *Digital integrators; *Human factors engineering; *Rotary wing aircraft; Digital command systems; Helicopters; Numerical control; Systems integration; Technology transfer
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1184284
AA- <NTIS> N85-25220/3
TI- Investigation of Technology Needs for Avoiding Helicopter Pilot Error Related Accidents
TI- <NOTE> Final rept
AU- Chais, R. I. ; Simpson, W. E.
CS- ORI, Inc., Rockville, MD.
CS- <CODE> 083938000; OW815683
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:3895; ORI-TR-2384; NASA-CR-3895
CN- NASW-3554
PY- Jun 85
PG- 54p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8518; STAR2315
CP- United States
AB- Pilot error which is cited as a cause or related factor in most rotorcraft accidents was examined. Pilot error related accidents in helicopters to identify areas in which new technology could reduce or eliminate the underlying causes of these human errors were investigated. The aircraft accident data base at the U.S. Army Safety Center was studied as the source of data on helicopter accidents. A randomly selected sample of 110 aircraft records were analyzed on a case-by-case basis to assess the nature of problems which need to be resolved and applicable technology implications. Six technology areas in which there appears to be a need for new or increased emphasis are identified.
DE- *Helicopters; *Human factors engineering; *Pilot error; Technology assessment; Aircraft accidents; Aircraft safety; Data bases; Military operations; Technology utilization
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1177193
AA- <NTIS> N85-23374/0
TI- Community Survey of Helicopter Noise Annoyance Conducted under Controlled Noise Exposure Conditions
AU- Fields, J. M. ; Powell, C. A.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.15:86400; NASA-TM-86400
CN- NAS1-16978

PY- Mar 85
PG- 188p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8515; STAR2313
CP- United States
AB- Reactions to low numbers of helicopter noise events (less than 50 per day) were studied in a community setting. Community residents were repeatedly interviewed about daily noise annoyance reactions on days when helicopter noise exposures were, without the residents' knowledge, controlled. The effects of maximum noise level and number of noise events on helicopter noise annoyance are consistent with the principles contained in LEQ-based noise indices. The effect of the duration of noise events is also consistent with LEQ-based indices. After removing the effect of differences in noise levels (LEQ) there is not an important difference between reactions to impulsive and nonimpulsive types of helicopters. EPNL, where corrected for number of overflights, and LEQ are approximately equally successful in representing the characteristics of noise which are related to human response. The new type of design provided estimates of the parameters in a noise reaction model which would not obtained with a similar degree of precision from conventional study designs.
DE- *Aircraft noise; *Helicopters; *Noise tolerance; *Surveys; Human tolerances; Long term effects; Noise measurement; Regression analysis
ID- NTISNASA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1173669
AA- <NTIS> AD-P004 519/5
TI- Aircrew-Aircraft Integration Issues in Future U. S. Army Helicopters
AU- Hartzell, E. J. ; Aiken, E. W. ; Voorhees, J. W.
CS- Army Research and Technology Labs., Moffett Field, CA.
CS- <CODE> 041432000; 410540
PY- Nov 84
PG- 16p
NT- This article is from 'Human Factors Considerations in High Performance Aircraft; Conference Proceedings: Aerospace Medical Panel Symposium Held at Williamsburg, Virginia on 30 April-2 May 1984,' AD-A152 468, p20-1-20-16.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI8514
CP- United States
AB- This paper reviews some human factors research issues, the resolution of which will be vital to the successful operations of future military helicopters. The Aeromechanics Laboratory is contributing to the overall effort of understanding and reducing the helicopter pilot's workload by engaging in a diverse program directed at answering some of the more fundamental questions relating to the transfer of information between man and machine. Primary issues involve the integration of controls and displays and interactions between pilot and automated systems. The results of three experimental studies address the issues of display-control compatibility, characteristics of integrated controllers, and voice systems.
DE- *Man machine systems; *Helicopters; *Human factors engineering; Flight crews; Integration; Army aircraft; Pilots; Workload; Reduction; Information transfer; Control systems; Display systems; Man computer interface; Compatibility; Voice communications; Symposia
ID- Component Reports; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1168391
AA- <NTIS> AD-A151 580/8
TI- In-Flight Estimation and Indication of Cumulative Fatigue Damage to Helicopter Gears
AU- Fraser, K. F.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
RN- ARL/AERO-PROP-164
PY- Mar 84
PG- 120p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8512
CP- Australia
AB- Estimates of the safe fatigue life of helicopter transmission components may be made if in-service load data together with transmission fatigue data, represented as the number of cycles to failure as a function of tooth load, are available. Instrumentation has been developed to provide in-flight estimation and indication of the proportion of safe fatigue life expended for critical gears in single or twin-engine helicopter transmission systems. In addition, basic transmission load data in the form of totalized times spent in a number of continuous torque bands are continually updated and stored during flight. The basic load data together with values of life expenditure for critical gears for the current flight can be automatically printed out after flight. This technique opens the way towards fatigue life monitoring of individual transmissions. The special demands of the life estimating system are evaluated and in particular the very significant effects of errors in mean torque estimation are assessed.
DE- *Transmission gears; *Helicopters; *Transmissions(Mechanical); *Estimates; *Inflight; Life expectancy(Service life); Australia; Computer programming; Fatigue tests(Mechanics); Gearboxes; Computer printouts; Computerized simulation; Fatigue life; Microcomputers
ID- *Foreign technology; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94F (Industrial and Mechanical Engineering--Tooling, Machinery, and Tools)

AZ- 1167332
AA- <NTIS> N85-17667/5
TI- Investigation on Experimental Techniques to Detect, Locate and Quantify Gear Noise in Helicopter Transmissions
TI- <NOTE> Final Report
AU- Flanagan, P. M. ; Atherton, W. J.
CS- Cleveland State Univ., OH.
CS- <CODE> 029790000; CR303094
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:3847; E-2294; NASA-CR-3847
CN- NAG3-315
PY- Jan 85
PG- 101p
NT- Original Contains Color Illustrations.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8511; STAR2308
CP- United States
AB- A robotic system to automate the detection, location, and quantification of gear noise using acoustic intensity measurement techniques has been successfully developed. Major system components fabricated under this grant include an instrumentation robot arm, a robot digital control unit and system software. A commercial, desktop computer, spectrum analyzer and two microphone probe complete the equipment required for the Robotic Acoustic Intensity Measurement System (RAIMS). Large-scale acoustic studies of gear noise in helicopter transmissions cannot be performed accurately and reliably using presently available instrumentation and techniques. Operator safety is a major concern in certain gear noise studies due to the operating environment. The man-hours needed to document a noise field in situ is another shortcoming of present techniques. RAIMS was designed to reduce the labor and hazard in collecting data and to improve the accuracy and repeatability of characterizing the acoustic field by automating the measurement process. Using RAIMS a system operator can remotely control the instrumentation robot to scan surface areas and volumes generating acoustic intensity information using the two microphone technique. Acoustic intensity studies requiring hours of scan time can be performed automatically without operator assistance. During a scan sequence, the acoustic intensity probe is positioned by the robot and acoustic intensity data is collected, processed, and stored.
DE- *Fabrication; *Helicopters; *Noise intensity; *Robotics; *Transmissions (Machine elements); *Vibrational spectra; Artificial intelligence; Digital systems; Gears; Noise measurement
ID- NTISNASA
SH- 94J (Industrial and Mechanical Engineering--Nondestructive Testing); 41G (Manufacturing Technology--Quality Control and Reliability); 41C (Manufacturing Technology--Robots and Robotics)

AZ- 1165700
AA- <NTIS> AD-A151 046/0
TI- Helicopter Mobile Crewman Summer Survival System
TI- <NOTE> Phase rept
AU- Gillespie, G. P.

CS- Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> 032381022; 393532
RN- NADC-83099-60
PY- Aug 83
PG- 8p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8511
CP- United States
AB- The system is designed to provide the Mobile Crewman with the necessary survival capabilities to cover a wide range of emergencies when escaping from a downed helicopter. It is designed to provide flotation and lift capability and the use of survival items. This system is designed to be worn when anti-exposure equipment is not required and to interface with, and be used with the Back Pack Mini-Raft. The location of survival equipment away from the subject's frontal area in holster or chaps type containers, is a unique characteristic. The system's survival items consist of: 1 PRC-90 Radio; 2 MK-13 Mod 0 Day/Night Flares; 1 Dye Marker; 1 Small Signal Mirror; 1 Pen Gun Kit; 1 Whistle; 1 Strobe Light; 1 Steady Burn Light; 1 four ounce Water Bottle, and a Utility Knife.
DE- *Survival(Personnel); *Survival equipment; Flight crews; Downed aircraft; Helicopters; Emergencies
ID- NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1162690
AA- <NTIS> PB85-856367
TI- Military Helicopters. 1970-March 1985 (Citations from the Engineering Index Data Base)
TI- <NOTE> Rept. for 1970-Mar 85
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Mar 85
PG- 241p
NT- Supersedes PB84-852920.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8509
CP- United States
AB- This bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (This updated bibliography contains 346 citations, 44 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; Military aircraft; Rotary wing aircraft; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 88E (Library and Information Sciences--Reference Materials)

AZ- 1162296
AA- <NTIS> N85-14806/2
TI- Technical Workshop: Advanced Helicopter Cockpit Design
AU- Hemingway, J. C. ; Callas, G. P.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.55:2351; REPT-85057; NASA-CP-2351
PY- Dec 84
PG- 346p
NT- Workshop Held at Moffett Field, Calif., 26-28 Jul. 1983.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A15/MF A01
JA- GRAI8509; STAR2306
CP- United States

AB- No abstract available.
DE- *Cockpits; *Conferences; *Helicopters; *Human factors engineering; *Man machine systems; *Software engineering; *Structural design criteria; Artificial intelligence; Avionics; Display devices; Night flights (Aircraft); Psychology; Rescue operations; Systems integration
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1160356
AA- <NTIS> AD-A149 998/7
TI- Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights
TI- <NOTE> Final and Annual rept. 15 Sep 81-30 Sep 83
AU- Folds, D. J. ; Yunker, G. W. ; Smith, T. A.
CS- Jacksonville State Univ., AL. Dept. of Psychology.
CS- <CODE> 082594001; 415332
CN- DAMD17-81-C-1174; 3E162777A879; BG
PY- 15 Sep 83
PG- 45p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8509
CP- United States
AB- Data from week-long simulated extended operations study were examined with respect to methodological issues associated with the assessment of helicopter pilot performance (including visual performance) and the potential impact of extended flight schedules on pilot performance. No significant changes in pilot performance over the week of extended operations were found. Methodological issues are discussed and recommendations for future studies are offered. Data from week-long simulated extended operations study were examined with respect to methodological issues associated with the assessment of the helicopter pilot performance (including visual performance) and the potential impact of extended flight schedules on pilot performance. No significant changes in pilot performance over the week of extended operations were found. Methodological issues are discussed and recommendations for future studies are offered.
DE- *Pilots; Fatigue(Physiology); Helicopters; Performance(Human); Eye movements; Instrument flight; Statistical analysis
ID- NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 70G (Administration and Management--Productivity)

AZ- 1157492
AA- <NTIS> AD-A149 413/7
TI- Crewstation Assessment of Reach as Applied to the OH-58A Helicopter
TI- <NOTE> Master's thesis
AU- Genetti, M. G.
CS- Auburn Univ., AL.
CS- <CODE> 003503000; 046850
PY- 13 Dec 84
PG- 136p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A07/MF A01
JA- GRAI8508
CP- United States
AB- A computer evaluation program, Crewstation Assessment of Reach (CARII), was utilized to determine the effectiveness of an evaluation designed for a single person workstation on a two person workstation. The workstation chosen for evaluation was the U.S. Army Helicopter OH-58A. To compensate for the multiple person workstation, the cockpit was defined from three points of view as follows: the pilot while flying, the copilot while flying and an observer in the copilots's station. Through an internal mechanism in the CAR program, a sample of link-men was generated from the means and standard deviations of twelve anthropometric measurements from the data of the 1970 survey of U.S. Army aviators. These link-men were then evaluated for their accommodation to the 24 controls defined in the workstation. Through the example of the relocation of one control, it was demonstrated that an evaluation tool such as CAR should be utilized in the design process. The problem of this study was to determine the effectiveness of the design of a two-person (shared) workstation by using a computerized evaluation method designed to evaluate the percent population accommodated by a single person workstation.
DE- *Cockpits; *Helicopters; *Pilots; *Anthropometry; *Computer programs;

Flight instruments; Flight control systems; Stress(Psychology); Stress(Physiology); Data acquisition; Input output processing; Army personnel; Theses
ID- *Crewstation; Workstation; OH-58A aircraft; CARII computer programs; CARII(Crewstation Assessment of Reach); NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1157279
AA- <NTIS> AD-A149 200/8
TI- Proceedings of the Army Science Conference (14th) Held at the United States Military Academy, West Point, New York on 19-21 June 1984. Volume 1. Principal Authors A through H
CS- Deputy Chief of Staff for Research, Development and Acquisition (Army), Washington, DC.
CS- <CODE> 062720000; 408992
PY- 22 Jun 84
PG- 372p
NT- See also Volume 2, AD-A149 201.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A16/MF A01
JA- GRAI8508
CP- United States
AB- These Proceedings of the 1984 Army Science Conference are a compilation of all papers presented at the conference and the supplemental papers that were submitted. Papers included in this volume follow: Development of a Portable Neutron Source for Radographic Evaluation and Aircraft Structural Defects; Eye Protection Against Lasers; Winter Traction Aids for Wheeled Vehicles; Thrust Dynamics and Helicopter Handling Qualities; Model Helicopter Rotor High-Speed Impulsive Noise; Evaluation of Potential Multipurpose Propellant Additives: Flash-Erosion Suppressant; Laser Projected Live Fire Target System; Deuterium Kinetic Isotope Effect; An experimental Probe for the Molecular Processes Governing the Initiation of TNT and RDX; Field Applicable Micro enzyme-linked Immunosorbent Assay for Detecting Malaria Infected Mosquitoes; A Primitive Driven, Artificial Intelligence Threat Model; Composite Materials for Electrocatalysts; Energy-less Manufacturing of Advanced Ceramics by SHS; Requirements and Specifications for Cartographic Video Discs; A Combined Mangetic and DTA Method for the Determination of Heat Treatment Data for Armament Steels; Symbolic Filtering of Military Messages Using Artificial Intelligence Techniques; Medical Defense Against the Potential Biological Warfare Agent Saxitoxin; Mine Detection in Cold Regions Using Non-Sinusoidal Radar; Field Production of Water for Injection; Light Emission Immunoassay.
DE- *Symposia; *Army research; *Reports; Military Publications; Military applications; Radiography; Airframes; Laser safety; Helicopters; Propellants; Explosives; Immunoassay; Ceramic materials; Metallurgy; Medical research; Biological warfare agents; Artificial intelligence; Human factors engineering
ID- NTISDODXA
SH- 70E (Administration and Management--Research Program Administration and Technology Transfer)

AZ- 1150681
AA- <NTIS> N85-11004/7
TI- Aircrew-Aircraft Integration: A Summary of US Army Research Programs and Plans
AU- Key, D. L. ; Aiken, E. W.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:85991; A-8853; NASA-TM-85991
PY- Oct 84
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8504; STAR2302
CP- United States
AB- A review of selected programs which illustrate the research efforts of the U.S. Army Aeromechanics Laboratory in the area of aircrew-aircraft integration is presented. Plans for research programs to support the development of future military rotorcraft are also described. The crew of a combat helicopter must, in general, perform two major functions during the conduct of a particular mission: flightpath control and mission management. Accordingly, the research programs described are being conducted in the same two major categories: (1) flightpath

control, which encompasses the areas of handling qualities, stability and control, and displays for the pilot's control of the rotorcraft's flightpath, and (2) mission management, which includes human factors and cockpit integration research topics related to performance of navigation, communication, and aircraft systems management tasks.
DE- *Aerodynamic stability; *Flight characteristics; *Flight control; *Helicopters; *Human factors engineering; Cockpits; Data management; Display devices; Man machine systems; Mission planning; Navigation; Target acquisition
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1149437
AA- <NTIS> AD-A148 081/3
TI- Shock and Vibration Bulletin. Part 3. Vibration Testing, Instrumentation and Data Analysis, Loads and Environments
CS- Naval Research Lab., Washington, DC. Shock and Vibration Information Center.
CS- <CODE> 000927002; 389004
RN- BULL-47-PT-3
PY- Sep 77
PG- 112p
NT- See also Part 4, AD-A148 088. Proceedings of the Symposium on Shock and Vibration (47th), Albuquerque, NM, 19-21 Oct 76.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A06/MF A01
JA- GRAI8504
CP- United States
AB- Contents: Cost Effectively Exciting Vibration Failure Models for Long-Time Reliability Demonstrations; Self-Tuning Resonant Fixtures; Analysis of Sinusoidal and Random Vibration Energies; Evauation of an Adaptive Filter as a Digital Tracking Filter; Total Mission Environmental Simulation through Digitally Controlled Electromagnetic Vibration; Comparison between Sinusoidal Sweep and Broadband Digital Techniques for Resonance Search and Transmissibility; Modal Investigation of Lightweight Aircraft Structures Using Digital Techniques; Digital Control System for a Multiple-Actuator Shaker; Measurement of Angular Vibration Using Conventional Accelerometers; Use of a Low Power Laser and Photodiode for Displacement Data; Grout/Soil Interaction and Ground-Motion Measurement; Computer-Based Transportable Data-Acquisition and Control System; Vibration Investigation of a Large Transport Helicopter; Aeroacoustic Environment of a Store in an Aircraft Weapons Bay; and An Interim Report on Shuttle Orbiter Vibroacoustics.
DE- *Shock(Mechanics); *Vibration; *Symposia; Test methods; Instrumentation ; Failure; Resonant frequency; Tuning; Self operation; Adaptive filters ; Digital filters; Excitation; Frequency response; Structural response; Aircraft; Vibrators(Mechanical); Accelerometers; Computer applications; Laser applications; Helicopters; Loads(Forces); Space shuttles; Computerized simulation; Ground motion; Periodicals; Naval research laboratories
ID- Aeroacoustics; NTISDODXA
SH- 46E (Physics--Structural Mechanics)

AZ- 1147997
AA- <NTIS> N85-10074/1
TI- YO-3A Acoustics Research Aircraft Systems Manual
AU- Cross, J. L.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:85968; A-9776; NASA-TM-85968
PY- Jul 84
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8503; STAR2301
CP- United States
AB- The flight testing techniques, equipment, and procedures employed during air-to-air acoustic testing of helicopters using the NASA YO-3A Acoustic Research Aircraft are discussed. The research aircraft instrumentation system is described as well as hardware installation on the test aircraft and techniques used during the tests. Emphasis is placed on formation flying, position locations, test matrices, and test procedures.
DE- *Acoustic measurement; *Flight characteristics; *Flight tests;

*Helicopter design; *Research aircraft; Aircraft configurations; Aircraft instruments; Hardware; Microphones; Noise reduction
ID- NTISNASA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 1147985
AA- <NTIS> N85-10033/7
TI- Mathematical Simulation Model of the CH-47B Helicopter, Volume 1
AU- Weber, J. M. ; Liu, T. Y. ; Chung, W.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84351-V-1; A-9303-V-1; NASA-TM-84351-V-1
PY- Apr 84
PG- 137p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8503; STAR2301
CP- United States
AB- A nonlinear simulation model of the CH-47B helicopter was adapted for use in the NASA Ames Research Center (ARC) simulation facility. The model represents the specific configuration of the ARC variable stability CH-47B helicopter and will be used in ground simulation research and to expedite and verify flight experiment design. Modeling of the helicopter uses a total force approach in six rigid body degrees of freedom. Rotor dynamics are simulated using the Wheatlely-Bailey equations including steady-state flapping dynamics. Also included in the model is the option for simulation of external suspension, slung-load equations of motion.
DE- *Ch-47 helicopter; *Dynamics; *Flight simulation; *Pilot performance; *Rotors; Degrees of freedom; Equations of motion; Flight tests; Mathematical models; Real time operation
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1147861
AA- <NTIS> DE84780190
TI- Technical Subsidies for the Operation of IRD/CNEN(Instituto de Radioprotecao e Dosimetria/Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro) Emergency Vehicles in the Case of a Nuclear Accident at the Angra Nuclear Power Plant with Associated Radioactive Releases to the Atmosphere
AU- Leao, J. L. B.
CS- Instituto de Radioprotecao e Dosimetria, Rio de Janeiro (Brazil).
CS- <CODE> 067513000; 3272750
RN- INIS-BR-103
PY- Mar 82
PG- 91p
NT- In Portuguese.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Portuguese
PC- PC A05/MF A01
JA- GRAI8503
CP- Brazil
AB- Technical support is provided for the operation of an emergency vehicle of Instituto de Radioprotecao e Dosimetria/Comissao Nacional de Energia Nuclear, Rio de Janeiro, Brazil, in the event of uncontrolled release of radioactivity from the Angra Nuclear Power Plant (NPP) to the atmosphere. It is based on internationally adopted emergency decision process philosophy, the concept of 'Protective Action Guide' (PAG), the exposure pathways relevant to nuclear accidents, the measuring systems to be used in obtaining the exposure rate in the effluent 'plume', the methods utilized to predict dose to the population, radioiodine suppression measures, the monitoring instrumentation available to the emergency group, some post-accident considerations and finally, the monitoring that may be carried out from an aircraft. Information is given about the NPP operator's responsabilities with respect to the prediction of the consequences of an accident, as well as methods for thyroid and whole body dose estimation based on exposure to the radioiodine and noble gases present in the effluent plume. The example of the Three Mile Island's incident is used to formulate some observations regarding collective dose to the public estimates derived from measurements made from a helicopter. (Atomindex citation 15:006045)
DE- *Angra-1 Reactor; *Emergency Plans; Earth Atmosphere; Radiation Accidents; Radiation Hazards; Radiation Protection
ID- *Foreign technology; ERDA/220900; ERDA/210200; NTISINIS
SH- 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 68F (Environmental Pollution and Control--Radiation

Pollution and Control)

AZ- 1146347
AA- <NTIS> AD-A147 257/0
TI- Military Vital Sign Monitor
TI- <NOTE> Final technical rept. 15 Feb-30 Jul 84
AU- Kataoka, R. W. ; Borkat, F. R.
CS- Naval Ocean Systems Center, San Diego, CA.
CS- <CODE> 055028000; 393159
RN- NOSC/TR-992
CN- M0993; M0993001
PY- 30 Sep 84
PG- 39p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8503
CP- United States
AB- The investigation of commercial vital monitoring devices for use aboard Navy/Marine Corps helicopters is summarized. Army and Air Force activity in test area, as well as NATO requirements, are presented. Finally, generalized military testing procedures are identified for medical equipment used aboard aircraft.
DE- *Medical equipment; *Monitors; Military applications; Test methods; NATO; Requirements; Test facilities; Helicopters; Naval aircraft; Marine Corps aircraft
ID- Vital signs; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 1143764
AA- <NTIS> AD-A147 040/0
TI- Effectiveness of Escape Hatch Illumination as an Aid to Egress from a Submerged Helicopter
TI- <NOTE> Interim rept
AU- Ryack, B. L. ; Smith, P. F. ; Champlin, S. M. ; Noddin, E. M.
CS- Naval Submarine Medical Research Lab., Groton, CT.
CS- <CODE> 055034000; 252220
RN- NSMRL-857
PY- 11 Feb 76
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8502
CP- United States
AB- Simulation procedures were used to evaluate the effectiveness of internal escape hatch illumination as an aid to egress from a helicopter which has crashed, submerged, and inverted in water. Simulations were conducted in the daytime and at night. More rapid egress occurred when the escape hatches were illuminated than when they were not. There was no significant difference between the speeds of night and day egress under either lighting condition. Also evaluated was the utility of an underwater breathing device. The use of escape hatch illumination and the provision of an underwater breathing device is supported by the results of this study. Originator-supplied keywords include: Human factors in helicopter escape, and Emergency underwater breathing device.
DE- *Illumination; *Escape systems; *Hatches; *Helicopters; Downed aircraft ; Breathing apparatus; Underwater equipment; Day; Night
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety)

AZ- 1141521
AA- <NTIS> AD-P003 961/0
TI- Medical Aspects of Helicopter Safety and Crashworthiness
AU- Shanahan, D. F.
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> 065116000; 411551
PY- Apr 84
PG- 13p
NT- This article is from 'Aeromedical Support in Military Helicopter Operations: Lecture Series Held at Soesterberg, The Netherlands on 4-5 June 1984, Fuerstenfeldbruck, Germany on 7-8 June 1984 and Oslo, Norway on 12-13 June 1984,' AD-A145 809, p8-1-8-13.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8501
CP- United States
AB- Helicopters are being used in increasing numbers for military operations in countries throughout the world. In the U.S. Army, helicopters comprise approximately 94 percent of the active fleet. While medical considerations for helicopter operations are much the same as for fixed wing operations, there are some differences of emphasis that will be reviewed. A review of the past 5 year's accident experience reveals that 80 percent are attributed to human error. It is shown that crew error is never a sufficient explanation for an accident. The relationship of errors to system deficiencies is established through human factors analysis. Once identifide, appropriate measures can be instituted to correct these deficiencies. Since current operational helicopters are not equipped with systems for inflight escape, crashworthiness is a key issue in their design. Principles of helicopter crashworthiness are reviewed, and the means for deriving these principles from crash injury analysis is discussed.
DE- *Aeromedical evacuation; *Helicopters; *Crashworthiness; Army aircraft; Military applications; Aviation accidents; Errors; Rates; NATO
ID- Component Reports; Human error; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 91B (Urban and Regional Technology and Development--Transportation and Traffic Planning)

AZ- 1141115
AA- <NTIS> AD-A146 442/9
TI- Aircrew-Aircraft Integration: A Summary of U.S. Army Research Programs and Plans
AU- Key, D. L. ; Aiken, E. W.
CS- Army Research and Technology Labs., Moffett Field, CA. Aeromechanics Lab.
CS- <CODE> 041432001; 393708
PY- 1984
PG- 22p
NT- Presented at the European Rotorcraft Forum (10th) The Hague, The Netherlands, 28-31 Aug 84. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8501
CP- United States
AB- A review of selected programs which illustrates the research efforts of the U.S. Army Aeromechanics Laboratory in the area of aircrew-aircraft integration is presented. Plans for research programs to support the development of future military rotorcraft are also described. The crew of a combat helicopter must, in general, perform two major functions during the conduct of a particular mission: flight-path control and mission management. Accordingly, the research programs described are being conducted in the same two major categories: (1) flightpath control, which encompasses the areas of handling qualities, stability and control, and displays for the pilot's control of the rotorcraft's flightpath and (2) mission management, which includes human factors and cockpit integration research topics related to performance of navigation, communication, and aircraft systems management tasks.
DE- *Flight crews; *Flight control systems; *Man computer interface; *Rotary wing aircraft; *Military aircraft; Pilots; Flight paths; Night flight; Weather; Air to air; Attack helicopters; Cockpits; Human factors engineering; Artificial intelligence; Aerodynamics; Flight simulation; Performance(Human); Missions; Army research; Research management
ID- NTISDODXA
SH- 70E (Administration and Management--Research Program Administration and Technology Transfer); 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1137702
AA- <NTIS> AD-A145 472/7
TI- Anthropometric Cockpit Compatibility Assessment of US Army Aircraft for Large and Small Personnel Wearing A Cold Weather, Armored Vest, Chemical Defense Protective Clothing Configuration
TI- <NOTE> Final rept
AU- Cote, D. O. ; Schopper, A. W.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-84-11
CN- 3E162777A879; BH
PY- Jul 84
PG- 55p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8426
CP- United States
AB- This report on individuals wearing a warm weather uniform presents the results of an anthropometric cockpit compatibility evaluation conducted with individuals wearing a 'worst-case' tactical clothing configuration; i.e., a combination of cold weather, armored vest, and chemical defense protective clothing. Subjects corresponding in stature to the uppermost and lowermost 5th percentiles of the Army male population were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft, and requested to demonstrate critical operational reaches with the shoulder harness unlocked. A relatively wide range of upper- and lower-body reach requirements were encountered. With the exception of a very large requirement associated with the TH-55 helicopter, upper-body reach requirements, as measured by total arm reach ('span'), ranged from 147-173 cm. For crotch height, the measure of leg-reach capability found most efficient, the range was 69-78 cm. Four aircraft could not accommodate the individual with the tallest sitting height (102) cm.
DE- *Protective clothing; *Anthropometry; *Human factors engineering; Compatibility; Cockpits; Army aircraft; Cold weather; Body armor; Helicopters; Fixed wing aircraft; Chemical warfare
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1137519
AA- <NTIS> AD-A145 287/9
TI- Joint Test Project Plan of Combat Air Support Target Acquisition Program. SEEKVAL Project IC1 Report, New Imagery Collection. Phase I
TI- <NOTE> Final rept
AU- Monk, W. W.
CS- SEEKVAL Joint Test Force, Washington, DC.
CS- <CODE> 081833000; 415052
PY- Mar 74
PG- 110p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8426
CP- United States
AB- This report contains descriptions of the hardware, procedures, and instrumentation utilized to define the technical, mechanical, logistical, and administrative problems involved in the collection of 70mm motion picture and infrared imagery from fixed and rotary wing platforms. Except for minor deficiencies, the equipment and procedures used in fixed- and rotary-wing 70mm motion picture photography was satisfactory for use in future SEEKVAL projects. The infrared sensor used was found to have unsatisfactory resolution for program requirements due to mounting deficiencies and lack of stabilization. (Author)
DE- *Target acquisition; Simulation; Data acquisition; Visual targets; Photographic images; Motion picture photography; Infrared images; Infrared photography; Aerial photography; Instrumentation; Resolution; Joint test and evaluation; Military planning; Fixed wing aircraft; Rotary wing aircraft; Mounts; Stabilization
ID- SEEKVAL project; NTISDODXA
SH- 63F (Detection and Countermeasures--Optical Detection); 82B (Photography and Recording Devices--Photographic Techniques and Equipment)

AZ- 1135215
AA- <NTIS> AD-A145 208/5
TI- Anthropometric Cockpit Compatibility Assessment of US Army Aircraft for Large and Small Personnel Wearing a Training, Warm-Weather Clothing Configuration
TI- <NOTE> Final rept
AU- Schopper, A. W. ; Cote, D. O.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-84-10
CN- 3E162777A879; BH
PY- Jul 84
PG- 52p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8425

CP- United States
AB- To assess physical aviator-cockpit reach compatibilities, eight small subjects 146.9 to 162.5 cm in stature and eight tall subjects 182.3 to 194.5 cm in stature were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft. Subjects were dressed in the warm weather training uniform of US Army aviators and were requested to operate all primary controls and instructor-pilot designated critical switches, knobs, etc., with the shoulder harness in the unlocked position. Helmeted head clearance also was evaluated. Among several candidate measures of upper- and lower-body reach capabilities, total arm reach (span), and crotch height, respectively, were found to be the most efficient discriminators between those who could and those who could not perform all critical operational reaches. Sitting height was employed to assess helmeted head clearance. Substantial variation was encountered in the reach-related demands for different aircraft. Minimum total arm-reach requirements throughout the fleet ranged from 147 to 168 cm; minimum crotch-height requirements ranged from 69 to 78 cm. Three aircraft could not accommodate a sitting height above 102 cm. Very large personnel experienced difficulty in achieving full lateral cyclic and stick movement in several aircraft.
DE- *Cockpits; *Anthropometry; *Army aircraft; Helicopters; Compatibility; Training aircraft; Transport aircraft; Pilots; Males
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1133985
AA- <NTIS> N84-29869/4
TI- Improved Pilot Model for Application to a Computer Flight Testing Program for Helicopters
AU- Haverdings, H.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-83052-U
PY- 26 Aug 83
PG- 31p
NT- Sponsored by Royal Netherlands Air Force Directorate of Material Air. Presented at 9TH European Rotorcraft Forum, Stress, Italy, 13-15 Sep. 1983.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8424; STAR2220
CP- Netherlands
AB- A computer flight testing program for evaluation of helicopter dynamics and handling and control qualities was developed. A control model to fly the mathematical helicopter model was designed for maneuvering flight. The model was refined to improve controllability so as to be able to keep state variable deviations small during a maneuver. This required augmentation of the cost function (to be optimized) by specifying weighting terms on control rate and on the control and the state as well. Terminal conditions have to be met approximately, rather than exactly, so as to eliminate the problem of the pilot's feedback gains becoming infinitely large. Results of an application for a landing flare with an S-61 class helicopter are shown.
DE- *Aircraft maneuvers; *Computerized simulation; *Flight simulation; *Helicopter control; *Mathematical models; Computer systems programs; Controllability; Man machine systems; Optimal control; Pilot performance; S-61 helicopter; Turning flight
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1131623
AA- <NTIS> N84-29662/3
TI- Rotorcraft Noise
AU- Huston, R. J.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.55:2234; L-15408; NASA-CP-2234
PY- Jul 82
PG- 424p
NT- Proc. Of the NASA/US Helicopter Ind. Workshop on Aerodyn. Noise Prediction/Noise Reduction, Hampton, VA., 29-31 Mar. 1982.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A18/MF A01

JA- GRAI8423; STAR2219
CP- United States
AB- No abstract available.
DE- *Aerodynamic noise; *Helicopters; *Noise reduction; *Prediction analysis techniques; Human factors engineering; Psychoacoustics; Rotor blades (Turbomachinery); Structural design criteria; Wind tunnels
ID- NTISNASA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1131413
AA- <NTIS> N84-28809/1
TI- Review of US Army Aircrew-Aircraft Integration Research Programs
AU- Key, D. C. ; Aiken, E. W.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:85947; A-9717; NASA-TM-85947
PY- Jul 84
PG- 18p
NT- Prepared in Cooperation with Army Research and Technology Labs., Moffett Field, Calif.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8423; STAR2219
CP- United States
AB- If the U.S. Army's desire to develop a one crew version of the Light Helicopter Family (LHX) helicopter is to be realized, both flightpath management and mission management will have to be performed by one crew. Flightpath management, the helicopter pilot, and the handling qualities of the helicopter were discussed. In addition, mission management, the helicopter pilot, and pilot control/display interface were considered. Aircrew-aircraft integration plans and programs were reviewed.
DE- *Armed forces (United states); *Flight crews; *Flight operations; *Man machine systems; *Military helicopters; *Pilots (Personnel); Artificial intelligence; Expert systems; Flight management systems; Human factors engineering; Management planning; Military operations
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1131098
AA- <NTIS> DE84750643
TI- Review of Methods for Plutonium Detection in Environment
AU- Gros, R.
CS- CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
CS- <CODE> 058927000; 1250000
RN- CEA-CONF-6860; CONF-8306170-1
PY- Jun 83
PG- 18p
NT- In French. Congress on plutonium and radioprotection, Saclay, France, 14 Jun 1983.
NT- U.S. Sales Only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI8423; NSA0900
CP- France
AB- Nuclear properties of plutonium isotopes are briefly recalled and importance of the physico-chemical form on the radioecological behaviour of the radioelement is shown. The different techniques used for environment monitoring are described: measurements on aerosols (with or without chemical separation) by spectrometry with proportional counters or semi-conductors; radiochemical separation associated to alpha spectrometry analysis on the ground with scintillator crystals or semi-conductors; miscellaneous methods (activation, tracks detectors, scintillator crystals in a helicopter. (ERA citation 09:029269)
DE- *Plutonium; Activation Analysis; Aerial Monitoring; Alpha Spectroscopy; Environment; Fallout Deposits; Gamma Spectroscopy; Plutonium Isotopes; Radioactive Aerosols; Radionuclide Migration; Scintillation Counting
ID- *Foreign technology; ERDA/510301; NTISDEE
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 68F (Environmental Pollution and Control--Radiation Pollution and Control)

AZ- 1128619
AA- <NTIS> N84-27707/8
TI- Correlations Between Incidents During Helicopter Missions and Background Variables and Moods
AU- Carlstroem, A.
CS- Foersvarets Forskningsanstalt, Stockholm (Sweden).
CS- <CODE> 063330000; RR628060
SP- National Aeronautics and Space Administration, Washington, DC.
RN- FOA-C-53017-H2
PY- Apr 84
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8422; STAR2218
CP- Sweden
AB- Correlations between background variables (e.g., flight experience and age, and moods and ambition before flight) and incidents during flight missions were assessed during 180 helicopter missions. Results show that one group of pilots with relatively short and one group with very long flight experience were affected by significantly more incidents than the group with medium flight experience. Relaxation shows a positive and activity a negative correlation with incidents. No correlation between age and incidents is found.
DE- *Military helicopters; *Pilot error; *Pilot performance; *Psychological factors; Age factor; Aircraft accidents; Experience; Flight fatigue
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1128618
AA- <NTIS> N84-27706/0
TI- Analysis of Incidents During Helicopter Missions
AU- Carlstroem, A.
CS- Foersvarets Forskningsanstalt, Stockholm (Sweden).
CS- <CODE> 063330000; RR628060
SP- National Aeronautics and Space Administration, Washington, DC.
RN- FOA-C-53016-H2
PY- Apr 84
PG- 29p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8422; STAR2218
CP- Sweden
AB- In order to identify critical situations during helicopter missions, incident reports from army pilots for a 5 yr period were analyzed. An empirical study in which helicopter pilots reported incidents with regard to causes and degree of risk was carried out. Results show errors to be most common during preflight procedures, tactical missions, and landing. The most common errors are procedure errors, faulty judgements of observations, and shortcomings in exterior supervision. The dominating main cause is disturbance of the pilot.
DE- *Aircraft accidents; *Military helicopters; *Pilot error; *Pilot performance; Aircraft landing; Flight conditions; Flight fatigue; Flight safety; Takeoff
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1123649
AA- <NTIS> N84-26374/8
TI- Single-Pilot IFR Flights and Operations
AU- Loranchet, P.
CS- Societe Nationale Industrielle Aerospatiale, Marignane (France).
CS- <CODE> 071754000; SQ446513
SP- National Aeronautics and Space Administration, Washington, DC.
RN- SNIAS-832-210-103
PY- 1983
PG- 6p
NT- Presented at the Aaaf 9TH European Rotorcraft and Powered Lift Aircraft Forum, Stresa, Italy, 13-15 Sep. 1983.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8420; STAR2216
CP- France

AB- The operational, technical, and human features specific to the single pilot Instrument Flight Rules (IFR) are investigated. Problem solving methods are examined. The results of a pilot questionnaire on single pilot IFR are presented.
DE- *Air traffic control; *Education; *Flight instruments; *Helicopter performance; *Instrument flight rules; *Pilot performance; Aircraft maneuvers; Flight paths; Flight safety; Human factors engineering; Weather; Weight reduction
ID- *Foreign technology; NTISNASAE
SH- 85A (Transportation--Air Transportation)

AZ- 1123615
AA- <NTIS> N84-26299/7
TI- Investigation of Interactions Between Helmet-Mounted Sight/Display, Sensor Platform and Human Pilot
AU- Danneberg, E. ; Kohnen, E. ; Stein, H. ; Stolzke, U.
CS- European Space Agency, Paris (France).
CS- <CODE> 062987000; E6854803
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ESA-TT-746; DFVLR-FB-81-30
PY- Jun 83
PG- 220p
NT- Transl. Into English of "Untersuchungen des Zusammerwirkens von Helmet-Mounted Sight/Display und Sensorschwenkrahmen Unter Einschluss Eines Piloten" Rept. Dvflr-FB-81-30 Dfvlr, Brunswick, Jun. 1981 181 p.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Translation
PC- PC A10/MF A01
JA- GRAI8420; STAR2216
CP- Germany, Federal Republic of
AB- When helicopters are used at night and under conditions of poor visibility, technical aids must replace the pilot's lack of vision. The interaction of a Helmet Mounted Sight/Display (HMS/D), a moving sensor platform, and a human pilot as system user was investigated by means of laboratory, moving simulator, and flight tests. Particular emphasis was given to the technical potential of the HMS/D in the laboratory, the tracking accuracy which could be achieved by the pilot on the moving simulator, and the practical application under real, military flight conditions.
DE- *Flight control; *Helmet mounted displays; *Low visibility; *Military helicopters; *Pilot performance; Display devices; Flight simulation; Image tubes; Indicating instruments; Landing simulation; Performance tests; Sensors; Training simulators
ID- *Foreign technology; Translations; NTISNASAT
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1123397
AA- <NTIS> N84-25684/1
TI- Investigation of Image Enhancement Techniques for the Development of a Self-Contained Airborne Radar Navigation System
AU- Phatak, A. V. ; Karmali, M. S.
CS- Analytical Mechanics Associates, Inc., Mountain View, CA.
CS- <CODE> 030966000; AU945491
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166530; AMA-83-12; NASA-CR-166530
CN- NAS2-11276
PY- Jul 83
PG- 73p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8420; STAR2216
CP- United States
AB- This study was devoted to an investigation of the feasibility of applying advanced image processing techniques to enhance radar image characteristics that are pertinent to the pilot's navigation and guidance task. Millimeter (95 GHz) wave radar images for the overwater (i.e., offshore oil rigs) and overland (Heliport) scenario were used as a data base. The purpose of the study was to determine the applicability of image enhancement and scene analysis algorithms to detect and improve target characteristics (i.e., manmade objects such as buildings, parking lots, cars, roads, helicopters, towers, landing pads, etc.) that would be helpful to the pilot in determining his own position/orientation with respect to the outside world and assist him in the navigation task. Results of this study show that significant

improvements in the raw radar image may be obtained using two dimensional image processing algorithms. In the overwater case, it is possible to remove the ocean clutter by thresholding the image data, and furthermore to extract the target boundary as well as the tower and catwalk locations using noise cleaning (e.g., median filter) and edge detection (e.g., Sobel operator) algorithms.
DE- *Image enhancement; *Image processing; *Navigation; *Radar navigation; Algorithms; Feasibility analysis; Clutter; Oceans; Pilot performance; Real time operation; Thresholds (Perception)
ID- NTISNASA
SH- 63H (Detection and Countermeasures--Radiofrequency Detection); 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 1121481
AA- <NTIS> PB84-871516
TI- Head Up Displays. 1975-July, 1984 (Citations from the International Aerospace Abstracts Data Base)
TI- <NOTE> Rept. for 1975-Jul 84
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 84
PG- 174p
NT- Supersedes PB83-869800. Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8419
CP- United States
AB- This bibliography contains citations concerning the design, fabrication, and applications of head up displays (HUDs). Applications include military aircraft, helicopters, space shuttle, and commercial aircraft. Functions of the display include instrument approach, target tracking, and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 217 citations, 21 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices
ID- *Head up displays; NTISPSIAA; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1120635
AA- <NTIS> N84-25297/2
TI- Human Factors in Weapon Systems
AU- Bergstroem, B. ; Palm, J.
CS- Foersvarets Forskningsanstalt, Stockholm (Sweden).
CS- <CODE> 063330000; RR628060
SP- National Aeronautics and Space Administration, Washington, DC.
RN- FOA-A-56006-H2; ISSN-0281-0239
PY- Feb 84
PG- 95p
NT- In Swedish and English. Proc. Of Symp., Stockholm, 13 Apr. 1983; Sponsored by Research Inst. Of National Defence (Foa) 56.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Swedish
DT- Conference proceeding
PC- PC A05/MF A01
JA- GRAI8419; STAR2215
CP- Sweden
AB- A conference on Human Factors in Weapon Systems, held 1983-04-13 in Stockholm is reported. The symposium was arranged by the Human Factors Division of National Defence Research Institute. Topics discussed include: human factors engineering and product development; human factors in weapon systems; and flight plans.
DE- *Conferences; *Human factors engineering; *Nap-of-the-earth navigation; *Weapon systems; Antitank missiles; Evaluation; Helicopters; Product development; Visual perception
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1111654
AA- <NTIS> AD-A140 634/7
TI- In-Flight Evaluation of Two Molecular Sieve Oxygen Concentration Systems in U.S. Army Aircraft (JUH-1H and JU-21G)
TI- <NOTE> Final rept

AU- Chaffin, W. ; Hiott, B. F. ; Knox, F. S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-84-6
CN- 3E162777A878; AF
PY- Mar 84
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8416
CP- United States
AB- The logistical problems associated with using high pressure gaseous oxygen systems have encouraged the development of molecular sieve oxygen concentration systems for use on board aircraft. This report summarizes the in-flight static performance characteristics of two such oxygen concentrators installed in a JU-21G fixed-wing, twin-engine turbopropeller aircraft and a JUH-1H turbine-powered helicopter. Flight profiles consisting of five separate flights at altitudes of 1,524, 3,048, 4,572, 6,096, and 7,620 meters (5,000, 10,000, 15,000, 20,000, and 25,000 feet) were flown in the JU-21G and five separate flights at altitudes of 1,524, 3,048 and 4,572 meters were flown in the JUH-1H. Oxygen concentration at flows of 15, 25, 35, and 70 liters per minute were recorded at each altitude. These flows were chosen to represent normal breathing requirements for one- and two-man crews. In all cases, the concentrators met or exceeded the requirements of MIL-R-83178. The use of engine bleed air to drive the oxygen concentrators produced no noticeable effect on aircraft performance. (Author)
DE- *Life support systems; *Oxygen equipment; *Molecular sieves; *Army aircraft; Oxygen generators; Oxygen; Concentration(Chemistry); Inflight ; Test and evaluation; Onboard; Static tests; Performance(Engineering); Helicopters; Flight paths; Profiles; Respiration; Requirements; Flight crews; Pressure; Flow
ID- Oxygen concentrators; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1110730
AA- <NTIS> N84-22371/8
TI- Active Sound Reduction Systems
AU- Steeneken, H. J. M.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> 013273000; IK311704
SP- National Aeronautics and Space Administration, Washington, DC.
RN- IZF-1983-8; TDCK-77951
CN- A82/K/145
PY- May 83
PG- 12p
NT- In Dutch; English Summary.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
PC- PC A02/MF A01
JA- GRAI8415; STAR2212
CP- Netherlands
AB- Sound reduction systems to increase headset sound attenuation are discussed. Attenuation improvements up to 15 dB for frequencies below 500 Hz are obtained. At high noise levels, such as in tanks or helicopters, the risk of hearing damage is decreased. The signal to noise ratio of speech communication is decreased. A method for the subjective measurement of sound attenuation increase is proposed, and the possibility of developing an active sound reduction system is discussed.
DE- *Acoustic attenuation; *Earphones; *Noise reduction; Acoustic measurement; Aircraft noise; Ear protectors; Helicopters; Noise injuries; Signal to noise ratios; Sound intensity; Tanks (Combat vehicles); Thresholds (Perception)
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 46A (Physics--Acoustics); 51C (Aeronautics and Aerodynamics--Aircraft); 79D (Ordnance--Combat Vehicles)

AZ- 1109262
AA- <NTIS> AD-A140 264/3
TI- CONUS Loran-C Error Budget: Flight Test
TI- <NOTE> Final rept
AU- King, L. D. ; McConkey, E. D. ; Venezia, K. J.
CS- Systems Control Technology, Inc., West Palm Beach, FL.
CS- <CODE> 072856000; 412702
SP- Federal Aviation Administration, Washington, DC. Program Engineering and Maintenance Service.

RN- DOT/FAA/PM-83/32
CN- DTFA01-83-C-20041
PY- Dec 83
PG- 125p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8415
CP- United States
AB- This report contains the description and results of a Loran-C flight test program conducted in the continental United States (CONUS). The data collection period was during July 1983. The purpose of the program was to collect Loran-C signal coverage and accuracy data representative of low altitude, low speed operations typical of helicopters and general aviation aircraft. The test aircraft used was a Beechcraft Queen Air, Model 65. The aircraft was configured with a data collection palate and multipin electrical connectors located in the aircraft cabin. A Teledyne TDL-711 navigation receiver was used in the test, utilizing an E-field antenna mounted on the top of the fuselage. A microprocessor controlled data collection system, utilizing a scanning DME and other aircraft navigation instruments, was used to record data and establish aircraft reference position.
DE- *Loran; *Errors; Flight testing; Accuracy; Aircraft cabins; Low altitude; Position(Location); Test vehicles; Civil aviation; Operation; Electric connectors; Helicopters; United States; Instrumentation; Electric fields; Fuselages; Antennas; Budgets; Aircraft
ID- Navigation receivers; NTISDODXA; NTISDOTFAA
SH- 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 1106966
AA- <NTIS> AD-A140 037/3
TI- Fuel Fire Tests of the Helicopter Crewman Jacket
TI- <NOTE> Final rept
AU- Kydd, G. H. ; Askew, G. K.
CS- Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> 032381022; 393532
RN- NADC-83014-60
PY- 4 Feb 83
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8414
CP- United States
AB- The Helicopter Crewman Jacket is not only resistant to flames itself, but it adds to whatever other protection the crewman might have creating a generally safer micro-environment.
DE- *Jackets; Flight crews; Test and evaluation; Flames; Test methods; Fire protection
ID- NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1105644
AA- <NTIS> N84-20176/3
TI- Experimental Evaluation of the Sternberg Task as a Workload Metric for Helicopter Flight Handling Qualities (Fhq) Research
AU- Hemingway, J. C.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:85884; A-9634; NASA-TM-85884
PY- Mar 84
PG- 39p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8413; STAR2210
CP- United States
AB- The objective was to determine whether the Sternberg item-recognition task, employed as a secondary task measure of spare mental capacity for flight handling qualities (FHQ) simulation research, could help to differentiate between different flight-control conditions. FHQ evaluations were conducted on the Vertical Motion Simulator at Ames Research Center to investigate different primary flight-control configurations, and selected stability and control augmentation levels

for helicopters engaged in low-level flight regimes. The Sternberg task was superimposed upon the primary flight-control task in a balanced experimental design. The results of parametric statistical analysis of Sternberg secondary task data failed to support the continued use of this task as a measure of pilot workload. In addition to the secondary task, subjects provided Cooper-Harper pilot ratings (CHPR) and responded to workload questionnaire. The CHPR data also failed to provide reliable statistical discrimination between FHQ treatment conditions; some insight into the behavior of the secondary task was gained from the workload questionnaire data.
DE- *Helicopter performance; *Ratings; *Workloads (Psychophysiology); Flight control; Pattern recognition; Statistical analysis
ID- NTISNASA
SH- 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1103855
AA- <NTIS> AD-A139 367/7
TI- Evaluation of Ride Quality Prediction Methods for Helicopter Interior Noise and Vibration Environments
TI- <NOTE> Technical paper
AU- Leatherwood, J. D. ; Clevenson, S. A. ; Hollenbaugh, D. D.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; 387543
SP- National Aeronautics and Space Administration, Washington, DC.; Army Aviation Systems Command, St. Louis, MO.
RN- NASA-L-15661; NASA-TP-2261; USAAVSCOM-TR-84-D-2
CN- 1L262209AH76
PY- Mar 84
PG- 47p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8413
CP- United States
AB- This paper presents the results of a simulator study conducted to compare and validate various ride quality prediction methods for use in assessing passenger/crew ride comfort within helicopters. Included are results quantifying 35 helicopter pilots' discomfort responses to helicopter interior noise and vibration typical of routine flights, assessment of various ride quality metrics including the NASA ride comfort model, and examination of possible criteria approaches. Results of the study indicated that crew discomfort results from a complex interaction between vibration and interior noise. Overall measures such as weighted or unweighted root-mean-square acceleration level and A-weighted noise level were not good predictors of discomfort. Accurate prediction required a metric incorporating the interactive efefcts of both noise and vibration. The best metric for predicting crew comfort to the combined noise and vibration environment was the NASA discomfort index. (Author)
DE- *Ride quality; *Vibration; *Aircraft noise; *Helicopters; Interactions; Predictions; Human factors engineering; Internal; Ratings; Passengers; Flight crews; Noise reduction; Reaction(Psychology); Questionnaires
ID- Interior noise; Discomfort index; Human response; Comfortability; NTISDODXA; NTISNASA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1103813
AA- <NTIS> AD-A139 324/8
TI- Sustained Intensive Air Operations: Physiological and Performance Aspects
TI- <NOTE> Conference proceedings
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-338
PY- Nov 83
PG- 237p
NT- Presented at the Aerospace Medical Panel Specialists' Meeting Held in Paris (France) 18-22 Apr 83. For sales information of individual items see AD-P002 981-AD-P002 995. See also classified supplement, AD-C033 186.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A11/MF A01
JA- GRAI8413

CP- France
AB- The symposium addressed the aeromedical and human factors aspects of the capabilities of aircrew and ground crew to perform their duties at high intensities at irregular times of the day and night over many days or weeks under the operational conditions which would occur in war. The Symposium included (I) four papers on the operational scenarios of sustained intensive air operations with particular emphasis on air defence and offensive operations, (II) eleven papers reporting laboratory studies on the measurement of aircrew workload, the effects of disturbances of circadian rhythms and deprivation of sleep and the use of hypnotics and stimulants to influence sleep and wakefulness, (III) six papers on the effects of NBC protective equipment and procedures on air and ground crew with particular reference to fast jet and helicopter operations, (IV) eight papers reporting field studies of fatigue, performance and physiological disturbances in aircrew and ground personnel engaged in sustained air operations including the South Atlantic Campaign, and (V) a panel discussion on the requirements for future research into the physiological, psychological and aeromedical aspects of sustained air operations and the potential value of current aeromedical knowledge to the NATO air forces.
DE- *Aerospace medicine; *Performance(Human); *Symposia; *Workload; Air Force operations; NATO; Measurement; Stress(Physiology); Circadian rhythms; Sleep deprivation; Sleep; Rest; Adaptation(Physiology); Fatigue(Physiology); Stress(Psychology); Air traffic controllers; Anxiety; Physiological effects; Hypnotics and sedatives; Ground crews; Flight crews
ID- *Foreign technology; Compilation Reports; Air operations; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1103630
AA- <NTIS> AD-A139 141/6
TI- Human Factors Affecting Pilot Performance in Vertical and Translational Instrument Flight
TI- <NOTE> Technical rept. 1 Jan-31 Dec 83 on Phase 3
AU- Tatro, J. S. ; Corl, L. ; Roscoe, S. N.
CS- New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
CS- <CODE> 012643033; 412156
RN- BEL-83-1/ONR-83-1
CN- N00014-81-K-0439
PY- Dec 83
PG- 92p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8413
CP- United States
AB- As part of an overall research program to develop both forward-looking and downward-looking tactical situation displays for all-weather instrument flight in VTOLs, an integrated horizontal situation display was developed for both vertical and translational flight. This report covers the development and initial experimentation of the downward-looking display and control system. The effects of eight factors on pilot performance as a function of those eight factors were derived for each of three dependent performance measures. (Author)
DE- *Display systems; *Human factors engineering; *Flight instruments; *Performance(Human); Vertical takeoff aircraft; Attack aircraft; Helicopters; Military requirements; Mission profiles; Performance(Engineering); Screens(Displays); Head up displays; Maneuverability; Predictions; Flight crews; Flight simulators
ID- NTISDODXA
SH- 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1101455
AA- <NTIS> AD-P002 845/6
TI- Avionics/Crew Station Integration
AU- Mulley, W. G.
CS- Naval Air Development Center, Warminster, PA.
CS- <CODE> 032381000; 245700
PY- Oct 83
PG- 9p
NT- This article is from 'Advanced Concepts for Avionics/Weapon System Design, Development and Integration: Conference Proceedings of the Avionics Panel Symposium (45th) Held at Ottawa, Canada on 18-22 April 1983,' AD-A138 600, p9-1-9-9.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8412

CP- United States
AB- The U.S. Navy has been encouraging advanced development concepts aimed at increasing the aircraft instrumentation performance for multi-platform application of 1990's weapons systems. The system integration (R&D) objectives are to produce a system architecture easily adaptable to many platforms; technology objectives are to determine the state of the art for displays, electronics, and controls; and the human factors objectives are to determine the proper human-machine interfaces so that the ultimate crew station will be capable of providing the pilot with the proper display and controls performance to satisfy the diverse requirements of fighter, attack, ASW, fixed-wing, rotary-wing, and V/STOL platforms in both a one-man crew of two-man crew matrix. All data/control interfaces among units of this crew station system and other platforms subsystems will be via digital data buses and video multiplex buses. No individual discrete signal, data, or control lines will be needed. This paper discusses the six interfaces necessary to ensure the optimum development of this crew station, the predicted platform mission improvements, and the requisite life-cycle cost considerations. This concept will serve as a basis for planning the integration of the necessary hardware and software features in current and future weapons systems.
DE- *Avionics; *Display systems; *Man machine systems; Cockpits; Naval aircraft; Integrated systems; Interfaces; Pilots; Flight control systems; Human factors engineering; Bus conductors; Multiplexing; Video signals; Digital systems; Modules(Electronics); Data management; Life cycle costs
ID- Crew stations; AIDS(Advanced Integrated Display System); NATO furnished ; Component Reports; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1099920
AA- <NTIS> N84-17433/3
TI- Human Factors Issues Associated with the Use of Speech Technology in the Cockpit
AU- Kersteen, Z. A. ; Damos, D.
CS- Arizona State Univ., Tempe.
CS- <CODE> 000950000; AX646679
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166548; NASA-CR-166548
PY- Dec 83
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8411; STAR2208
CP- United States
AB- The human factors issues associated with the use of voice technology in the cockpit are summarized. The formulation of the LHX avionics suite is described and the allocation of tasks to voice in the cockpit is discussed. State-of-the-art speech recognition technology is reviewed. Finally, a questionnaire designed to tap pilot opinions concerning the allocation of tasks to voice input and output in the cockpit is presented. This questionnaire was designed to be administered to operational AH-1G Cobra gunship pilots. Half of the questionnaire deals specifically with the AH-1G cockpit and the types of tasks pilots would like to have performed by voice in this existing rotorcraft. The remaining portion of the questionnaire deals with an undefined rotorcraft of the future and is aimed at determining what types of tasks these pilots would like to have performed by voice technology if anything was possible, i.e. if there were no technological constraints.
DE- *Ah-1g helicopter; *Avionics; *Human factors engineering; *Speech recognition; *Voice communication; Aircraft pilots; Amplitudes; Synthesizers
ID- NTISNASA
SH- 45F (Communication--Verbal); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1098483
AA- <NTIS> AD-A138 375/1
TI- Forecast of Army Aviation Training Research and Development Requirements for the Period 1985 to 2000. Volume 1
TI- <NOTE> Final draft rept. 9 Jan 80-31 Jul 81
AU- Lenz, R. C. ; Chen, K. L. ; Skerl, J. A. ; Newman, R. L. ; Anderson, L. A.
CS- Dayton Univ., OH. Research Inst.
CS- <CODE> 007431003; 105400
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- UDR-TR-81-10-VOL-1; ARI-TR-565
CN- MDA903-80-C-0229; 2Q763743A765
PY- Aug 81
PG- 128p

NT- See also Volume 2, AD-A130 209.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8411
CP- United States
AB- This research report identifies U.S. Army aviation system and subsystem acquisitions projected for the time period of 1985 to 2000 which will require behavioral research to support development of new aircrew training methods and equipment. The report describes the conduct and results of three tasks; (a) a survey to identify future Army aviation related systems and subsystems; (b) the identification of systems with unique training needs; and (c) the determination of training requirements and the forecasting of behavioral research requirements for the systems with unique training needs. This research is intended to assist the Army behavioral research requirements for future Army aviation aircrew training before the new aviation systems and subsystems are introduced. The lead time provided by the early initiation of behavioral research programs should aid the development of effective training systems. Requirements for the behavioral research needed to support Army aviation training programs in the time frame 1985 to 2000 are described in this report of U.S. Army aviation training R&D needs. The appendix (published as ARI Research Note 82-29) presents the survey results in questionnaire format, as they were originally obtained, together with information on scoring model weighting, and a complete listing of the bibliographical references. (Author)
DE- *Army aviation; *Army training; *Flight crews; *Flight training; Behavioral science; Research management; Performance(Human); Attitudes(Psychology); Adjustment(Psychology); Surveys; Scoring; Training devices; Flight simulators; Display systems; Cockpits; Computerized simulation; Systems engineering; Combat readiness; Helicopters; Army research; Technology forecasting; Human factors engineering; Man machine systems; Questionnaires
ID- Aircrew training; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1098236
AA- <NTIS> AD-A138 126/8
TI- Effects of Extended Use of AN/PVS-5 Night Vision Goggles on Helicopter Pilots' Performance
AU- Stone, L. W. ; Duncan, C. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-84-3
CN- 3E162777A879; 3E162773A819; BH; 00
PY- Jan 84
PG- 51p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8411
CP- United States
AB- The effects of extended use of AN/PVS-5 night vision goggles (NVG) were investigated by observing 10 NVG helicopter instructor pilots during two 6-hour missions. Each mission consisted of three 2-hour flights during which pilot control inputs and aircraft status variables were recorded in flight. Questionnaires were completed before the first mission and after the NVG mission. In order to examine for a carryover effect, subjects were flown in a crossover design in which half of the aviators flew NVG on the first mission, the other half on the second. Only the out-of-ground-effect hover showed a statistically significant carryover effect; that is, subjects who flew naked eye before NVG demonstrated a greater absolute difference in hover flight performance variability than those who flew naked eye after NVG flight. In the traffic pattern (final approach segment), there was a statistically significant difference between the visual conditions only. The postflight questionnaire responses revealed a concern over what was described as a lack of concentration and a decline of mental alertness. Some physiological stress reactions were reported. None of the three maneuvers analyzed revealed a significant effect on performance across flights.
DE- *Goggles; *Night vision devices; Pilots; Helicopters; Performance(Human); Fatigue(Physiology); Workload; Questionnaires; Multivariate analysis; Inflight; Stress(Physiology)
ID- AN/PVS-5; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1095918

AA- <NTIS> AD-P002 708/6
TI- Army Helicopter Crashworthiness
AU- Carper, C. H. ; Burrows, L. T. ; Smith, K. F.
CS- Army Research and Technology Labs., Fort Eustis, VA.
CS- <CODE> 055062000; 393742
PY- Oct 83
PG- 17p
NT- This article is from the Proceedings of the Conference on Flight Mechanics and System Design Lessons from Operational Experience Held in Athens, Greece on 10-13 May 83, AD-A137 607, p14-1 - 14-17.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8410
CP- United States
AB- This paper discusses the evolution of crash survival design criteria, its influence on the formulation of a US Army military standard for rotary-wing aircraft crashworthiness, and its application to current and new-generation Army helicopters. Emphasis is given to the need for a total systems' approach in design for crashworthiness and the necessity for considering crashworthiness early in the design phase of a new aviation weapon systems development effort. The actual application of crashworthiness to Army helicopters is presented with statistics that show dramatic reductions in fatalities and injuries with implementation of a crashworthy fuel system. Current and planned US Army R&D to improve crashworthiness technology is discussed, including full-scale crash testing, human tolerance definition, improved energy absorbers, crew restraint systems, and crash impact characteristics of composite helicopter structures. Applicability of the work within Army helicopter crashworthiness to commercial/civil helicopters is shown. The cost effective aspects of designing helicopters to be more crash survivable are also discussed. (Author)
DE- *Helicopters; *Army aircraft; *Crashworthiness; *Aviation safety; *Human factors engineering; Composite structures; Survival(General); Casualties; Military requirements; Rotary wing aircraft; Structural analysis; Fuel systems; Drop tests; Impact tests; Tolerances(Physiology); Energy absorbers; Cost effectiveness; Civil aviation; Conferencing(Communications); Information exchange; Technology transfer
ID- Component Reports; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1095709
AA- <NTIS> AD-A137 825/6
TI- Study to Determine the CB (Chemical/Biological) Threat and Define Alternative Crew Protection Systems for the Advanced Attack Helicopter (AAH). Volume 1
TI- <NOTE> Final rept. 1 Oct 79-1 Dec 80
AU- Rannenberg, G. C.
CS- United Technologies Corp., Windsor Locks, CT. Hamilton Standard Div.
CS- <CODE> 065201001; 161400
SP- Army Natick Research and Development Command, MA.
RN- AAH-CB-07; NATICK-TR-81/021; NATICK/CEMEL-238
CN- DAAK60-79-C-0136
PY- 1 Dec 80
PG- 186p
NT- See also Volume 2 dated 15 Jan 82, AD-C027 334.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8410
CP- United States
AB- A chemical biological threat is defined and applied to the Advanced Attack Helicopter as presently designed. Conclusions are reached regarding the safety and mission effectiveness of the helicopter against this threat. Various change options to improve the chemical/biological characteristics of the Advanced Attack Helicopter are evaluated and recommendations made.
DE- *Chemical warfare; *Biological warfare; *Protection; *Protective clothing; Flight crews; Helicopters; Determination; Threat evaluation; Attack helicopters
ID- NTISDODXA; NTISDODA
SH- 74D (Military Sciences--Chemical, Biological, and Radiological Warfare) ; 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1095504
AA- <NTIS> AD-A137 615/1

TI- UH-60A (BLACKHAWK). A Case Study of Manpower, Personnel and Training Requirements Determination
TI- <NOTE> Final rept
AU- O'Connor, F. E. ; Fairall, R. L. ; Birdseye, E. H.
CS- Information Spectrum, Inc., Arlington, VA.
CS- <CODE> 051752000; 410136
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- ARI-RN-84-32
CN- MDA903-81-C-0386; 2Q162722A791
PY- Jan 84
PG- 96p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8410
CP- United States
AB- This report describes and analyzes the procedures used to determine manpower, personnel and training (MPT) requirements for the UH-60A BLACKHAWK Helicopter Program and related accomplishment of actual MPT events/documents to those called for in the Life Cycle System Management Model (LCSMM). It addresses concerns being raised about the acequacy and timeliness of the Army's MPT requirements determination procedures. (Author)
DE- *Army research; *Military requirements; *Manpower; *Personnel; *Training; Case studies; Life cycles; Systems management; Models; Determination; Human factors engineering; Man machine systems; Helicopters; Utility aircraft; Data acquisition; Materiel; Acquisition; Systems analysis; Acceptability; Timeliness; Estimates; Methodology; Quantitative analysis; Qualitative analysis
ID- Force structure planning; NTISDODXA; NTISDODA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92A (Behavior and Society--Job Training and Career Development)

AZ- 1088242
AA- <NTIS> AD-A136 880/2
TI- Portable Life Support Stretcher Unit (PLSSU): Engineering Drawings
TI- <NOTE> Technical document
AU- Kataoka, R. W.
CS- Naval Ocean Systems Center, San Diego, CA.
CS- <CODE> 055028000; 393159
RN- NOSC/TD-604
CN- M0933PN
PY- Jun 83
PG- 89p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8408
CP- United States
AB- The Portable Life Support Stretcher Unit (PLSSU) is being developed to provide a patient litter with all necessary features. The PLSSU is similar in configuration to a standard canvas litter. This allows it to interface with all military aircraft and vehicles designed to carry casualties on canvas litters. Standard military aircraft litter rack equipment, hoists, and securing equipment designed for the canvas litter can be used without modification. An important feature of the PLSSU is that it quickly transforms a utility helicopter or other transport vehicle into an equipped MEDEVAC unit, and just as quickly returns it to utility status. During a MEDEVAC operation, the patient is carried on a canvas litter, backboard, or Stokes litter, all of which can be attached to the PLSSU.
DE- *Stretchers; *Engineering drawings; Portable equipment; Life support systems; Military applications; Patients; Monitoring
ID- NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 1082742
AA- <NTIS> N84-11765/4
TI- Technique for Measuring the Sound Pressure Levels under Flying Helmets and Headsets
AU- Mimpen, A. M. ; Smoorenburg, G. F.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> 013273000; IK311704
SP- National Aeronautics and Space Administration, Washington, DC.
RN- IZF-1982-39; TDCK-77630
CN- A80/K/112
PY- Dec 82

PG- 25p
NT- In Dutch; English Summary.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- Dutch
PC- PC A02/MF A01
JA- GRAI8405; STAR2202
CP- Netherlands
AB- A measuring technique was developed to determine the equivalent sound pressure levels under flying helmets and headsets. Subjectively these sound levels are qualified as very high and potentially damaging for the ear. A miniature electret microphone placed near the entrance of the ear canal of subjects in the laboratory measured the frequency characteristic, corresponding to the chosen microphone position. It is shown that only the difference between the frequency characteristics of the electret microphone and the standard microphone of the noise dose meter is important. A frequency dependent correction for the position of the electret microphone near the ear canal is not required. However, this is true only if helmets or headsets are used. Additional corrections are required for the unprotected ear. A preliminary measurement in an Alouette 3 helicopter shows in the cockpit a level of 96 dB(A), an Leq = 85 dB(A) under the helmet without speech and an Leq of about 95 dB(A) with communication speech.
DE- *Acoustic measurement; *Earphones; *Helmets; *Sound pressure; Cockpits; Electrets; Human factors engineering; Microphones; Noise injuries; Se-3160 helicopter
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1078415
AA- <NTIS> AD-A135 244/2
TI- Measurement of Spinal Loads in Two Modified Anthropomorphic Dummies
TI- <NOTE> Final rept
AU- Laananen, D. H. ; Coltman, J. W.
CS- Simula, Inc., Tempe, AZ.
CS- <CODE> 071110000; 411094
RN- TR-82405
CN- DAMD17-81-C-1175
PY- 5 May 82
PG- 172p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8405
CP- United States
AB- The new generation of U.S. Army helicopters possesses unprecedented crashworthiness. Although these seats are far superior to any prior systems, there are several areas of uncertainty in the design criteria that require additional research to enable further progress to be made in the hardware. Research efforts were designed to meet the following objectives: (1) Establish the sensitivity of seat and occupant response to system variables. (2) Determine the effect on system performance of the type of dummy being used for testing and establish an appropriate standardized dummy for seat system evaluation. (3) Investigate the performance of the seat with an occupant more nearly representative of the operational occupant than are anthropomorphic dummies. Cadavers were to be used for this investigation. (4) Establish, through dynamic testing, additional information concerning human tolerance to accelerative loads in the + G sub z direction.
DE- *Aircraft seats; Helicopters; Army aircraft; Human factors engineering; Experimental design; Requirements; Performance(Engineering); Acceleration; Tolerances(Physiology); Dynamic tests
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1075780
AA- <NTIS> AD-A134 425/8
TI- Survey of Characteristics of Near Mid-Air Collisions Involving Helicopters
TI- <NOTE> Final rept
AU- Billmann, B. R.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- DOT/FAA/CT-83/40
PY- Aug 83
PG- 25p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8404
CP- United States
AB- Rotorcraft operating characteristics may require a collision avoidance system to perform a substantially different function than is provided to conventional fixed wing aircraft by Traffic Alert and Collision Avoidance System (TCAS) I or thee Minimum TCAS II. This paper has been prepared to provide analysis of environmental conditions and operational characteristics of near mid-air collision situations involving rotorcraft. The analysis is intended to provide data in establishing preliminary human factors and procedural design requirements for a rotorcraft collision avoidance system. The information should be used to establish TCAS Rotorcraft Program experimental requirements. (Author)
DE- *Helicopters; *Collisions; Collision avoidance; Case studies; Environments; Weather; Air traffic control systems; Flight maneuvers; Statistical analysis
ID- NTISDODXA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 1075445
AA- <NTIS> PB84-852920
TI- Military Helicopters. 1970-November, 1983 (Citations from the Engineering Index Data Base)
TI- <NOTE> Rept. for 1970-Nov 83
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 83
PG- 210p
NT- Supersedes PB83-859033.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8403
CP- United States
AB- This bibliography contains citations concerning military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, v/stol and advance concepts, noise and vibration problems. (This updated bibliography contains 302 citations, 26 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; Military aircraft; Rotary wing aircraft; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1074283
AA- <NTIS> NTN83-0653
TI- Displaying Helicopter Engine Data: Programmable model shows how pilots' jobs can be made easier
TI- <NOTE> NTIS Tech Note
CS- Army Materiel Development and Readiness Command, Alexandria, VA.
CS- <CODE> 047809000
PY- Sep 83
PG- 1p
NT- Write NTIS for information about Tech Notes subscriptions and back issue packages available.
LA- English
PC- Not available NTIS
JA- GRAI8403
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. A report discusses a programmable feasibility model of a master monitor and display system for helicopter engines. The system is intended to reduce pilot workload. The report, which was prepared for the U.S. Army Aviation Research and Development Command, covers functional requirements and system interfaces, human factors engineering, methods of data transmission from sensors, and hardware. A quantity of seven switches was considered optimum on the basis of the subsystems to be monitored and the available space....FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report, order number: AD-A105 082, price code: A03.
DE- *Helicopters; *Jet engines; *Human factors engineering
ID- NTN/B; NTISNTND
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines,

and Propellants--Jet and Gas Turbine Engines); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1071625
AA- <NTIS> N83-34564/5
TI- Effects of Aircraft Noise on Human Activities
TI- <NOTE> Final Report, 1 Jan. 1980 - 31 Mar. 1983
AU- Arnoult, M. D. ; Gilfillan, L. G.
CS- Texas Christian Univ., Fort Worth. Dept. of Psychology.
CS- <CODE> 015061008; TQ704345
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:173064; NASA-CR-173064
CN- NAG1-22
PY- 31 Mar 83
PG- 96p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8402; STAR2122
CP- United States
AB- The effects of aircraft noise on human activities was investigated by developing a battery of tasks (1) representative of a range of human activities and (2) sensitive to the disruptive effects of noise. The noise used were recordings of jet aircraft and helicopter sounds at three lvels of loudness--60, 70, and 80 dB(A). Experiment 1 investigated 12 different cognitive tasks, along with two intelligibility tasks included to validate that the noises were being effective. Interference with intelligibility was essentially the same as found in the research literature, but only inconsistent effects were found on either accuracy or latency of performance on the cognitive tasks. When the tasks were grouped into four categories (Intelligibility, Matching, Verbal, and Arithmetic), reliable differences in rated annoyingness of the noises were related to the task category and to the type of noise (jet or helicopter).
DE- *Aircraft noise; *Helicopters; *Human reactions; *Jet aircraft; *Noise pollution; Cognition; Intelligibility; Noise intensity
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 1064974
AA- <NTIS> AD-A132 602/4
TI- Portable Life Support Stretcher Unit (PLSSU) Environmental Tests: Preproduction Model
TI- <NOTE> Final rept. Oct 80-Sep 81
AU- Rowley, G. W. ; Kataoka, R. W.
CS- Naval Ocean Systems Center, San Diego, CA.
CS- <CODE> 055028000; 393159
RN- NOSC/TR-797
CN- M0933; M0933PN
PY- Jun 82
PG- 50p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8401
CP- United States
AB- A preproduction Portable Life Support Stretcher Unit (PLSSU) was subjected to a series of environmental tests, including conditions simulating aircraft (helicopter and fixed wing) environments. The various fittings of the PLSSU were found to have sufficient strength for their intended uses. The main structure showed minor deficiencies in integrity, in both design and fabrication, but is considered to have passed the environmental tests despite some damage. Minor preproduction improvements are recommended in structural reinforcements, fittings, and attachments. (Author)
DE- *Stretchers; *Life support systems; Portable equipment; Test and evaluation; Environmental tests; Simulation; Environments; Helicopters; Fixed wing aircraft; Vibration; Resistance; Strength(General); Fittings ; Efficiency; Models; Static tests
ID- NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 1063559
AA- <NTIS> N83-32518/3
TI- Interior Noise and Vibration Measurements on Operational Military Helicopters and Comparisons with Various Ride Quality Criteria
AU- Clevenson, S. A. ; Leatherwood, J. D. ; Hollenbaugh, D. D.

CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NAS 1.15:84664; L-15598; NASA-TM-84664
CN- DA PROJ. 1L2-62209-AH-76
PY- Aug 83
PG- 82p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8326; STAR2120
CP- United States
AB- The results of physical measurements of the interior noise and vibration obtained within eight operational military helicopters are presented. The data were extensively analyzed and are presented in the following forms: noise and vibration spectra, overall root-mean-square acceleration levels in three linear axes, peak accelerations at dominant blade passage frequencies, acceleration exceedance data, and overall and 'A' weighted sound pressure levels. Peak acceleration levels were compared to the ISO 1-hr reduced comfort and fatigue decreased proficiency boundaries and the NASA discomfort criteria. The 'A' weighted noise levels were compared to the NASA annoyance criteria, and the overall noise spectra were compared to MIL-STD-1294 ('Acoustical Noise Limits in Helicopters'). Specific vibration components at blade passage frequencies for several aircraft exceeded both the ISO reduced comfort boundary and the NASA passenger discomfort criteria. The 'A' weighted noise levels, corrected for SPH-4 helmet attenuation characteristics, exceeded the NASA annoyance threshold for several aircraft.
DE- *Aircraft noise; *Ear protectors; *Helicopters; *Human tolerances; *Noise measurement; *Noise reduction; *Vibration; Computer techniques; Data acquisition; Flight tests; Graphs (Charts); Time series analysis
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1062725
AA- <NTIS> AD-A132 498/7
TI- Helicopter In-Flight Monitoring System Second Generation (HIMS II)
TI- <NOTE> Final rept. Jan 81-Jul 83
AU- Jones, H. D. ; Lewis, J. A. ; Higdon, A. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-83-13
CN- 1E162777A878; AF
PY- Aug 83
PG- 51p
NT- See also AD-745 118.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8326
CP- United States
AB- This report presents a description of a computerized airborne data acquisition system used to measure pilot performance in a UH-1 helicopter. The unit can record approximately 20 aircraft parameters in addition to other experimental data. This report can also serve as an operator's manual for the system.
DE- *Performance(Human); *Digital recording systems; *Helicopters; Data acquisition; Response; Pilots; Attitude indicators; Airspeed indicators ; Ground position indicators; Altimeters; Analog to digital converters; Computers; Airborne; Monitoring; Instruction manuals; User manuals; User needs
ID- Inflight data; Airborne data acquisition; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1061322
AA- <NTIS> N83-30400/6
TI- Report from the International Congress of Navigation
AU- Arnzen, S. ; Skarman, E.
CS- Foersvarets Forskningsanstalt, Stockholm (Sweden).
CS- <CODE> 063330000; RR628060
SP- National Aeronautics and Space Administration, Washington, DC.
RN- FOA-C-20489-E3; ISSN-0347-3694
PY- 13 Apr 83
PG- 45p
NT- In Swedish; English Summary. Held at Paris, 21-24 Sep. 1982.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI8325; STAR2119
CP- Sweden
AB- Integrated navigation for sea and air applications was discussed. Sensor accuracy; laser gyroscopes; ship navigation processing system; MAN NAV with Decca; Das Azimuth; SAREL; DN Doppler; navigation for aircraft; DR integrated with Omega and with Loran; carrier aircraft inertial navigation, Kalman filter applications; integrated systems for helicopters; maritime data and control collision avoidance, safety at sea; and human factors were considered.
DE- *Air navigation; *Conferences; *Navigation aids; *Surface navigation; Collision avoidance; Decca navigation; Inertial navigation; Kalman filters; Omega navigation system; Safety factors
ID- *Foreign technology; NTISNASAE
SH- 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 1060140
AA- <NTIS> AD-P001 679/0
TI- Aircraft Icing Research at NASA
AU- Reinmann, J. J. ; Shaw, R. J. ; Olsen, W. A.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; 387544
PY- Jun 83
PG- 13p
NT- This article is from 'Proceedings of International Workshop on Atmospheric Icing of Structures (1st) Held at Hanover, New Hampshire on 1-3 June 1982,' AD-A131 869. p103-115.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8325
CP- United States
AB- This paper briefly describes the new research activity in: ice protection systems, icing instrumentation, experimental methods, analytical modeling for the above, and in flight research. The renewed interest in aircraft icing has come about because of the new need for All-Weather Helicopter s and General Aviation aircraft. Because of increased fuel costs, tomorrow's Commercial Transport aircraft will also require new types of ice protection systems and better estimates of the aeropenalties caused by ice on unprotected surfaces.
DE- *Deicing systems; *Deicing materials; *Aircraft; *Helicopters; Ice; Ice breakup; Structures; Water; Drops; Freezing; Surface analysis; Protective treatments; Protective coatings; Research management; Test methods; Workshops
ID- Component reports; Ice accretion; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 48H (Natural Resources and Earth Sciences--Snow, Ice, and Permafrost)

AZ- 1057971
AA- <NTIS> AD-P001 643/6
TI- Helicopter Integrated Controller Research
AU- Dunbar, S. L.
CS- San Jose State Univ., CA.
CS- <CODE> 050166000; 314900
PY- Jan 83
PG- 8p
NT- This article is from 'Proceedings of the Annual Conference on Manual Control (18th) Held at Dayton, Ohio on 8-10 June 1982,' AD-A131 256. p466-473.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8324
CP- United States
AB- The proposed research will examine the use of an integrated controller for the primary flight control of a helicopter. The primary controls of pitch, roll, and yaw will be integrated into a single, side-stick controller. Two types of integrated controllers will be studied: 1) an isotonic (displacement) controller; and 2) an isometric (force) controller. The two integrated control configurations will be compared to the conventional arrangement via performance on a 3-axis compensatory tracking task. RMS error will provide the dependent measure. (Author)
DE- *Control sticks; Integrated systems; Helicopters; Man machine systems;

Tracking; Optimization; Test methods; Compensation; Flight control systems; Displacement; Loads(Forces)
ID- Side stick controllers; Compensatory tracking; Component reports; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1057964
AA- <NTIS> AD-P001 636/0
TI- Helicopter Pilot Response Latency as a Function of the Spatial Arrangement of Instruments and Controls
AU- Hartzell, E. J. ; Dunbar, S. L. ; Beveridge, R. ; Cortilla, R.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; 388090
PY- Jan 83
PG- 20p
NT- This article is from 'Proceedings of the Annual Conference on Manual Control (18th) Held at Dayton, Ohio on 8-10 June 1982,' AD-A131 256. p345-364.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8324
CP- United States
AB- This study addresses the question of the spatial arrangement of helicopter instruments and controls in terms of stimulus-response compatibility. The results indicate that in airspeed and altitude adjustment tasks the compatible placement of controls and displayed information may result in a significant time savings and reduced workload and therefore increased mission performance. Fitts' Law is used as a dependent measure to assess the performance of subjects in a discrete manual control task.
DE- *Man machine systems; *Flight control systems; Flight instruments; Spatial distribution; Instrument panels; Position(Location); Performance tests; Response; Display systems; Manual operation; Pilots; Helicopters; Compatibility; Reaction time; Delay; Error analysis
ID- Manual control systems; Human response; Job difficulty; Fitts law; Component reports; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1057963
AA- <NTIS> AD-P001 635/2
TI- Instrument Position-Control Manipulation (IPCOM II): Helicopter Pilot Response as a Function of Control-Display Compatibility
AU- Craig, K. M.
CS- San Jose State Univ., CA.
CS- <CODE> 050166000; 314900
PY- Jan 83
PG- 9p
NT- This article is from 'Proceedings of the Annual Conference on Manual Control (18th) Held at Dayton, Ohio on 8-10 June 1982,' AD-A131 256. p336-344.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8324
CP- United States
AB- The proposed research will examine differences in reaction time and task completion measures as a function of control-display configuration in a helicopter cockpit environment. The two configurations to be compared are ipsilateral and contralateral, with the ipsilateral configuration defined as one having each control (cyclic/velocity; collective/altitude) and its corresponding instrument placed on the same side. The contralateral, conventional helicopter configuration, is the converse. Simultaneous manipulation of altitude and velocity controls will be required. Fitts' law will be used to provide levels of task difficulty. (Author)
DE- *Man machine systems; *Flight control systems; Display systems; Helicopters; Pilots; Workload; Response; Reaction time; Manual operation; Multiple operation; Flight instruments; Position(Location); Optimization; Human factors engineering; Compatibility; Spatial distribution; Motor reactions
ID- IPCOM(Instrument Position Control Manipulation); Job difficulty; Human response; Pedals; Fitts law; Component reports; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1057954
AA- <NTIS> AD-P001 626/1
TI- Optimal Control Model Analysis of Data from a Simulated Hover Task
AU- Baron, S.
CS- Bolt Beranek and Newman, Inc., Cambridge, MA.
CS- <CODE> 004246000; 060100
PY- Jan 83
PG- 21p
NT- This article is from 'Proceedings of the Annual Conference on Manual Control (18th) Held at Dayton, Ohio on 8-10 June 1982,' AD-A131 256. p186-206.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8324
CP- United States
AB- Development of engineering requirements for man-in-the-loop simulation is a complex task involving numerous trade-offs between simulation fidelity and costs, accuracy and speed, etc. The principal issues confronting the developer of a simulation involve the design of the cue (motion and visual) environment so as to meet simulation objectives, and the design of the digital simulation model to fulfill real-time requirements with adequate accuracy. In specifying the cue environment the designer must establish the need for particular cues as well as the requisite fidelity for their presentation. These choices are important because the validity and utility of the resulting simulation can be critically dependent upon them and because the decisions involve major costs of the simulation. Unfortunately, these decisions are difficult to arrive at rationally, inasmuch as they depend on complex psychological as well as engineering factors. This paper describes the application of the multi-cue OCM to the analysis of data obtained in a previous study of simulated helicopter hover. The experiment was designed to examine the effects on hover control of motion cues (as provided by a motion platform or g-seat) and of delays in the generation of visual cues. The simulated task corresponded to maintaining a helicopter in a high hover relative to a ship moving at 15 knots.
DE- *Flight simulation; *Cues(Stimuli); Motion; Real time; Optimization; Man machine systems; Hovering; Helicopters; Ship motion; Trade off analysis; Cost effectiveness; Flight control systems; Manual operation; Visual perception; Performance(Human); Mathematical prediction
ID- OCM(Optimal Control Models); Manual control systems; Fidelity; Component reports; NTISDODXA
SH- 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1051780
AA- <NTIS> AD-A130 685/1
TI- Development of Passive Diver Thermal Protection System
TI- <NOTE> Technical memo
AU- Lippitt, M. W. ; Nuckols, M. L.
CS- Naval Coastal Systems Center, Panama City, FL.
CS- <CODE> 059679000; 410650
RN- NCSC-TM-378-83
CN- S0394SL
PY- May 83
PG- 65p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8323
CP- United States
AB- The development of the US Navy Passive Diver Thermal Protection system, designed to satisfy a majority of the air mode thermal protection requirements of fleet diving activities in cold water, is described. The requirements, the evolution of system design, the development and test of the various prototypes, and the system operational and performance evaluations are discussed. The final system demonstrated its ability to maintain a resting diver within acceptable thermal limits for 6 hours in 4.5 degrees C water. The protection system allows sufficient mobility to allow the diver to engage in typical special warfare activities such as helicopter cast and recovery, parachuting, boat cast and recovery, and long surface and underwater swims.
DE- *Diving suits; *Thermal insulation; *Cold regions; Diver equipment; Military operations; Performance(Engineering); Protective clothing; Passive systems; Operational effectiveness; Field tests
ID- Cold water; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1051145
AA- <NTIS> PB83-869800
TI- Head Up Displays. 1975-July, 1983 (Citations from the International Aerospace Abstracts Data Base)
TI- <NOTE> Rept. for 1975-Jul 83
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 83
PG- 191p
NT- Supersedes PB83-853457. Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8322
CP- United States
AB- This bibliography contains citations concerning the design, fabrication and applications of head up displays (HUDS). Applications include military aircraft, helicopters, space shuttle and commercial aircraft. Functions of the display include instrument approach, target tracking and navigation. The head up display provides for an integrated avionics system with the pilot in the loop. (This updated bibliography contains 196 citations, 20 of which are new entries to the previous edition.)
DE- *Bibliographies; *Display devices
ID- *Head up displays; NTISNTIST; NTISNERACD
SH- 49E* (Electrotechnology--Optoelectronic Devices and Systems); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1049162
AA- <NTIS> AD-A130 279/3
TI- Impact and Vibration Testing of a Modified UH-1 Crew Seat
TI- <NOTE> Final rept
AU- Shanahan, D. F. ; Haley, J. L. ; Johnson, J. C. ; Wells, J. H. ; Knoche, H.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-83-10
CN- 3E162777/A878; AD
PY- Jun 83
PG- 85p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8322
CP- United States
AB- The German Air Force has developed a modified UH-1 pilot seat designed to improve comfort by increasing support to the thigh and lower back, providing better vibration dampening and increasing cold weather comfort. This seat was tested for vibration dampening, pilot acceptance, and impact tolerance in a side-by-side test with the standard UH-1 seat. The modified seat is more comfortable than the standard UH-1 seat. The modified seat provides better impact protection than the standard seat, provided that the seat frame and restraint system do not tear loose. The modified seat does not provide better vibration dampening than the standard UH-1 seat. (Author)
DE- *Pilot seats; *Human factors engineering; Vibration; Impact; Fatigue(Physiology); Pain; Pads(Cushions); Retrofitting; Test methods; Aircraft equipment; Helicopters
ID- UH-1 aircraft; Lower back pain; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1049115
AA- <NTIS> AD-A130 231/4
TI- Preliminay Investigation of Variation in Some Dark Adaptation Aspects fo Possible Relevance to Military Helicopter Aircrew
TI- <NOTE> Technical rept
AU- Donaldson, E.
CS- Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
CS- <CODE> 067994000; 009850
RN- AFAMRL-TR-83-053
CN- 7184; 11
PY- Jun 83
PG- 91p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8322
CP- United States
AB- The variability in night visual capacity of military aircrew may be relevant to task selection especially for the low level night operation of the light observation helicopter. The experimental objective was to assess the extent of variation in threshold for spatial frequencies and in the time to recovery of dark adaptation after a standard light exposure simulating a flare illumination. The subjects were eleven volunteers, five of whom were aircrew. After assessment of their distant visual acuity, the subjects were dark adapted for a period of thirty minutes. The level of adaptation was measured with an adaptometer which had the capability of presenting the stimulus at several spatial frequencies. A brief exposure to the simulated flare illumination was immediately followed by assessment of the effect on dark adaptation and time for recovery. Considerable variation was demonstrated in the rate and threshold levels of dark adaptation for light and for resolution of several spatial frequencies. Following the simulated flare exposure of 0.8 mL for 90 seconds, most subjects attained a threshold level for light within 30 seconds and there was no evidence of a recovery effect in the curves of the threshold luminance for resolution of a 6.25 cycles per degree grating. Marked differences in the threshold levels and in the spread of the subjects' estimations were clearly evident.
DE- *Dark adaptation; Military personnel; Flight crews; Helicopters; Night vision; Visual acuity; Measurement; Threshold effects; Illumination; Light; Luminance
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1049093
AA- <NTIS> AD-A130 209/0
TI- Forecast of Army Aviation Training Research and Development Requirements for the Period 1985-2000. Volume 2. Appendices
TI- <NOTE> Final draft rept. 9 Jan 80-31 Jul 81
AU- Lenz, R. C. ; Chen, K. L. ; Skerl, J. A. ; Newman, R. L. ; Anderson, L. A.
CS- Dayton Univ., OH. Research Inst.
CS- <CODE> 007431003; 105400
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
RN- UDR-TR-81-10-VOL-2; ARI-RN-82-29-VOL-2
CN- MDA903-80-C-0229; 2Q763743A765
PY- Aug 81
PG- 269p
NT- See also Rept. no. ARI-TR-565.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A01
JA- GRAI8322
CP- United States
AB- This research note presents the results of a survey designed to identify U.S. Army aviation system and subsystem acquisitions projected for the time period of 1985 to 2000 which will require behavioral research to support development of new aircrew training methods and equipment. Survey results are presented in questionnaire format, as they were originally obtained, together with information on scoring model weighting, and a complete listing of the bibliographical references. This research is intended to assist the Army in identifying behavioral research requirements for future Army aviation aircrew training before the new aviation systems and subsystems are introduced. The lead time provided the early initiation of behavioral research programs should aid the development of effective training systems. Requirements for the behavioral research needed to support Army aviation training programs in the time frame 1985 to 2000 are described in this report. This document presents an integrated and future-oriented review of U.S, Army aviation training R&D needs. (Author)
DE- *Army aviation; *Flight crews; *Flight training; *Behavioral science; *Research management; Performance(Human); Attitudes(Psychology); Adjustment(Psychology); Surveys; Scoring; Training devices; Flight simulators; Display systems; Cockpits; Computerized simulation; Systems engineering; Combat readiness; Helicopters; Army research; Technology forecasting; Human factors engineering; Man machine systems; Questionnaires
ID- Aircrew training; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1048381
AA- <NTIS> PB83-224857

TI- Research Facilities Center Annual Report: Fiscal Year 1982
CS- National Oceanic and Atmospheric Administration, Miami, FL. Research Facilities Center.
CS- <CODE> 031711009
RN- NOAA-83062702
PY- Apr 83
PG- 34p
NT- See also P83-112946.
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LA- English
PC- PC A03/MF A01
JA- GRAI8321
CP- United States
AB- This annual report describes the resources and accomplishments of the Research Facilities Center (RFC) during Fiscal Year (FY) 1982. The RFC is one of the member laboratories of the Environmental Research Laboratories (ERL) of the National Oceanic and Atmospheric Administration(NOAA), U.S. Department of Commerce. It provides instrumented aircraft support to research programs from ERL, NOAA and other agencies and organizations. Its unique capability is the operation of large, complex state of the art instrumentation systems for long duration missions under all weather conditions including severe weather and hurricane penetrations.
DE- *Research aircraft; *Meteorological data; Project planning; Helicopters ; Weather; Hazards; Detectors; Instrumentation
ID- State of the art; NTISCOMNOA
SH- 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 51GE (Aeronautics and Aerodynamics--General)

AZ- 1044490
AA- <NTIS> AD-P001 158/5
TI- Pilot Model Determination Using Parameter Identification Methods on Hovering VTOL Flight Data
AU- Andrisani, D. ; Bourne, S. M. ; Gau, C. F.
CS- Purdue Univ., Lafayette, IN. School of Aeronautics and Astronautics.
CS- <CODE> 009058139; 291850
PY- May 82
PG- 24p
NT- This article is from 'Proceedings of the Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics' Held at Edwards AFB, California on 19-21 January 1982, AD-A129 333.
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LA- English
PC- PC A02/MF A01
JA- GRAI8320
CP- United States
AB- This paper presents highly intriguing preliminary results concerning the mathematical model of human pilots hovering over a moving landing pad in an X-22A VTOL aircraft. The results are in the form of a time domain mathematical model which was determined from transient responses of the X-22A. The pilot, using both a head-up-display for landing pad position information and the outside visual scene for attitude information, was asked to precisely hover over a simulated landing pad which would move in semi-random step-like jumps. Since the X-22A (with its translation rate control system) was also driven by simulated ship wake turbulence and natural turbulence, the pilot's task was to track step inputs while correcting for random disturbances.
DE- *Pilots; *Workload; *Performance(Human); *Mathematical models; Vertical takeoff aircraft; Flight control systems; Display systems; Job analysis ; Configuration management; Optimization; Data acquisition; Systems analysis; Model theory; Mathematical prediction
ID- Component reports; Flying qualities; X-22A VTOL; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1044489
AA- <NTIS> AD-P001 157/7
TI- Development of a Pilot Model for Helicopter Visual Flight Task Segments
AU- Phatak, A. V. ; Karmali, M. S. ; Hartzell, E. J.
CS- Analytical Mechanics Associates, Inc., Mountain View, CA.
CS- <CODE> 030966000; 413735
CN- DAAK51-81-C-0004
PY- May 82
PG- 25p
NT- This article is from 'Proceedings of the Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics' Held at Edwards AFB, California on 19-21 January 1982, AD-A129 333.
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email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8320
CP- United States
AB- This paper addresses the problems associated with developing an analytical representation for the human pilot in helicopter visual flight task segments. A two-level hierarchical model structure with elements corresponding to the autonomous information processing and control tasks and higher level decision-making functions is proposed. The utility of this modeling framework for understanding or interpreting pilot response behavior is discussed with reference to the visual approach to a hover task. An information-theoretic approach for rank ordering the visual cues according to information content is developed, and applied to the austere helipad scenario.
DE- *Pilots; Workload; Performance(Human); Job analysis; Helicopters; Models; Information processing; Control systems; Decision making; Missions; Human factors engineering; Closed loop systems; Visual perception; Cues(Stimuli); Matrices(Mathematics)
ID- Component reports; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1044459
AA- <NTIS> AD-P001 127/0
TI- Workload Requirements of the Helicopter Antisubmarine Warfare Mission
AU- Cosgrove, M. A.
CS- Air Force Flight Test Center, Edwards AFB, CA.
CS- <CODE> 000544000; 012100
PY- May 82
PG- 3p
NT- This article is from 'Proceedings of the Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics' Held at Edwards AFB, California on 19-21 January 1982, AD-A129 333.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8320
CP- United States
AB- The pilot workload in the helicopter Antisubmarine Warfare (ASW) environment is unique is many aspects, particularly when coupled to the harsh environment of at-sea night operations. This report will primarily address the tasks involved in piloting the Navy's SH-3H helicopter.
DE- *Pilots; *Naval personnel; *Flight crews; *Workload; Helicopters; Mission profiles; Scenarios; Performance(Human); Night flight; Fatigue(Physiology); Man machine systems; Human factors engineering; Job analysis; Decision making
ID- Component reports; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1044458
AA- <NTIS> AD-P001 126/2
TI- Army Workload Research and Development Requirements
AU- Dunn, R. S.
CS- Army Research and Technology Labs., Moffett Field, CA.
CS- <CODE> 041432000; 410540
PY- May 82
PG- 6p
NT- This article is from 'Proceedings of the Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics' Held at Edwards AFB, California on 19-21 January 1982, AD-A129 333.
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LA- English
PC- PC A02/MF A01
JA- GRAI8320
CP- United States
AB- This article presents a discussion of the principle current Army requirement for research and methodology development in pilot and aircrew workload measurement. Emphasis is given to the shifting impact of operator task demands and to the utility value of workload methodology in guiding design and development activities. The discussion focuses on requirements which are especially acute in the system acquisition process involving development of new helicopter crew stations. Conclusions and opinions offered by the writer suggest both a conceptual orientation and a general approach to meeting the

requirements. (Author)
DE- *Pilots; *Army personnel; *Flight crews; *Workload; *Measurement; Research management; Methodology; Performance(Human); Behavior; Variables; Applied psychology; Systems analysis; Man machine systems; Human factors engineering; Experimental design
ID- Component reports; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 1044004
AA- <NTIS> AD-A129 371/1
TI- Effects on Computer Recognition of Speech When Speaking through Protective Masks
TI- <NOTE> Final rept
AU- Malkin, F. J.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-7-83
PY- May 83
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8320
CP- United States
AB- The purpose of this experiment was to investigate the effects on computer recognition of speech when speaking through aviator protective masks as compared to the standard boom-mounted microphone. Twelve Army aviators were tested with a 50-word vocabulary under three conditions: no mask (boom-mounted microphone), M24 aviator protective mask which has an internally mounted microphone, and the XM33 developmental aviator protective mask which has an externally mounted microphone. The conclusions were (1) of the two masks designs, the M24 mask with the internally mounted microphone provided better results with the speech recognition system and (2) although there was no significant difference in performance between the boom-mounted microphone and the protective masks, there was an indication of inconsistent performance obtained with the boom-mounted microphone which was not clearly understood and warrants further investigation.
DE- *Computer applications; *Speech recognition; *Protective masks; *Speech; Pilots; Human factors engineering; Man computer interface; Artificial intelligence; Microphones; Voice communications; Speech transmission; Accuracy; Test methods; Errors; Performance(Engineering); Attack helicopters
ID- NTISDODXA
SH- 45F (Communication--Verbal)

AZ- 1037731
AA- <NTIS> PB83-101618
TI- Foreign Technology Alert Bibliography: Aircraft Technology
TI- <NOTE> Final rept. Jan 80-May 82
AU- Wilkinson, G.
CS- Infocom, Crawley (England).
CS- <CODE> 076891000
RN- INFO-FT/82-07
PY- c1982
PG- 122p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC$25.00/MF$25.00
JA- GRAI8317
CP- Tajikistan
AB- This document provides a systematically organised collection of abstracts from the NTIS bibliographic data base relating to fixed wing and rotary wing aircraft technology, but only describing work originating from countries outside the USA. A tailored search of the data base was performed and the output carefully categorized, edited and indexed. The reports range widely in content and encompass all principal aspects of civil and military aviation. Much of the technology originates from Western Europe, particularly the United Kingdom, France and West Germany. Many reports from AGARD are included. Other important sources of documents are Australia, Canada, Italy, Japan, the Netherlands, and Sweden. Most reports are in their native language, but some translations are available, all titles are annotated accordingly. Contents: Fixed wing aircraft(Aircraft design, Aerodynamics, Structures and materials, Aeronautical engineering, Engines, Aircraft control technology, Instrumentation, Flight evaluation, Aviation safety), Rotary wing aircraft(Aerodynamics and design, Airframes and engines, Fatigue evaluation, Enviromental

engineering, Flight control systems, Instrumentation, Airworthiness and safety, Towing applications.) About 90 percent of the records relate to fixed wing aircraft and the headings in this section are further sub-divided. Each of the 46 sections in the book is cross-referenced, there is also an author index and useful subject index based on major descriptors.
DE- *Aircraft; *Bibliographies; Aerodynamics; Airframes; Commercial aircraft; Helicopters; Military aircraft
ID- *Foreign technology; NTISTFNTI
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1037558
AA- <NTIS> N83-23241/3
TI- Helicopter Technology Benefits and Needs. Volume 2: Appendices
AU- Zuk, J. ; Adams, R. J.
CS- Systems Control, Inc., (VT), West Palm Beach, FL.
CS- <CODE> 055072000; S9210091
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166470-V-2; NASA-CR-166470-V-2
CN- NAS2-10411
PY- Jul 80
PG- 53p
NT- Presented at Public Service Helicopter Users' Workshop, Moffett Field, Calif., 14-16 Jul. 1980.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A04/MF A01
JA- GRAI8317; STAR2112
CP- United States
AB- Vehicle design, avionics and flight systems; safety and reliability; navigation, guidance and flight control; propulsion; auxiliary systems; human factors; and monitoring and diagnostic systems are the technology areas involved in solving operational and technical problems related to the use of helicopters. Tables show the problems encountered and the proposed research and technology for helicopter use for search and rescue; emergency medical services; law enforcement; environmental control; fire fighting; and resource management.
DE- *Aeronautical engineering; *Conferences; *Helicopter performance; *Operational problems; Aircraft safety; Avionics; Flight control; Helicopter control; Human factors engineering; Propulsion system configurations
ID- NTISNASA
SH- 85A (Transportation--Air Transportation)

AZ- 1037557
AA- <NTIS> N83-23240/5
TI- Helicopter Technology Benefits and Needs. Volume 1: Summary
AU- Zuk, J. ; Adams, R. J.
CS- Systems Control, Inc., (VT), West Palm Beach, FL.
CS- <CODE> 055072000; S9210091
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:166469-V-1; NASA-CR-166469-V-1
CN- NAS2-10411
PY- Jul 80
PG- 34p
NT- Presented at Public Service Helicopter Users' Workshop, Moffett Field, Calif., 14-16 Jul. 1980.
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LA- English
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI8317; STAR2112
CP- United States
AB- Present public service helicopter benefits and the potential benefits of an advanced public service rotorcraft (200 knots to 300 knots) are summarized. Past and future public service growth is quantified and assessed and needs, problem areas, and desired vehicle characteristics are defined. Research and technology recommendations are formulated and the costs and benefits of research options are assessed.
DE- *Aeronautical engineering; *Conferences; *Helicopter performance; *Operational problems; Aircraft safety; Avionics; Flight control; Helicopter control; Human factors engineering; Propulsion system configurations
ID- NTISNASA
SH- 85A (Transportation--Air Transportation)

AZ- 1037338
AA- <NTIS> N83-22091/3

TI- Simulation of a Weather Radar Display for over-Water Airborne Radar Approaches
AU- Clary, G. R.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84315; A-9185; NASA-TM-84315
PY- Feb 83
PG- 29p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8317; STAR2112
CP- United States
AB- Airborne radar approach (ARA) concepts are being investigated as a part of NASA's Rotorcraft All-Weather Operations Research Program on advanced guidance and navigation methods. This research is being conducted using both piloted simulations and flight test evaluations. For the piloted simulations, a mathematical model of the airborne radar was developed for over-water ARAs to offshore platforms. This simulated flight scenario requires radar simulation of point targets, such as oil rigs and ships, distributed sea clutter, and transponder beacon replies. Radar theory, weather radar characteristics, and empirical data derived from in-flight radar photographs are combined to model a civil weather/mapping radar typical of those used in offshore rotorcraft operations. The resulting radar simulation is realistic and provides the needed simulation capability for ongoing ARA research.
DE- *Airborne radar approach; *Meteorological radar; *Ocean surface; *Radar imagery; *Radarscopes; *Simulation; Clutter; Helicopters; Mathematical models; Offshore platforms; Radar antennas; Radar targets; Reflection; Transponders
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 49E (Electrotechnology--Optoelectronic Devices and Systems); 63H (Detection and Countermeasures--Radiofrequency Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1036236
AA- <NTIS> AD-A127 911/6
TI- Qualification Test Report for 450 Gallon Crashworthy Fuel Tank for U.S. Air Force H-53 Helicopter. Volume V
AU- Lyman, R. R. ; Patnode, C. A. ; Crumbaker, J. O.
CS- Fiber Science, Inc., Salt Lake City, UT.
CS- <CODE> 071925000; 412003
RN- QTR-2191-001-VOL-5
CN- F09603-79-C-1642
PY- 2 Apr 82
PG- 166p
NT- See also Volume 6, AD-A127 912.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8317
CP- United States
AB- The filament wound, crashworthy 450 gallon H53 external fuel tank was subjected to a series of qualification tests to verify the design. The tests described within the report include physical measurements, pressure, slosh & virbation, static load, vapor ignition, ballistic, fuel fire & crash impact.
DE- *Fuel tanks; *External stores; *Helicopters; Test and evaluation; Qualifications; Crashworthiness; Filament wound construction; Test methods; Fuels; Vapors; Ignition; Explosion effects; Firing tests(Ordnance); Visual inspection; Pressure; Instrumentation; Calibration; Fires; Test equipment; Lightning; Photographs
ID- H-53 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1036235
AA- <NTIS> AD-A127 910/8
TI- Qualification Test Report for 450 Gallon Crashworthy Fuel Tank for U.S. Air Force H-53 Helicopter. Volume IV
AU- Lyman, R. R. ; Patnode, C. A. ; Crumbaker, J. O.
CS- Fiber Science, Inc., Salt Lake City, UT.
CS- <CODE> 071925000; 412003
RN- QTR-2191-001-VOL-4
CN- F09603-79-C-1642
PY- 2 Apr 82
PG- 233p
NT- See also Volume 5, AD-A127 911.
NT- Microfiche copies only. Order this product from NTIS by: phone at

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LA- English
PC- MF A01
JA- GRAI8317
CP- United States
AB- See AD-A127 907 for abstract.
DE- *Fuel tanks; *External stores; *Helicopters; Test and evaluation; Qualifications; Crashworthiness; Filament wound construction; Test methods; Inspection; Test equipment; Instrumentation; Calibration; Contours; Engineering drawings; Visual inspection; Standards; Pressure; Capacity(Quantity); Vibration; Environmental tests; Low temperature; High temperature; Static loads; Static tests
ID- H-53 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1036233
AA- <NTIS> AD-A127 908/2
TI- Qualification Test Report for 450 Gallon Crashworthy Fuel Tank for U.S. Air Force H-53 Helicopter. Volume II
AU- Lyman, R. R. ; Patnode, C. A. ; Crumbaker, J. O.
CS- Fiber Science, Inc., Salt Lake City, UT.
CS- <CODE> 071925000; 412003
RN- QTR-2191-001-VOL-2
CN- F09603-79-C-1642
PY- 2 Apr 82
PG- 194p
NT- See also Volume 3, AD-A127 909.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8317
CP- United States
AB- See AD-A127 907 for abstract.
DE- *Fuel tanks; *External stores; *Helicopters; Test and evaluation; Qualifications; Test methods; Crashworthiness; Filament wound construction; Inspection; Requirements; Purity; Pressure; Test equipment; Composite materials; Plastics; Contours; Compatibility; Specifications; Instrumentation; Calibration; Center of gravity; Vibration
ID- H-53 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1035937
AA- <NTIS> AD-A127 611/2
TI- Integration Analysis: A Proposed Integration of Test and Evaluation Techniques for Early on Detection of Human Factors Engineering Discrepancies
TI- <NOTE> Master's thesis
AU- Carlson, D. L.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Mar 83
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A05/MF A01
JA- GRAI8317
CP- United States
AB- The objective of this thesis is to address the idea of implementing a viable T&E technique at the early stages of DT&E in order to reduce design discrepancies and minimize acquisition costs and time. This technique involves integration of Task Analysis, Operator Interviews and Link Analysis to evaluate a system's Functional Mock-up. The technique will, therefore, be referred to as Integration Analysis throughout the paper. In order to provide a measure of its contribution, it will be implemented on a recently procured system that experienced numerous HFE design discrepancies at its OT&E stage. The system in question, the Recovery Assist, Securing, and Traversing (RAST) System associated with the LAMPS MK III Acquisition, revealed HFE problems in relation to its LSO Control Station. The use of the subject technique could have discovered a majority of those problems much earlier in the Acquisition Process.
DE- *Human factors engineering; *Man machine systems; *Systems analysis; *Landing aids; *Flight decks; Test and evaluation; Test methods; Quality control; Acquisition; Cycles; Control systems; Consoles; Stations; Deck safety equipment; Safety; Helicopters; Launching; Recovery; Aircraft landings; Operators(Personnel); Interviewing;

Performance(Engineering); Theses
ID- RAST(Recovery Assist Securing and Transversing); LSO(Landing Safety Officer); LSO Control Station; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1028493
AA- <NTIS> AD-P000 674/2
TI- Helmet Mounted Display Symbology for Helicopter Landing on Small Ships
AU- Donley, S. T. ; Dukes, T. A.
CS- Naval Air Development Center, Warminster, PA.
CS- <CODE> 032381000; 245700
PY- 1981
PG- 25p
NT- This article is from 'Advanced Aircrew Display Symposium Proceedings (5th) Held at Patuxent, Maryland, 15-16 September 1981,' AD-A126 132.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8315
CP- United States
AB- Helmet Mounted Display symbology has been designed to aid in landing a specific helicopter, the SH-2F, on small ships, utilizing the NAVTOLAND Precision Landing Guidance System. A maximal display for single-pilot operation and a minimal display for two-pilot operation have been developed, both without head tracking. The maximal display provides all the necessary flight information in three modes for localizer acquisition, approach, and hover. Novel symbology is introduced for aiding the pilot in localizer acquisition under high wind conditions and for glide slope and localizer tracking during approach. The minimal display symbology relies on active participation by the co-pilot via verbal communication. In this display the presentation of the positioning information is based on the doppler Direction Velocity Indicator panel instrument format throughout approach and hover. (Author)
DE- *Helmet mounted displays; *Display systems; *Man machine systems; *Optical images; *Landing aids; *Symbols; Information processing; Aircraft landings; Glide slope; Human factors engineering; Formats; Configurations; Flight instruments; Instrument panels; Helicopters
ID- Head down displays; SH-2F aircraft; Workloads; Component reports; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 49E (Electrotechnology--Optoelectronic Devices and Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1028190
AA- <NTIS> AD-A126 132/0
TI- Advanced Aircrew Display Symposium Proceedings (5th) Held at Patuxent, Maryland, 15-16 September 1981
CS- Naval Air Test Center, Patuxent River, MD.
CS- <CODE> 019779000; 246750
PY- 1981
PG- 281p
NT- For sales information of individual items see AD-P000 665 - AD-P000 676. See also AD-A097 285.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A13/MF A01
JA- GRAI8315
CP- United States
AB- Contents include: (1) Human Engineering in Aircraft and System Design; (2) Color Selection and Verification Testing for Airborne Color CRT Displays; (3) The F/A-18 Today; (4) Systems Integration of Primary Flight Information; (5) Display Evaluation Flight Test; (6) Workload Assessment Device; (7) Flight Information Requirements for Monitoring an Automatic Landing; (8) Maneuvering Flight Path Display - An Update; (9) Application of Diffraction Optics Lantirn Head-Up Display; (10) Advanced Fighter Technology Integrator (AFTI) F-16 Display Mechanization; (11) Multicolor CRT Displays for Military Aircraft; (12) Helmet Mounted Display for Helicopter Landing on Small Ships; (13) Head-Up Display Operational Problems; and (14) 'Light Bar' Attitude Indicator.
DE- *Display systems; *Cockpits; *Symposia; *Man machine systems; Human factors engineering; Weapon system effectiveness; Flight paths; Maneuvers; Pilots; Optics; Holography; Head up displays; Cathode ray tube screens; Colors; Helmet mounted displays; Acceleration; Aerial gunnery; Tactical aircraft; Multisensors; Luminosity; Helicopters; Jet fighters

ID- Color display systems; F-16 aircraft; F/A-18 aircraft; SH-2F aircraft; 757 Aircraft; 767 Aircraft; Compilation reports; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1023563
AA- <NTIS> DE82005529
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. New Mexico-Fort Sumner NI 13-5 Quadrangle. Final Report
CS- Carson Helicopters, Inc., Parkasie, PA.
CS- <CODE> 070318000; 9511099
SP- Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2(NEWMEX-FORTSUMNER)
CN- AC13-76GJ01664
PY- Sep 81
PG- 200p
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LA- English
PC- MF A01
JA- GRAI8314; NSA0700
CP- United States
AB- The results of a high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the Fort Sumner, two degree quadrangle, New Mexico, are presented. Instrumentation and methods are described in Volume I of this final report. The work was done by Carson Helicopters Inc., and Carson Helicopters was assisted in the interpretation by International Exploration, Inc. The work was performed for the US Department of Energy - National Uranium Resource Evaluation (NURE) Program. A total of 139 statistically significant eU anomalies were identified in this quadrangle. Of this number 31 were considered to be of sufficient intensity to warrant field investigations. Many of these anomalies appear to be wholly, or in part, associated with various Quarternary surficial deposits, Permian sediments (specifically the Fourmile Draw Member of the San Andreas Formation), and the area around Rough Mountain. (ERA citation 07:045856)
DE- *Uranium deposits; *New mexico; Aerial prospecting; Radiometric surveys ; Magnetic surveys; Statistical data
ID- ERDA/050200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 1022875
AA- <NTIS> AD-A125 501/7
TI- Evaluation of Engine Performance Assessment Procedures for the Lycoming T53 Engine as Installed in the Iroquois Helicopter
TI- <NOTE> Mechanical engineering note
AU- Glenny, D. E.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
RN- ARL/MECH-ENG NOTE-387
PY- Apr 81
PG- 49p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8314
CP- Australia
AB- Since the introduction of the Iroquois/Lycoming T53 helicopter into service with the US Forces and its subsequent use by the RAAF, the aircraft and, in particular, its engine have been subject to an exhaustive series of regular in-service tests to determine the installed power available and thus the aircraft performance capabilities. The Lycoming T53-L11/L13 engine, as with most other turboshaft engines, is fitted with a torque indicating system. The torque meter can be used in conjunction with other engine/aircraft instrumentation to assess engine performance on initial installation or during subsequent service life. A synopsis of the many engine performance assessment procedures used by various operators throughout the world is given.
DE- *Helicopter engines; *Turboshaft engines; *Performance(Engineering); Power levels; Power measurement; Performance tests; Monitoring; Torque; Indicators; Measuring instruments; Peak power; Pressure; Temperature; Specifications; Operational effectiveness
ID- *Foreign technology; Lycoming T53-L11 engines; Irquois helicopter; NTISDODXA
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines) ; 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1022486
AA- <NTIS> PB83-804278
TI- Search and Rescue Methods and Equipment. 1964-February 1983 (Citations from the NTIS Data Base)
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Mar 83
PG- 319p
NT- Supersedes PB82-801374 and PB80-812837.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8313
CP- United States
AB- Reports dealing with maritime and aviation search and rescue are presented. Studies are included on search and rescue planning, locating equipment, rescue beacons, communication devices, specialized aircraft and their components, and searching strategies. Underwater rescue and survival are excluded. (This updated bibliography contains 310 citations, 25 of which are new entries to the previous edition.)
DE- *Bibliographies; *Search and rescue; Air sea rescues; Rescue operations ; Rescue equipment; Searching; Detection; Radio beacons; Rescue beacons ; Crash locator beacons; Sea markers; Helicopters; Coast Guard; Aviation safety; Rescue systems; Computerized simulation; Communication satellites; Relay satellites; Transmitter receivers; Direction finding; Distress signals; Search radar; Downed aircraft; Survival kits; Loran; Omega navigation; Navigational aids; Crash rescue boats; Survival equipment; Life rafts
ID- Flying drift search tactics; Sprint drift search tactics; Sea loiter aircraft; Sea sitting aircraft; Loran C navigation systems; NTISNTISN
SH- 85GE* (Transportation--General); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1021398
AA- <NTIS> N83-18237/8
TI- NIr Research on Pilot Dynamics and Workload
AU- Vandegraaff, R. C.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-82002-U
PY- 11 Jan 82
PG- 17p
NT- Presented at Aiaa/Afftc/NASA Dryden Workshop on Flight Testing to Identify Pilot Workload and Pilot Dyn., Edwards AFB, Calif., Jan. 1982.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A07
JA- GRAI8313; STAR2108
CP- Netherlands
AB- Pilot performance and workload both in manual and monitoring tasks were studied. Human control behavior, task condition and control effort in terms of modern control theory, as well as the assessment of pilot workload by physiological parameters are described. It is indicated that the optimal control model structure provides a meaningful representation of pilot workload and dynamics in complex control tasks. The results of an in flight helicopter experiment reflect a good correlation between model results, performance and workload measures, measured system performance quantities, subjective effort ratings, and measures of heart rate and respiration. It is found that skin resistance measures are sensitive to uncertainty aspects of the task rather than to the performance aspects.
DE- *Heart rate; *Physiological factors; *Pilot performance; *Respiration; *Task complexity; *Workloads (Psychophysiology); Flight stress (Biology); Helicopter control; Human behavior; Performance prediction; Ratings
ID- *Foreign technology; NTISNASAE
SH- 92B (Behavior and Society--Psychology); 57W (Medicine and Biology--Stress Physiology)

AZ- 1021152
AA- <NTIS> N83-17531/5
TI- Control Model for Maneuvering Flight for Application to a Computer Flight Testing Program
AU- Haverdings, H.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790

SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-81046-U
PY- 31 Jul 81
PG- 18p
NT- Sponsored by Royal Netherlands Air Force Directorate of Material. Presented at 7TH European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Ger., 8-11 Sep. 1987.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8313; STAR2108
CP- Netherlands
AB- A computer-flight-testing (CFT) program for helicopters was developed to evaluate helicopter dynamics and handling and control qualities. The nonlinear 6 degrees of freedom helicopter model is driven by control inputs by a specially developed control model (or pseudo pilot). This is an adaptation of a linear optimal control model as used in human factor analysis. The helicopter model is based on two dimensional strip aerodynamics and steady-state rotor blade dynamics using only out-of-plane bending mode shapes, which are suitable for various types of rotor articulation. The pilot model consists of a flight path generation (FPG) model and a stabilization (STAB) model. The FPG model is based on linearized system dynamics using terminal optimal control, generating both the required flight path and the control inputs to achieve it. These controls are input into the helicopter model. The two flight paths are compared, and differences are fed back to the STAB model to generate corrective control inputs of such a nature that the helicopter-model-generated flight path tracks the required flight path generated by the FPG model. Also the STAB model is based on linearized system dynamics. As an example, two flare maneuvers are 'flown', and the results discussed. The pseudo-pilot model merforms well, provided that helicopter dynamics do not change much during a specific maneuver.

DE- *Controllability; *Dynamic models; *Flight simulation; *Helicopter control; *Maneuverability; Computerized simulation; Flight tests; Man machine systems; Optimal control
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 1018044
AA- <NTIS> AD-B035 688/1
TI- Methodology Investigation. Requirements for the Test and Evaluation of Direct-Fire Antiarmor Weapon Systems
TI- <NOTE> Final rept. Jan-Sep 77
AU- Brooks, W. E.
CS- Yuma Proving Ground, AZ.
CS- <CODE> 001052000; 383350
RN- YPG-338
PY- Aug 78
PG- 122p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8312
CP- United States
AB- This report provides the requirements for an instrumented firing range for the evaluation of direct-fire weapon systems. The requirements include two primary ranges, one with multiple firing conditions permitting stationary and moving firing against stationary and moving targets, and one range for stationary firing against fixed targets.
DE- *Antiarmor ammunition; *Antitank weapons; *Antivehicular weapons; *Ranges(Facilities); Aircraft guns; Attack helicopters; Antitank guns; Antitank ammunition; Fire control systems; Tanks(Combat vehicles); Test and evaluation; Military requirements; Human factors engineering
ID- LPN-USATECOM-Y-CO-RD6-YP1-007; S/L change 8224; NTISDODXD
SH- 79A (Ordnance--Ammunition, Explosives, and Pyrotechnics); 79G (Ordnance--Guns); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 1015326
AA- <NTIS> AD-P000 213/9
TI- TRIAD - An Approach to Embedded Simulation
AU- Cross, P.
CS- Rediffusion Simulation, Inc., Arlington, VA.
CS- <CODE> 077438000; 413267
PY- 1982
PG- 17p
NT- This article is from 'Proceedings of the 4th Interservice/Industry Training Equipment Conference, 16-18 November 1982. Volume I,' AD-A122

155.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8311
CP- United States
AB- The paper describes TRIAD, a prototype simulation complex developed for helicopter pilot training that incorporates embedded simulation principles. TRIAD comprises three major components; a computer/linkage/peripheral complex, an out-the-window CIG visual display system and a Bell 206 Helicopter, each integrated together to demonstrate the feasibility of embedded simulation for pilot training while maintaining certification on the aircraft configuration on the aircraft configuration. The total system is described and includes the technical approach, an assessment of achieved performance, cost summary and suitability for training applications. A description of the aircraft modifications is presented. The problems solved and lessons learned during this program are discussed together with an outline of future goals aimed at complete system simulation with minimum aircraft hardware adaptation.
DE- *Training devices; *Flight training; *Flight simulators; Operational effectiveness; Helicopters; Pilots; Display systems; Visual aids; Human factors engineering; Operators(Personnel); Computer aided instruction; Integrated systems
ID- Triad systems; Component reports; NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 1015300
AA- <NTIS> AD-P000 187/5
TI- The Feasibility of Employing an in-Cockpit Device to Provide Motion Cues to the Pilot of a Flight Simulator
AU- Cardullo, F. M. ; Butrimas, S. K.
CS- State Univ. of New York at Binghamton.
CS- <CODE> 047751000; 333220
PY- 1982
PG- 6p
NT- This article is from 'Proceedings of the 4th Interservice/Industry Training Equipment Conference, 16-18 November 1982. Volume I,' AD-A122 155.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8311
CP- United States
AB- A study was undertaken to investigate the feasibility of providing motion simulation with an in-cockpit device rather than an external motion platform. The conventional wisdom has deemed that it would not be feasible to provide the necessary stimulation of the vestibular apparatus because of insufficient excursion inherent in an in-cockpit device. This paper addresses that issue in light of recent research that begins to clarify this interrelationship between the visual and vestibular systems in the perception of motion. A novel approach is suggested which relies heavily on the coordination of the visual and vestibular systems. In addition, experimental protocols are suggested by which the approach can be verified. This study was originally performed for helicopter simulators but the technique is applicable to fighters as well and perhaps even to transport aircraft.
DE- *Human factors engineering; *Flight simulators; *Motion; *Cues(Stimuli) ; Pilots; Flight training; Space perception; Interfaces; Eye; Vestibular apparatus; Visual perception; Auditory perception; Man machine systems; Cockpits; Internal
ID- Component reports; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1014826
AA- <NTIS> AD-A123 814/6
TI- Impact Injury Caused by Linear Acceleration: Mechanisms, Prevention and Cost
TI- <NOTE> Conference proceedings
AU- Haley, J. L.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-322
PY- 1982
PG- 499p
NT- Presented at Aerospace Medical Panel Specialists' Meeting, Cologne, Germany, F.R., 26-29 Apr 82. Errata sheet inserted.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A21/MF A01
JA- GRAI8311
CP- France
AB- Problems dealing with impact injury caused by linear acceleration are covered. Papers cover spinal column injuries caused by gz (eyeballs down) impact, tensile (eyeballs up) loading of the spinal column, and lower leg injuries, as sustained by front seat occupants in automobile 'glance off' impacts at high speed. Head and neck injury mechanisms are discussed both from a physiological and neurological standpoint. Both helmeted and unhelmeted head impacts are analyzed, and helmet test and evaluation methods are covered. Several papers described accident/injury investigation methods, including a helicopter crash test with instrumented dummies aboard. Injury-preventing hardware is covered; papers include restraint harness slack, 'dynamic preload' of the restrained body, testing and evaluation of new shock-absorbing (stroking) helicopter seats, automotive air bag testing, and the use of a 'webbing tear' shock absorber on a helicopter crew chief's restraint harness. The validation of a spinal injury model and a more general kinematics (whole body) model are also discussed. Finally, the cost effectiveness of torso armor was discussed in two papers. The conclusions from this meeting will hopefully be applied for improved impact protection.
DE- *Wounds and injuries; *Stress(Physiology); *Impact acceleration; *Biodynamics; Impact; Tensile stress; Loads(Forces); High velocity; Protection; Spinal column; Head(Anatomy); Neck(Anatomy); Accident investigations; Test methods; Protective equipment; Prevention; Anatomical models; Cost effectiveness; Armor
ID- *Foreign technology; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 1013638
AA- <NTIS> N83-14078/0
TI- Nasa Lewis Research Center's Program on Icing Research
AU- Reinmann, J. J. ; Shaw, R. J. ; Olsen, W. A.
CS- National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
CS- <CODE> 019039001; ND315753
RN- NAS 1.15:83031; E-1469; NASA-TM-83031
PY- 1982
PG- 17p
NT- Proposed for Presentation at the 21ST Aerospace Sci. Conf., Reno, Nev., 10-13 Jan. 1983; Sponsored by Aiaa and Presented at the 1ST Intern. Workshop on Atmospheric Icing of Struct., Hanover, N.H., 1-3 Jun. 1982; Sponsored by Epri and the Army Cold Regions Research and Engineering Lab.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8310; STAR2105
CP- United States
AB- The helicopter and general aviation, light transport, and commercial transport aircraft share common icing requirements: highly effective, lightweight, low power consuming deicing systems, and detailed knowledge of the aeropenalties due to ice on aircraft surfaces. To meet current and future needs, NASA has a broadbased icing research program which covers both research and engineering applications, and is well coordinated with the FAA, DOD, universities, industry, and some foreign governments. Research activity in ice protection systems, icing instrumentation, experimental methods, analytical modeling, and in-flight research are described.
DE- *Deicers; *Flight hazards; *Flight tests; *Ice formation; *Ice prevention; *Nasa programs; Airfoils; Electromagnetic pulses; Glycols; Helicopter performance; Mathematical models; Measuring instruments; Scaling laws; Wind tunnels
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 1011269
AA- <NTIS> N83-13114/4
TI- The Effects of Pilot Stress Factors on Handling Quality Assessments During US/German Helicopter Agility Flight Tests
AU- Pausder, H. J. ; Gerdes, R. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84194; A-9084; NASA-TM-84194
PY- Oct 82

PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8309; STAR2104
CP- United States
AB- Flight tests were conducted with two helicopters to study and evaluate the effects of helicopter characteristics and pilot and task demands on performance in nap-of-the-Earth flight. Different, low-level slalom courses were set up and were flown by three pilots with different levels of flight experience. A pilot rating questionnaire was used to obtain redundant information and to gain more insight into factors that influence pilot ratings. The flight test setups and procedures are described, and the pilot ratings are summarized and interpreted in close connection with the analyzed test data. Pilot stress is discussed. The influence of demands on the pilot, of the helicopter characteristics, and of other stress factors are outlined with particular emphasis on how these factors affect handling-qualities assessment.
DE- *Controllability; *Flight stress (Biology); *Flight tests; *Helicopter performance; *Pilot performance; Data acquisition; International cooperation; Nasa programs; Stress (Psychology); Task complexity
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology)

AZ- 1011256
AA- <NTIS> N83-13098/9
TI- Introduction to Flight Test Instrumentation Design
AU- Abbink, F. J.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-81021-U
PY- 27 Apr 81
PG- 43p
NT- Presented at 4TH AGARD Special Course on Flight Test Instrumentation, Delft, Netherlands, May 1981.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8309; STAR2104
CP- Netherlands
AB- Developments in flight test instrumentation are reviewed and instrumentation design aspects are considered in relation to the overall cost of flight testing. The instrumentation and data processing required for determination of available electric power during instrument landing approaches, determination of operational limits for helicopter use on ships, flight testing the gyro gunsight of a fighter aircraft, and flight testing a civil transport aircraft prototype are described.
DE- *Flight test instruments; *Functional design specifications; *Systems engineering; Checkout; Costs; Data acquisition; Data processing; Digital systems; Flight tests; Magnetic recording; Photographic recording; Real time operation; User requirements
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1011241
AA- <NTIS> N83-13059/1
TI- Aeronautics Research and Technology Program and Specific Objectives
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NAS 1.15:85163; NASA-TM-85163
PY- 1981
PG- 189p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8309; STAR2104
CP- United States
AB- Aeronautics research and technology program objectives in fluid and thermal physics, materials and structures, controls and guidance, human factors, multidisciplinary activities, computer science and applications, propulsion, rotorcraft, high speed aircraft, subsonic aircraft, and rotorcraft and high speed aircraft systems technology are

addressed.
DE- *Aeronautical engineering; *Applications programs (Computers); *Ceramics; *Computer systems programs; *Flight control; *Fluid mechanics; *Guidance (Motion); *Human factors engineering; *Polymer physics; *Propulsion system configurations; *Propulsion system performance; *Rotary wing aircraft; *Structural analysis; *Supersonic aircraft; *Thermodynamics
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1009967
AA- <NTIS> AD-A123 098/6
TI- Measurements of the Attenuation of an Army Headset
TI- <NOTE> Technical memo
AU- Cogger, M. K. ; Wood, S. A.
CS- Royal Aircraft Establishment, Farnborough (England).
CS- <CODE> 013778000; 310450
SP- Defence Research Information Centre, Orpington (England).
RN- RAE-TM-FS-449; DRIC-BR-84535
PY- Jan 82
PG- 13p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8309
CP- United Kingdom
AB- Acoustic attenuation measurements have been made on a headset currently in use in British armoured military vehicles, which is reported to demonstrate good low-frequency noise attenuation. The results of the tests are reported and discussed with reference to the use of this form of earmuff assembly in a helicopter crew helment, since helicopter cabin noise is predominantly low-frequency in nature.
DE- *Helmets; *Protection; *Headgear; *Acoustic attenuation; Army equipment ; Aircraft noise; Armored vehicles; Helicopters; Noise reduction; Low frequencies; Noise generators; Flight crews; Measurement
ID- *Foreign technology; Muffs(Ear); Hearing protection; Cabin noise; Army headsets; Noise fields; Pink noise spectrum; NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 46A (Physics--Acoustics)

AZ- 1009426
AA- <NTIS> PB83-859033
TI- Military Helicopters. 1970-January, 1983 (Citations from the Engineering Index Data Base)
TI- <NOTE> Rept. for 1970-Jan 83
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jan 83
PG- 263p
NT- Supersedes PB82-867169.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8308
CP- United States
AB- This bibliography contains citations concerning military helicopters. Topics include helicopter airworthiness, design philosophy, airfoils, aerodynamics, rotor dynamics, operations and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, noise and vibration problems. (This updated bibliography contains 276 citations, 33 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; Military aircraft; Rotary wing aircraft; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- Gyroplanes; NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1007122
AA- <NTIS> DE82021711
TI- ASI/Pinson 1-KW High-Reliability Wind System. Phase II. Prototype Construction and Testing
AU- Noll, R. B. ; Drees, H. M.
CS- Atomics International Div., Golden, CO. Rocky Flats Plant.
CS- <CODE> 056115001; 9509480
SP- Aerospace Systems, Inc., Burlington, MA.; Pinson Energy Corp., Marstons

Mills, MA.; Department of Energy, Washington, DC.
RN- RFP-3301
CN- AC04-76DP03533
PY- Jul 81
PG- 159p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8308; NSA0700
CP- United States
AB- The approved design is a 15-ft vertical-axis turbine with three straight 8-ft blades controlled by a tilt-cam mechanism. The tilt-cam mechanism controls blade cyclic pitch amplitudes in a manner similar to a helicopter swash plate. The turbine rotor has a calculated power coefficient of 0.4 at an optimum tip speed ratio of approx. 3.0 which results in a rotational speed of 112 RPM in a 9 m/sec wind. The electrical system provides 1-kW of 24 V DC power in a 9 m/sec wind by means of a flux-switching alternator. The electronic circuitry, designed with high-reliability components, consists of a voltage regulator and a power rectifier. A dumpload circuit is provided as an option. Two transient protection networks are included, one on the tower for the alternator and the other to protect circuitry in the control building. Three prototypes were fabricated and extensive testing was conducted on the first unit. Prototype tests showed that the SWECS operated as designed although output at 20 MPH was slightly lower than 1-kW. A system power coefficient of 0.25 was obtained in initial tests. Design changes were made as a result of tests, the most noticeable change being the replacement of the approved vertical tail vane and horizontal wing with a V-vane configuration. Poor wind conditions precluded completion of acceptance testing. As a result, Rockwell performed controlled velocity tests (CVT) of the first prototype prior to field tests. Additional effort included instrumentation for the first prototype; design, fabrication and testing of equipment for manual installation; and preparation of an assembly, operation and maintenance manual. (ERA citation 07:061232)
DE- *Vertical axis turbines; Construction; Performance testing; Design; Manufacturing; Turbine blades; Mechanical transmissions; Control systems; Tilt mechanisms; Alternators; Lightning; Relays; Cost; Specifications
ID- ERDA/170602; NTISDE
SH- 97O (Energy--Miscellaneous Energy Conversion and Storage)

AZ- 1004884
AA- <NTIS> AD-A122 601/8
TI- USAF Bioenvironmental Noise Data Handbook. Volume 156. HH-1N In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Hille, H. K.
CS- Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
CS- <CODE> 067994000; 009850
RN- AMRL-TR-75-50-VOL-156
CN- 7231; 09
PY- Nov 82
PG- 15p
NT- See also Volume 1, AD-A031 865 and Volume 157, AD-A120 507.
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LA- English
PC- PC A02/MF A01
JA- GRAI8308
CP- United States
AB- The HH-IN is a USAF multi-purpose utility helicopter providing support for various USAF missions. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for two locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)
DE- *Handbooks; *Noise(Sound); *Aircraft noise; *Helicopters; *Aircraft engine noise; *Turboshaft engines; Inflight; Flight crews; Bioacoustics ; Sound pressure; Level(Quantity); Speech; Interference; Measurement; Exposure(Physiology); Experimental data; Tables(Data); Utility aircraft ; Multipurpose; Psychoacoustics
ID- *Bioenvironmental noise data; HH-in aircraft; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 1003395
AA- <NTIS> N83-11113/8
TI- An Optimal Control Model Approach to the Design of Compensators for Simulator Delay
TI- <NOTE> Final Report
AU- Baron, S. ; Lancraft, R. ; Caglayan, A.
CS- Bolt Beranek and Newman, Inc., Cambridge, MA.
CS- <CODE> 004246000; BS628995
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NAS 1.26:3604; BBN-5004; NASA-CR-3604
CN- NAS2-10907
PY- Oct 82
PG- 119p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8307; STAR2102
CP- United States
AB- The effects of display delay on pilot performance and workload and of the design of the filters to ameliorate these effects were investigated. The optimal control model for pilot/vehicle analysis was used both to determine the potential delay effects and to design the compensators. The model was applied to a simple roll tracking task and to a complex hover task. The results confirm that even small delays can degrade performance and impose a workload penalty. A time-domain compensator designed by using the optimal control model directly appears capable of providing extensive compensation for these effects even in multi-input, multi-output problems.
DE- *Compensators; *Delay; *Display devices; *Flight simulation; *Man machine systems; *Optimal control; *Pilot performance; Feedback control ; Hovering; Rotary wing aircraft; Tracking (Position); Workloads (Psychophysiology)
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1002118
AA- <NTIS> AD-A121 502/9
TI- Performance Impact of Current United States and United Kingdom Aircrew Chemical Defense Ensembles
TI- <NOTE> Final rept. 1 Jul 81-1 Jul 82
AU- Hamilton, B. E. ; Folds, D. ; Simmons, R. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-82-9
CN- 3E162777A879; BH
PY- Sep 82
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8307
CP- United States
AB- Six male volunteers from the graduating entry level flight program at the US Army Aviation Center (USAAVNC), Fort Rucker, Alabama, served as subjects in an investigation of the ability of helicopter pilots to fly while wearing chemical defense (CD) ensembles in hot weather. Each subject flew on three separate days, wearing a different ensemble each day. The ensembles tested were the United States Army Aircrew chemical defense ensemble, the United Kingdom aircrew chemical defense ensemble, and the United States Army standard flight suit uniform. While subjects made statistically larger heading errors while wearing the US chemical defense ensemble, no operationally significant differences in performance were seen. It was also concluded that a pilots's performance was not an indicator of heat stress.
DE- *Protective clothing; *Chemical warfare; *Pilots; *Performance(Human); Flight; Control; Helicopters; Hot weather; Heat stress(Physiology); Hoods; Protective masks; Flight clothing; Skills; Aviation safety; Human factors engineering; Army aviation
ID- NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 74D (Military Sciences--Chemical, Biological, and Radiological Warfare) ; 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 1001884
AA- <NTIS> AD-A120 597/0

TI- Preliminary Study on Scanning Techniques Used by U.S. Coast Guard Lookouts during Search and Rescue Missions
AU- Blackwell, N. J. ; Simmons, R. R. ; Watson, J. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-82-7
CN- 3E162777A879; 3E162773A819; BH; 00
PY- Aug 82
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8307
CP- United States
AB- This research was a cooperative study undertaken by the US Coast Guard Research and Development Center (USCG R&D) and the US Army Aeromedical Research Laboratory (USAARL). Eye performance data were collected from Coast Guard personnel performing as lookouts during simulated search and rescue missions on HH-3F helicopters, a 210-foot cutter, and an 82-foot cutter. Visual performance was measured by means of NAC Eye Mark Recorder systems during the Winter 1981 Visual Detection Experiment conducted by the USCG R&D Center in the Gulf of Mexico off of Panama City, Florida, during January and February, 1981. The visual performance measures were analyzed to determine the scanning patterns utilized by the various lookouts. Based upon this initial study, it appears that most personnel spend about one half of search time on only one segment of their total assigned viewing area. For example, pilots and copilots spend most of their time looking out their respective front windows. For the surface vessels, the subjects seemed to display the condition termed eye lock -- that is, a lookout would position his eyes and keep them stationary, allowing the movement of the search vessel to dictate his scan path. The scanner patterns prescribed in the US Coast Guard training manuals were used infrequently; rather the observers followed the outline of structures within their fields of view.
DE- *Scanning; *Vision; *Search and rescue; Coast Guard; Observers; Simulation; Performance(Human); Coast Guard ships; Coast Guard aircraft ; Helicopters; Pilots; Eye
ID- NTISDODXA
SH- 57S (Medicine and Biology--Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1001799
AA- <NTIS> AD-A120 501/2
TI- Comparison of Helicopter Copilot Workload While Using Three Navigation Systems during Nap-of-the-Earth Flight
TI- <NOTE> Final rept
AU- Cote, D. O. ; Simmons, R. R. ; Krueger, G. P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-82-8
CN- 3E162777A879; BH
PY- Aug 82
PG- 113p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8307
CP- United States
AB- Three different generic navigation systems were examined for their effects on helicopter copilot/navigator workload and performance during nap-of-the-earth (NOE) flight. The navigation systems examined were: (1) the conventional 1:50,000 scale topgraphic hand-held map, (2) a Doppler navigation system in conjunction with a hand-held map, and (3) a projected map system driven by Doppler signals in conjunction with a hand-held map. Eighteen pilots performed copilot/navigator duties in an Army JUH-1H utility helicopter flown by a laboratory research pilot. Data collected included measures of navigation performance, pilot-copilot communications, and copilot/navigator eye movements. The results indicate thatautomatic navigation systems like the ones used here improve navigation performance by enabling the aircrew to reach their destination with reduced in-flight delays, at a faster airspeed, and with fewer and smaller navigation errors. The number of verbal exchanges between the copilot and pilot was reduced when using the Doppler system versus the hand-held map alone. Subjects who used the Doppler also spent less time navigating. When using a projected map system, copilot/navigators experienced a lower level of visual workload and spent 10% more time looking outside the cockpit.
DE- *Work measurement; *Navigators; *Pilots; *Navigation; Helicopters; Performance(Human); Comparison; Flight; Doppler navigation; Army aircraft; Monitoring; Eye movements; Tracking; Vision; Measurement

ID- Nap of the Earth; JUH-1H aircraft; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 1000710
AA- <NTIS> N83-10050/3
TI- A Piloted Simulator Investigation of Stability and Control, Display and Crew-Loading Requirements for Helicopter Instrument Approach. Part 2: Supporting Data
AU- Lebacqz, J. V. ; Forrest, R. D. ; Gerdes, R. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84258-PT-2; A-9056-PT-2; NASA-TM-84258-PT-2
PY- Sep 82
PG- 120p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8306; STAR2101
CP- United States
AB- Pilot rating comments and standard deviation measures of flight performance and control use are presented.
DE- *Flight simulation; *Helicopter control; *Pilot performance; Aircraft stability; Avionics; Display devices; Flight tests; Helicopter performance; Instrument approach; Tables (Data)
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 1000709
AA- <NTIS> N83-10049/5
TI- A Piloted Simulator Investigation of Stability and Control, Display and Crew-Loading Requirements for Helicopter Instrument Approach. Part 1: Technical Discussion and Results
AU- Lebacqz, J. V. ; Forrest, R. D. ; Gerdes, R. M.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84258-PT-1; A-9056-PT-1; NASA-TM-84258-PT-1
PY- Sep 82
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8306; STAR2101
CP- United States
AB- A ground-simulation experiment was conducted to investigate the influence and interaction of flight-control system, fight-director display, and crew-loading situation on helicopter flying qualities during terminal area operations in instrument conditions. The experiment was conducted on the Flight Simulator for Advanced Aircraft at Ames Research Center. Six levels of control complexity, ranging from angular rate damping to velocity augmented longitudinal and vertical axes, were implemented on a representative helicopter model. The six levels of augmentation were examined with display variations consisting of raw elevation and azimuth data only, and of raw data plus one-, two-, and three-cue flight directors. Crew-loading situations simulated for the control-display combinations were dual-pilot operation (representative auxiliary tasks of navigation, communications, and decision-making). Four pilots performed a total of 150 evaluations of combinations of these parameters for a representative microwave landing system (MLS) approach task.
DE- *Aircraft stability; *Display devices; *Flight simulation; *Helicopter control; *Instrument approach; *Pilot performance; Avionics; Flight tests; Helicopter performance
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0999345
AA- <NTIS> AD-A121 956/7
TI- Psychological Effects of Chemical Defense Ensemble Imposed Heat Stress on Army Aviators
TI- <NOTE> Final rept
AU- Hamilton, B. E. ; Simmons, R. R. ; Kimball, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-83-6

CN- 3E62777A879
PY- Nov 82
PG- 34p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8306
CP- United States
AB- Psychological testing was conducted with six Army aviators before and after flights in a UH-1H helicopter while wearing standard flight suits, US or UK aircrew chemical defense ensembles. Additional testing on non-flight days was conducted to provide a baseline for evaluation. Tests consisted of encode/decode problems, math problems, logical reasoning problems, target detection problems, and a four-choice reaction time test. Tests were scored for number of attempted, percent correct, reaction time of correct and incorrect responses. Self reports of mood were also taken and scored. The results of the study indicated that various levels of ensemble-imposed heat stress caused orderly changes in psychological function and extended the results of laboratory investigations to the aviation setting. In addition, reaction time data showed changes in the pilot's ability to deal with 'error' situations as a function of imposed heat stress and that self reports of mood were unreliable indicators of severe heat stress. (Author)
DE- *Heat stress(Physiology); *Flight clothing; *Protective clothing; Pilots; Army personnel; Psychological tests; Performance tests; Helicopters; Inflight; Monitoring; Performance(Human); Errors; Reasoning; Target recognition; Reaction time; Chemical warfare
ID- UH-1H aircraft; NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology)

AZ- 0999158
AA- <NTIS> AD-A121 664/7
TI- The Effect of an Eye Movement Recorder on Head Movements
AU- Beach, A. J. ; Hill, M. W.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
RN- DCIEM-82-R-25
PY- Jul 82
PG- 10p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8306
CP- Canada
AB- The present study had two major objectives: (1) to detemrine whether the NAC Eye Mark system alters the normal pattern of subject head movement in a typical simulated helicopter piloting tasks; and (2) to obtain subjective evaluations from subjects while wearing the NAC eye mask concerning field of view, acuity, comfort and safety. Concerning the analysis technique, it was shown that the measurement of total movement of the subjects head could be reliably accomplished with the equipment and method used. The unmodified NAC eyepiece was found to cause significantly more head movement in IFR flight than a no mask condition. It was also demonstrated that an NAC mask with the lower horizontal section removed and semi-silvered lenses on both eyes did not differ significantly from the no mask condition in terms of head movements; in contrast, the unmodified Mark I mask was the preferred choice of the subjects since the eye pieces did not cause eye fatigue with the lighting conditions in the simulator. Subsequent work has shown that in actual flight conditions, the Mark II mask was preferred, since the increased light levels of actual flight alleviated the problem of eye fatigue.
DE- *Eye movements; *Recording systems; *Head(Anatomy); Motion; Humans; Pilots; Helicopters; Flight simulation; Test and evaluation
ID- *Foreign technology; NAC Eye Mark system; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0999104
AA- <NTIS> AD-A121 581/3
TI- Physiological Impact of Wearing Aircrew Chemical Defense Protective Ensembles While Flying the UH-1H in Hot Weather
TI- <NOTE> Final rept. Nov 80-Aug 82
AU- Knox, F. S. ; Nagel, G. A. ; Hamilton, B. E. ; Olazabal, R. P. ; Kimball, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; 404578
RN- USAARL-83-4
CN- 3E162777A878; AF
PY- Oct 82
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8306
CP- United States
AB- Six recent graduates of initial entry rotary wing training flew a UH-1H for up to 4 hours while wearing each of three clothing ensembles. Each aviator wore the standard flight suit, the US chemical defense (CD) ensemble, and the United Kingdom CD ensemble in hot weather (mean WBGT 29 C). Skin temperatures (chest, thigh, upper arm and calf), rectal temperature, heart rate, and preflight and postflight body weights were recorded. Three of six aviators terminated flight for medical reasons (heart rates > 140 bpm or nausea) while wearing the US ensemble. Well acclimatized aviators in this study who did not preflight and drank water every hour were able to fly for at least 2 hours (one fuel load) before the most susceptible subjects had to terminate flight due to heat stress. heart rate was the most susceptible subjects had to terminate flight due to heat stress. Heat rate was the most sensitive indicator of this stress. In this study, these susceptible subjects tended to be older and heavier. Although no measures of cardiopulmonary fitness (e.g., V sub 02 max) were made, it may be that these susceptible subjects were somewhat less fit. The US ensemble was somewhat more stressful than the UK or standard ensembles. Subjectively all subjects preferred the AR5 respirator to the M24 mask, were divided on overgarment vs undergarment, and most disliked the US overboots. As a caveat it should be stated that fitness alone is not likely to be sufficient to overcome the heat stress induced by these ensembles as flight times are extended. Some sort of cooling will probably be needed. (Author)
DE- *Protective clothing; *Flight clothing; Physiological effects; Flight crews; Chemical warfare; Helicopters; Heat stress(Physiology); Heart rate; Body temperature; Weight reduction; Hot weather; Flight
ID- UH-1H aircraft; NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 74D (Military Sciences--Chemical, Biological, and Radiological Warfare) ; 57W (Medicine and Biology--Stress Physiology)

AZ- 0995280
AA- <NTIS> N82-34188/4
TI- Noise Measurement in Wind Tunnels, Workshop Summary
AU- Hickley, D. H. ; Williams, J.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NAS 1.15:84219; A-8843; NASA-TM-84219
PY- Sep 82
PG- 36p
NT- Workshop on Aeroacoustics Tunnel Testing Techniques Held at Moffett Field, Calif., Mar. 1979.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8304; STAR2024
CP- United States
AB- In reviewing the progress made in acoustic measurements in wind tunnels ove the 5-yr span of the workshops, it is evident that a great deal of progress has occurred. Specialized facilities are now on line, special measurement techniques were developed, and corrections were devised and proven. This capability is in the process of creating a new and more correct data bank on acoustic phenomena, and represents a major step forward in acoustics technology. Additional work is still required, but now, rather than concentrating on facilities and techniques, researchers may more profitably concentrate on noise-source modeling, with the simulation of propulsor noise source (in flight) and of propulsor/airframe airflow characteristics. Promising developments in directional acoustic receivers and other discrimination/correlation techniques should now be regularly exploited, in part for model noise-source diagnosis, but also to expedite extraction of the lone source signal from any residual background noise and reverberation in the working chamber and from parasitic noise due to essential rigs or instrumentation inside the airstream.
DE- *Aeroacoustics; *Aircraft noise; *Engine noise; *Noise measurement; *Wind tunnels; Data bases; Engine airframe integration; Graphs (Charts) ; Helicopters; Shear layers; Wing nacelle configurations
ID- NTISNASA
SH- 46A (Physics--Acoustics); 51F (Aeronautics and Aerodynamics--Test

Facilities and Equipment)

AZ- 0994944
AA- <NTIS> AD-A120 791/9
TI- USAF Bioenvironmental Noise Data Handbook. Volume 155. CH-3 In-Flight Crew Noise
AU- Hille, H. K.
CS- Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
CS- <CODE> 067994000; 009850
RN- AMRL-TR-75-50-VOL-155
CN- 7231; 09
PY- Sep 82
PG- 18p
NT- See also Volume 1, AD-A031 865 and Volume 154, AD-A116 146.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8304
CP- United States
AB- The CH-3 is a USAF tactical combat transport helicopter. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this helicopter during normal flight operations. Data are reported for nine locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise levels and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, USAF Bioenvironmental Noise Data handbook, Vol 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.
DE- *Handbooks; *Noise(Sound); *Aircraft engine noise; *Helicopters; Transport aircraft; Bioacoustics; Psychoacoustics; Inflight; Flight crews; Sound pressure; Level(Quantity); Measurement; Speech; Interference; Exposure(Physiology)
ID- Bioenvironmental noise; CH-3 aircraft; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 57S (Medicine and Biology--Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0994919
AA- <NTIS> AD-A120 507/9
TI- USAF Bioenvironmental Noise Data Handbook. Volume 157. KC-10A In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Hille, H. K.
CS- Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
CS- <CODE> 067994000; 009850
RN- AMRL-TR-75-50-VOL-157
CN- 7231; 09
PY- Sep 82
PG- 18p
NT- See also Volume 158, AD-A116 930.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8304
CP- United States
AB- The KC-10A is a standard USAF tanker-transport aircraft with high-speed, high altitude refueling and long range transport capability. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this helicopter during normal flight operations. Data are reported for 24 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.
DE- *Handbooks; *Noise(Sound); *Aircraft noise; *Tanker aircraft; *Transport aircraft; Bioacoustics; Measurement; Flight crews; Psychoacoustics; Inflight; Sound pressure; Level(Quantity); Speech; Interference; Exposure(Physiology); Tables(Data)
ID- *Bioenvironmental Noise; KC-10A aircraft; NTISDODXA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 57S (Medicine and Biology--Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0994438
AA- <NTIS> PB83-112946
TI- Research Facilities Center Annual Report Fiscal Year 1981
CS- National Oceanic and Atmospheric Administration, Miami, FL. Research Facilities Center.
CS- <CODE> 031711009
RN- NOAA-82081901
PY- Jun 82
PG- 33p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8303
CP- United States
AB- The Research Facilities Center (RFC), a member of NOAA's Environmental Research Laboratories, provides instrumented aircraft in support of a variety of atmospheric/oceanic research programs initiated by NOAA elements and other government agencies. The aircraft and their associate research systems, the planning and execution of field programs, the collection of data and their validation, the calibration of the sensors, etc., represent the major efforts of the laboratory. The Scientific Instrumentation Group installs, modifies, operates and maintains the airborne research systems. Although the RFC is based in Miami, Florida, its research operations span the globe.
DE- *Research aircraft; *Meteorological data; Detectors; Instrumentation; Project planning; Helicopters; Flight plans; Operations; Florida
ID- NTISCOMNOA
SH- 55GE (Atmospheric Sciences--General); 51GE (Aeronautics and Aerodynamics--General)

AZ- 0990319
AA- <NTIS> AD-A119 570/0
TI- Evaluation of Helicopter Pilot's Attitude Control Using a Simulated Head-Up Display in a Simulated Helicopter Cockpit
TI- <NOTE> Master's thesis
AU- Stichter, M. C.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> 019895000; 251450
PY- Jun 82
PG- 58p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Thesis
PC- PC A04/MF A01
JA- GRAI8302
CP- United States
AB- As demands on the aviator's aeronautical, technical, and tactical skills increase, so must the employment of advanced cockpit design concepts. Advanced systems make for a reduced crew workload and a safer, more proficient mission capable aircraft. Six designated helicopter pilots (Navy, Marine Corps and Army) were evaluated on their ability to fly a simulated instrument flight regime using only a head-up display as an attitude reference. Flight and control simulation was obtained through the construction of a generic helicopter cockpit, with dynamic gage indications generated by an analog computer. Two head-up display flights were flown with the display in the 12 o'clock and 2 o'clock positions. Their results were compared to an initial flight using cockpit instrumentation only. All three flights were identical profiles. Pilot performance was recorded graphically with strip charts and reduced into three performance zones. By averaging the percentage of time each pilot was in zone one, over each individual flight, it was shown that the average pilot's performance using the head-up display was within four to seven percentage points of their performance using only cockpit instrumentation. (Author)
DE- *Flight simulators; *Head up displays; *Attitude control systems; Helicopters; Cockpits; Pilots; Simulation; Performance(Human); Test and evaluation; Questionnaires; Theses
ID- NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 0987670
AA- <NTIS> AD-A118 942/2
TI- An Assessment of the Training Effectiveness of Device 2F64C for Training Helicopter Replacement Pilots
TI- <NOTE> Technical rept

AU- Browning, R. F. ; McDaniel, W. C. ; Scott, P. G. ; Smode, A. F.
CS- Training Analysis and Evaluation Group (Navy), Orlando, FL.
CS- <CODE> 055048000; 407626
RN- TAEG-TR-127
PY- Jul 82
PG- 155p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8301
CP- United States
AB- The effectiveness of flight simulators is heavily dependent on simulator utilization practices. This report presents the first of four planned assessments of the training effectiveness of Device 2F64C in training fleet replacement SH-3 helicopter pilots.
DE- *Training devices; *Flight simulators; Management planning and control; Pilots; Helicopters; Replacement; Human factors engineering; Operational effectiveness; Cockpits; Scenarios; Reliability; Test and evaluation; Maintenance; Economic analysis
ID- NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 0983253
AA- <NTIS> AD-A118 142/9/XAB
TI- Application of Coding Methods in Development of Symbology for a Computer-Generated Topographic Display for Army Aviators
TI- <NOTE> Interim technical rept. Aug 81-Feb 82
AU- McCallum, M. C. ; Rogers, S. P.
CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> 029731000; 405951
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- 459-2; USAAVRADCOM-81-0089-2
CN- DAAK80-81-C-0089
PY- Mar 82
PG- 130p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8225
CP- United States
AB- This report presents the results of a literature review conducted to identify previous research that could provide guidelines during the initial design of a new symbol system for topographic and tactical data display. Methods of symbol design based on ten dimensions of visual coding -- shape, alphanumeric, size, numerosity, inclination, brightness, color, flash rate, stereo depth, and apparent movement -- are identified and evaluated. The evaluation of alternative coding methods is based on three design-oriented criteria: amount of information conveyed, types of data coded, and aid to operator visual search. These criteria are considered in the review of research investigating both unidimensional and more complex multidimensional symbol systems. A model is presented which identifies the relationships between many factors and symbology system characteristics that ultimately affect the design of symbol systems. (Author)
DE- *Computer applications; *Symbolic programming; *Data displays; *Topography; *Army aviation; Tactical data systems; Pilots; Army personnel; Literature surveys; Visual perception; Avionics; Mapping; Flight instruments; Human factors engineering; Information systems; Interactive graphics; Man machine systems; Helicopters; Navigation; Symbols
ID- CGTD(Computer Generated Topographic Display); NOE(Nap of the Earth Flight); NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0983212
AA- <NTIS> AD-A118 101/5/XAB
TI- Importance of Topographic Features and Tactical Annotations on Maps Used by Army Aviators for Nap-of-the-Earth Flight
TI- <NOTE> Interim technical rept. Aug 81-Jan 82
AU- Rogers, S. P.
CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> 029731000; 405951
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- 459-1; USAAVRADCOM-81-0089-1
CN- DAAK80-81-C-0089
PY- Jan 82
PG- 51p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8225
CP- United States
AB- This report describes a survey conducted to assist in the definition of requirements for the display of topographic and tactical information for Army aviators. The introductory section of the report describes Army Aviation tasks, difficulties with map use in the performance of these tasks, and the solution of these difficulties through the development of a computer-generated topographic display system. The general objective of the reported project was to support the development of such a computer-based system through identification of the most important topographic and tactical features used in meeting Army aviation mission requirements. One hundred and seven Army aviators participated in the project, completing an extensive survey by rating the importance and frequency of use of specific features. The report presents a series of tables summarizing the results of the project including average importance ratings of each feature, and rankings of features by importance ratings. A discussion of the overall pattern of results is also provided. (Author)
DE- *Man computer interface; *Information systems; *Display systems; Cockpits; Data acquisition; Topographic maps; Mapping; Human factors engineering; Military requirements; Navigational aids; Army planning; Computer applications; Terrain following; Helicopters; Surveys; Questionnaires; Pilots; Methodology
ID- Nap of the earth; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 88B (Library and Information Sciences--Information Systems)

AZ- 0981235
AA- <NTIS> AD-A117 486/1/XAB
TI- Speech Command Auditory Display System (SCADS)
TI- <NOTE> Conference paper
AU- Voorhees, J. W. ; Marchionda, K. M. ; Atchison, V. L.
CS- Army Research and Technology Labs., Moffett Field, CA. Aeromechanics Lab.
CS- <CODE> 041432001; 393708
PY- 18 Jun 82
PG- 9p
NT- Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8224
CP- United States
AB- The missions of the helicopter, within both the military and the civil sector, have changed rather dramatically over the last 20 years. The military's experience is Southeast Asia during the 1960's demonstrated the wide range of missions that could be accomplished by rotary wing aircraft: fire fighting, heavy lift, and large scale medical evacuations, as well as tactical missions of troop transport and close air support. The post-Vietnam civilian uses for helicopters have duplicated several of the military missions, resulting in an added interest in helicopters in both the military and the civilian sectors. This increased interest has also led to rapid advances in rotorcraft technology. As helicopters have become much more capable, there has been an increasing sophistication in flight controls, power plant systems, and in cockpit displays. This combination of the increase of types of missions and the increase in cockpit sophistication has created a new set of problems. The limiting factor for many types of helicopter missions is now the pilot; and the limitation appears to be specifically related to information transfer. This information transfer is in the form of aircraft status information to the pilot, and information transfer from the pilot back to the aircraft in the form of control manipulations. (Author)
DE- *Cockpits; *Display systems; *Flight control systems; Human factors engineering; Pilots; Auditory signals; Integrated systems; Flight maneuvers; Low altitude; Head up displays; Helicopters; Test and evaluation
ID- SCADS(Speech Command Auditory Display Systems); Workloads; Nap of the Earth flight; Dials; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 0981220
AA- <NTIS> AD-A117 471/3/XAB
TI- Human Engineering Laboratory Aviation Supply Class III/V Materiel (HELAVS III/V) Field Test

TI- <NOTE> Conference paper
AU- Poston, A. M. ; Garrett, P. F. ; DeBellis, W. B. ; Reed, H. J. ; Garinther, J. M.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
PY- 18 Jun 82
PG- 15p
NT- Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8224
CP- United States
AB- The experimental objective was to obtain human performance data on helicopter refueling and rearming procedures. The data consisted of time measurements while refueling the helicopter and rearming the HELLFIRE missiles and 2.75-inch rockets. The experiment addressed the effects of crew size, day/night operations, and chemical/biological protective equipment on the refueling and rearming operations. A second objective was to develop test methodologies which could be applied to the Aviation Performance Assessment in a Chemical Environment (APACHE) field study. An additional objective was to evaluate the Division '86 Table of Organization and Equipment (TOE) staffing levels related to FARP operations. This data will assist the US Army Training and Doctrine Command in developing realistic TOEs for future attack helicopter units. It can be concluded that all three conditions evaluated did have an impact on rearming and refueling times. The crew-size change appears to have the most impact, followed by the day/night condition, and then the wearing of CB protective clothing.
DE- *Performance(Human); *Refueling; *Loading(Handling); *Aircraft ammunition; *Human factors engineering; Logistics support; Army operations; Forward areas; Crews; Manpower; Protective equipment; Day; Night; Replenishment; Weapons; Helicopters; Guided missiles; Rockets; Army training; Operational effectiveness
ID- NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0979095
AA- <NTIS> AD-A117 290/7/XAB
TI- Quantification of Helicopter Vibration Ride Quality Using Absorbed Power Measurements
TI- <NOTE> Conference paper
AU- Hollenbaugh, D. D.
CS- Army Research and Technology Labs., Fort Eustis, VA.
CS- <CODE> 055062000; 393742
PY- 18 Jun 82
PG- 18p
NT- Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8223
CP- United States
AB- The absorbed power concept offers certain advantages over pure acceleration for helicopter ride quality evaluation. First, it takes into account multi-frequency, multi-axial vibration across a broad frequency range. Second, it provides proper weighting functions for all frequencies and axes according to body response. Third, it is applicable to random as well as periodic accelerations. A larger data base and further experimentation is required for full validation of absorbed power as a means for quantifying helicopter vibration ride quality. Further in-flight data will be collected to expand the vibration/noise environment data base, repeating measurements on the aircraft mentioned here, and add further aircraft. Already underway is a program to take measurements on US Navy air craft types. Data have been recorded on a Sikorsky RH-53D and a Kaman SH-2F. The subjective response experiments will be continued for correlation and validation of the absorbed power and NASA Ride Comfort Model.
DE- *Helicopters; *Vibration; *Measurement; *Human factors engineering; Flight crews; Flight simulation; Test equipment; Test methods
ID- *Ride quality; *Absorbed power; Human response; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0977714
AA- <NTIS> N82-25266/9/XAB
TI- Conceptual Design Study for an Advanced Cab and Visual System, Volume 1

TI- <NOTE> Final Report
AU- Rue, R. J. ; Cyrus, M. L. ; Garnett, T. A. ; Nachbor, J. W. ; Seery, J. A.
CS- Boeing Military Airplane Co., Wichita, KS.
CS- <CODE> 071314800; BR805365
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166235; NAS 1.26:166235
CN- NAS2-10464
PY- Jul 80
PG- 116p
NT- Sponsored in Part by the Dept. Of the Army.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8222; STAR2016
CP- United States
AB- A conceptual design study was conducted to define requirements for an advanced cab and visual system. The rotorcraft system integration simulator is for engineering studies in the area of mission associated vehicle handling qualities. Principally a technology survey and assessment of existing and proposed simulator visual display systems, image generation systems, modular cab designs, and simulator control station designs were performed and are discussed. State of the art survey data were used to synthesize a set of preliminary visual display system concepts of which five candidate display configurations were selected for further evaluation. Basic display concepts incorporated in these configurations included: real image projection, using either periscopes, fiber optic bundles, or scanned laser optics; and virtual imaging with helmet mounted displays. These display concepts were integrated in the study with a simulator cab concept employing a modular base for aircraft controls, crew seating, and instrumentation (or other) displays. A simple concept to induce vibration in the various modules was developed and is described. Results of evaluations and trade offs related to the candidate system concepts are given, along with a suggested weighting scheme for numerically comparing visual system performance characteristics.
DE- *Aircraft control; *Display devices; *Rotary wing aircraft; *Visual flight; Fiber optics; Flight simulators; Laser applications; Periscopes

ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 92A (Behavior and Society--Job Training and Career Development)

AZ- 0973495
AA- <NTIS> N82-24197/7/XAB
TI- V/STOL Tilt Rotor Research Aircraft. Volume 4: Cfe Technical Data
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> 055558000; TV739419
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166350; NAS 1.26:166350
PY- 1 Oct 80
PG- 319p
NT- Sponsored by NASA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A01
JA- GRAI8221; STAR2015
CP- United States
AB- Manufacturer drawings and specifications for contractor furnished transducers and related equipment for the XV-15 aircraft research instrumentation and data acquisition system are given.
DE- *Aircraft instruments; *Data acquisition; *Drawings; *Equipment specifications; *Tilt rotor research aircraft program; *Xv-15 aircraft; Block diagrams; Coders; Electric connectors; Electronic transducers; Maintenance; Manuals; Voltage converters (Dc to dc)
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0973494
AA- <NTIS> N82-24196/9/XAB
TI- V/STOL Tilt Rotor Research Aircraft. Volume 3: Ship 2 Instrumentation
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> 055558000; TV739419
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166349; NAS 1.26:166349
PY- 11 Aug 78
PG- 579p

NT- Sponsored by NASA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A25/MF A01
JA- GRAI8221; STAR2015
CP- United States
AB- Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 2 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness, instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement data codes to J-box locations is given in a table. Cross references are given.
DE- *Aircraft instruments; *Data acquisition; *Tilt rotor research aircraft program; *Xv-15 aircraft; Calibrating; Communication cables; Electric connectors; Installing; Power lines; Tables (Data); Temperature measuring instruments; Wiring
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0973493
AA- <NTIS> N82-24195/1/XAB
TI- V/STOL Tilt Rotor Research Aircraft. Volume 2: Ship 1 Instrumentation
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> 055558000; TV739419
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166348; NAS 1.26:166348
PY- 11 Aug 78
PG- 456p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A20/MF A01
JA- GRAI8221; STAR2015
CP- United States
AB- Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 1 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement item codes to J-box locations is given in a table. Cross references are given.
DE- *Aircraft instruments; *Data acquisition; *Tilt rotor research aircraft program; *Xv-15 aircraft; Calibrating; Communication cables; Electric connectors; Installing; Manuals; Power lines; Tables (Data); Wiring
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0973492
AA- <NTIS> N82-24194/4/XAB
TI- V/STOL Tilt Rotor Research Aircraft. Volume 1: General Information, Revision C
AU- Kimbell, M. ; Whitener, A.
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> 055558000; TV739419
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166347; NAS 1.26:166347
CN- NAS2-7800
PY- 8 Aug 80
PG- 357p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A16/MF A01
JA- GRAI8221; STAR2015
CP- United States
AB- The configuration, operation and maintenance requirements for the contractor-furnished portion of the XV-15 research instrumentation and data acquisition system are defined. Descriptions of systems operation, maintenance and checkout procedures, and cable designations are given.
DE- *Aircraft instruments; *Data acquisition; *Tilt rotor research aircraft program; *Xv-15 aircraft; Block diagrams; Calibrating; Communication cables; Demultiplexing; Engine monitoring instruments; Loads (Forces); Maintenance; Manuals; Time division multiplexing; Torquemeters; Vibration measurement
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and

Aerodynamics--Avionics)

AZ- 0972179
AA- <NTIS> DE82011240/XAB
TI- Aerial Survey System for Sensing Low-Energy gamma-Ray Emitters in Weapon Materials
AU- Stuart T.P
CS- EG and G, Inc., Las Vegas, NV.
CS- <CODE> 010462000; 2309000
SP- Department of Energy, Washington, DC.
RN- EGG-1183-1815
CN- AC08-76NV01183
PY- Sep 72
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8221; NSA0000
CP- United States
AB- An airborne system was assembled to detect terrestrial distributions of Pu. The system consists of arrays of NaI gamma -ray detectors and recording electronics. Preliminary surveys of contaminated areas were conducted from a helicopter. Sensitivity is a few microcuries of Pu per square meter at normal helicopter survey rates of 1-1/2 mi exp 2 /h. Spatial resolution is approx. 120 ft. at a typical survey altitude of 100 ft.
DE- *Plutonium isotopes; *Nai detectors; *Survey monitors; Terrestrial ecosystems; Aerial monitoring; Gamma detection; Nuclear weapons; Gamma sources; Sensitivity; Spatial resolution; Electronic equipment; Recording systems
ID- ERDA/510300; ERDA/450202; ERDA/440101; ERDA/440300; NTISDE
SH- 77G (Nuclear Science and Technology--Radioactive Wastes and Radioactivity); 77E (Nuclear Science and Technology--Nuclear Instrumentation); 68F (Environmental Pollution and Control--Radiation Pollution and Control)

AZ- 0971142
AA- <NTIS> AD-A115 861/7/XAB
TI- Climatic Laboratory Evaluation YCH-47D Helicopter
TI- <NOTE> Final rept. 9 Sep-22 Oct 80
AU- Niemann, J. R. ; Adam, C. F. ; Brown, J. A.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-79-13
PY- Aug 81
PG- 222p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A10/MF A01
JA- GRAI8221
CP- United States
AB- The United States Army Aviation Engineering Flight Activity conducted a climatic laboratory evaluation of the Boeing Vertol YCH-47D helicopter. Approximately 17-1/2 hours of aircraft operating time and 22 test runs were required to complete the test. The YCH-47D systems, subsystems and components were evaluated at stabilized temperatures ranging from -65 F to +125 F. In some cases, inconclusive results were obtained at the colder temperatures because the test was conducted without rotor blades. The foremost of which are the apparent inability of the flight control hydraulic fluid to warm sufficiently for flight and the pilot's inability to neutralize the flight controls prior to engine start. The YCH-47D performed acceptably from -25 F to 125 F and exhibited potential for operation at a temperature of -50 F. Two deficiencies were identified: (1) failure of the engine control lever to control the engine during start because of excess moisture in the cockpit; and (2) the erratic operation of the hydraulic power transfer units at -50 F. A total of 14 shortcomings were also identified. Further engineering testing below -25 F with rotor blades installed is recommended to determine if the hydraulic fluid temperature can be increased and maintained in flight at a level that would provide satisfactory flight control response and to evaluate the use of MIL-H-5606 hydraulic fluid at the lower temperatures. The operator's manual should specify a minimum temperature for aircraft operation. (Author)
DE- *Helicopters; *Environmental tests; *Cold weather tests; *Hot weather; Auxiliary power plants; Helicopter engines; Flight control systems; Avionics; Hydraulic equipment; Fuel systems; Human factors engineering; Reliability; Maintainability; Test methods; Deficiencies; Climate; Simulation; Low temperature; High temperature
ID- YCH-47D aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0970918
AA- <NTIS> AD-A115 635/5/XAB
TI- Development of the Helicopter Crewman Jacket
TI- <NOTE> Final rept
AU- Lewyckyj, J. Z.
CS- Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> 032381022; 393532
RN- NADC-82122-60
PY- Jan 82
PG- 54p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8221
CP- United States
AB- This jacket, to be worn by Helicopter Mobile Crewmen or Helicopter passengers, provides for insulation and flotation to a wearer forced into cold water. It consists of an outer fire resistant aramid shell, a vest-like bladder attached to the shell and a layer of insulation. This bladder can be inflated thru a CO2 inflation device by a pull on a beaded handle. It can also be inflated orally. When inflated, the jacket will keep the wearer face-up in the water.
DE- *Jackets; *Flight clothing; Flight crews; Helicopters; Inflating; Floats; Experimental design; Specifications
ID- NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0969091
AA- <NTIS> AD-A115 435/0/XAB
TI- Aeronautical Systems Technology Needs: Escape, Rescue and Survival, Test Facilities and Test Equipment and Training/Simulation Equipment
TI- <NOTE> Annual rept. CY1982
AU- Moon, M. A.
CS- Aeronautical Systems Div., Wright-Patterson AFB, OH.
CS- <CODE> 000409000; 008800
RN- ASD-TR-82-5001
PY- Feb 82
PG- 88p
NT- Supersedes report dated Feb 81, AD-A097 827.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8220
CP- United States
AB- This report is a part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified in the Aeronautical Systems Division. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., (1) guidance for technology program, (2) prove developmental potential, and (3) engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. (Author)
DE- *Aeronautical engineering; *Life support systems; *Escape systems; Man machine systems; Survival(General); Emergencies; Protective equipment; Flight simulation; Training devices; Checkout procedures; Cockpits; Oxygen; Biomedicine; Flight crews; Ejection seats; Parachute canopies; Operators(Personnel); Helicopter hoists; Radar mapping; Ground stations ; Avionics; Electrooptics; Test equipment; Microprocessors
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 0968786
AA- <NTIS> AD-A115 127/3/XAB
TI- A Comparison of Display Formats for the Electronic Master Monitor and Advisory Display System
TI- <NOTE> Final rept
AU- Malkin, F. J. ; Fallesen, J. J. ; Reed, H. J.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-9-82
PY- Apr 82
PG- 31p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8220
CP- United States
AB- A comparison of two sets of display formats for the Electronic Master Monitor and Advisory Display System (EMMADS) was conducted to determine the effect display format has no performance. Performance measures included accuracy of response and latency of response to a display of a fault, as well as error on a subsidiary tracking task. A subjective questionnaire was used to determine if pilot preferences exist for display format. The results indicated that there were no significant differences in any performance measure due to the display formats but that there was a significant difference in reaction time among the subsystems. The subsystem with only three alternative faults had a significantly lower reaction time than the two other subsystems with eight and ten alternatives each. Pilot preference tended to favor those formats which were simple, uncluttered, and which appeared to be least busy.
DE- *Display systems; *Formats; *Helicopters; *Human factors engineering; Comparison; Response; Accuracy; Information processing; Pilots; Instrument panels; Cockpits; Integration; Terrain following; Reaction time; Performance(Engineering); Tracking
ID- EMMADS(Electronic Master Monitor and Advisory Display System); CH-47 aircraft; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0967270
AA- <NTIS> DE82006074/XAB
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. New Mexico-Roswell NI 13-8 Quadrangle. Final Report
CS- Carson Helicopters, Inc., Parkasie, PA.
CS- <CODE> 070318000; 9511099
SP- Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2(NEWMEX-ROSWELL)
CN- AC13-76GJ01664
PY- Sep 81
PG- 129p
NT- Includes 13 sheets of 48x reduction microfiche.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC E07/MF$5.60
JA- GRAI8219; NSA0000
CP- United States
AB- The results of a high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the Roswell two degree quadrangle, New Mexico are presented. Instrumentation and methods are described in Volume I of this final report. The work was done by Carson Helicopters, Inc., and Carson Helicopters was assisted in the interpretation by International Exploration, Inc. The work was performed for the US Department of Energy - National Uranium Resource Evaluation (NURE) program. Analysis of this radiometric data yielded 238 statistically significant eU anomalies. Of this number, seventy-four were considered to be sufficient strength to warrant further investigation.
DE- *Uranium deposits; *New mexico; Aerial prospecting; Radiometric surveys ; Magnetic surveys; Statistical data
ID- ERDA/050200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0967106
AA- <NTIS> DE82005537/XAB
TI- NURE Aerial gamma-Ray and Magnetic-Reconnaissance Survey Portions of New Mexico, Arizona, and Texas. Volume I. Instrumentation and Data Reduction. Final Report
CS- Bendix Field Engineering Corp., Grand Junction, CO.
CS- <CODE> 056119000; 9502148
SP- Carson Helicopters, Inc., Perkasie, PA.; Department of Energy, Washington, DC.
RN- GJBX-412-81-V.1
CN- AC13-76GJ01664
PY- Sep 81
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8219; NSA0000
CP- United States

AB- As part of the Department of Energy (DOE) National Uranium Resource Evaluation Program, a rotary-wing high sensitivity radiometric and magnetic survey was flown covering portions of the State of New Mexico, Arizona and Texas. The survey encompassed six 1:250,000 scale quadrangles, Holbrook, El Paso, Las Cruces, Carlsbad, Fort Sumner and Roswell. The survey was flown with a Sikorsky S58T helicopter equipped with a high sensitivity gamma ray spectrometer which was calibrated at the DOE calibration facilities at Walker Field in Grand Junction, Colorado, and the Dynamic Test Range at Lake Mead, Arizona. The radiometric data were processed to compensate for Compton scattering effects and altitude variations. The data were normalized to 400 feet terrain clearance. The reduced data is presented in the form of stacked profiles, standard deviation anomaly plots, histogram plots and microfiche listings. The results of the geologic interpretation of the radiometric data together with the profiles, anomaly maps and histograms are presented in the individual quadrangle reports. The survey was awarded to LKB Resources, Inc. which completed the data acquisition. In April, 1980 Carson Helicopters, Inc. and Carson Geoscience Company agreed to manage the project and complete delivery of this final report.
DE- *Uranium deposits; *New mexico; *Arizona; Exploration; Aerial surveying ; Radiometric surveys; Magnetic surveys; Gamma spectroscopy; Geological surveys; Measuring instruments; Data acquisition
ID- ERDA/050200; ERDA/580100; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0967100
AA- <NTIS> DE82005530/XAB
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. Texas-New Mexico-El Paso NH 13-1 Quadrangle. Final Report
CS- Bendix Field Engineering Corp., Grand Junction, CO.
CS- <CODE> 056119000; 9502148
SP- Carson Helicopters, Inc., Perkasie, PA.; Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2F
CN- AC13-76GJ01664
PY- Sep 81
PG- 212p
NT- Includes 4 sheets of 48x reduction microfiche.
NT- Available in microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8219; NSA0000
CP- United States
AB- The results of a high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the El Paso, two degree quadrangle, New Mexico, are presented. Instrumentation and methods are described in Volume I of this final report. The work was done by Carson Helicopters Inc., and Carson Helicopters was assisted in the interpretation by International Exploration, Inc. The work was performed for the US Department of Energy - National Uranium Resource Evaluation (NURE) program. A total of 72 statistically significant eU anomalies were identified in this quadrangle. Of this number 20 were considered to be of sufficient intensity to warrant field investigations, however, many of these anomalies appear to be wholly, or in part, associated with various unconsolidated Quaternary deposits. Only three of the 20 can, with certainty be identified with bedrock; one with a Quaternary flow, one with Cambrian sandstone and one with a Precambrian granite.
DE- *New mexico; *Uranium deposits; Geophysical surveys; Aerial surveying; Radiometric surveys; Magnetic surveys; Gamma spectroscopy; Exploration; Uranium; Thorium; Potassium; Isotope ratio; Experimental data
ID- ERDA/050200; ERDA/580200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0967099
AA- <NTIS> DE82005528/XAB
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. New Mexico-Las Cruces NI 13-10 Quadrangle. Final Report
CS- Bendix Field Engineering Corp., Grand Junction, CO.
CS- <CODE> 056119000; 9502148
SP- Carson Helicopters, Inc., Perkasie, PA.; Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2D
CN- AC13-76GJ01664
PY- Sep 81
PG- 262p
NT- Includes 7 sheets of 48x reduction microfiche.
NT- Available in microfiche only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
PC- MF A01
JA- GRAI8219; NSA0000
CP- United States
AB- The results of a high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the Las Cruces two degree quadrangle, New Mexico, are presented. Instrumentation and methods are described in Volume 1 of this final report. The work was done by Carson Helicopters, Inc., and International Exploration, Inc. The work was performed for the US Department of Energy - National Uranium Resource Evaluation (NURE) program. Analysis of this radiometric data yielded 192 statistically significant eU anomalies. Of this number, thirty-nine were considered to be of sufficient strength to warrant further investigation.
DE- *New mexico; *Uranium deposits; Geophysical surveys; Aerial surveying; Radiometric surveys; Magnetic surveys; Gamma spectroscopy; Exploration; Potassium; Thorium; Uranium; Isotope ratio; Experimental data
ID- ERDA/050200; ERDA/580200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0967098
AA- <NTIS> DE82005527/XAB
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. New Mexico-Carlsbad NI 31-11 Quadrangle. Final Report
CS- Bendix Field Engineering Corp., Grand Junction, CO.
CS- <CODE> 056119000; 9502148
SP- Carson Helicopters, Inc., Perkasie, PA.; Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2C
CN- AC13-76GJ01664
PY- Sep 81
PG- 184p
NT- Includes 8 sheets of 48x reduction microfiche.
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF$4.60
JA- GRAI8219; NSA0000
CP- United States
AB- As part of the Department of Energy (DOE) Nation Uranium Resource Evaluation Program, a rotary-wing high sensitivity radiometric and magnetic survey was flown covering the Carlsbad Quadrangle of the State of New Mexico. The area surveyed consisted of approximately 1732 line miles. The survey was flown with a Sikorsky S58T helicopter equipped with a high sensitivity gamma ray spectrometer which was calibrated at the DOE calibration facilities at Walker Field in Grand Junction, Colorado, and the Dynamic Test Range at Lake Mead, Arizona. Instrumentation and data reduction methods are presented in Volume I of this report. The reduced data is presented in the form of stacked profiles, standard deviation anomaly plots, histogram plots and microfiche listings. The results of the geologic interpretation of the radiometric data together with the profiles, anomaly maps and histograms are presented in this Volume II final report.
DE- *New mexico; *Uranium deposits; Geophysical surveys; Exploration; Aerial surveying; Radiometric surveys; Magnetic surveys; Gamma spectroscopy; Maps; Uranium; Thorium; Potassium; Isotope ratio; Experimental data
ID- ERDA/050200; ERDA/580200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0967097
AA- <NTIS> DE82005526/XAB
TI- NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey of Portions of New Mexico, Arizona and Texas. Volume II. Arizona-Holbrook NI 12-5 Quadrangle. Final Report
CS- Bendix Field Engineering Corp., Grand Junction, CO.
CS- <CODE> 056119000; 9502148
SP- Carson Helicopters, Inc., Perkasie, PA.; Department of Energy, Washington, DC.
RN- GJBX-412-81-V.2E
CN- AC13-76GJ01664
PY- Sep 81
PG- 274p
NT- Includes 13 sheets of 48x reduction microfiche.
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF$5.80
JA- GRAI8219; NSA0000
CP- United States
AB- The results of a high-sensitivity, aerial gamma-ray spectrometer and

magnetometer survey of the Holbrook two degree quadrangle, Arizona are presented. Instrumentation and methods are described in Volume 1 of this final report. The work was done by Carson Helicopters, Inc., and Carson Helicopters was assisted in the interpretation by International Exploration, Inc. The work was performed for the US Department of Energy - National Uranium Resource Evaluation (NURE) program. Analysis of this radiometric data yielded 260 statistically significant eU anomalies. Of this number, forty-four were considered to be of sufficient strength to warrant further investigation. These preferred anomalies are separated into groups having some geologic aspect in common.
DE- *Arizona; *Uranium deposits; Geophysical surveys; Exploration; Aerial surveying; Gamma spectroscopy; Magnetic surveys; Radiometric surveys; Maps; Uranium; Thorium; Potassium; Isotope ratio; Experimental data
ID- ERDA/050200; ERDA/580200; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0965139
AA- <NTIS> N82-22260/5/XAB
TI- Controls and Displays for All-Weather Operation of Helicopters
AU- Vonreth, R. D.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
CS- <CODE> 064776001; MT620643
SP- National Aeronautics and Space Administration, Washington, DC.
RN- MBB-UD-319-81-O
PY- 3 Apr 81
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8218; STAR2013
CP- Germany, Federal Republic of
AB- Various mission requirements for all weather operations are reviewed. In particular some of the most important features for military applications are outlined. Some of the basic relations between increasing display sophistication and increasing control sophistication are discussed. Also the influence of various functions on the degree of control automation as it seems desirable for future systems under the aspect of man machine interaction are taken into consideration. The controls and displays arrangement of some representative helicopters of presently operational helicopters are described. An outline of the goals and results of some experimental and research programs is given. The characteristics of presently operational helicopters are compared with the technologically feasible solutions taking into account some of the economic constraints as initial cost, operational cost and reliability. In an outlook at the future some basic requirements for the controls and the displays operation are established.
DE- *All-weather air navigation; *Control boards; *Display devices; *Human factors engineering; *Military helicopters; Economic factors; Military operations
ID- *Foreign technology; NTISNASAE
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0965129
AA- <NTIS> N82-22250/6/XAB
TI- A Theory of Human Error
TI- <NOTE> Final Report
AU- Mcruer, D. T. ; Clement, W. F. ; Allen, R. W.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; S9710660
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166313; NAS 1.26:166313
CN- NAS2-10400
PY- May 80
PG- 91p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8218; STAR2013
CP- United States
AB- Human error, a significant contributing factor in a very high proportion of civil transport, general aviation, and rotorcraft accidents is investigated. Correction of the sources of human error requires that one attempt to reconstruct underlying and contributing causes of error from the circumstantial causes cited in official investigative reports. A validated analytical theory of the input-output behavior of human operators involving manual control, communication, supervisory, and monitoring tasks which are relevant to

aviation operations is presented. This theory of behavior, both appropriate and inappropriate, provides an insightful basis for investigating, classifying, and quantifying the needed cause-effect relationships governing propagation of human error.
DE- *Aircraft accidents; *Human behavior; *Human factors engineering; *Operators (Personnel); *Pilot error; Air navigation; Air traffic control; Aircraft safety; Decision making; Flight simulation; Man machine systems; Manual control
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85D (Transportation--Transportation Safety)

AZ- 0965128
AA- <NTIS> N82-22249/8/XAB
TI- Technical Approaches for Measurement of Human Errors
TI- <NOTE> Final Report
AU- Clement, W. F. ; Heffley, R. K. ; Jewell, W. F. ; Mcruer, D. T.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> 022912000; S9710660
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166314; NAS 1.26:166314
CN- NAS2-10400
PY- May 80
PG- 140p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8218; STAR2013
CP- United States
AB- Human error is a significant contributing factor in a very high proportion of civil transport, general aviation, and rotorcraft accidents. The technical details of a variety of proven approaches for the measurement of human errors in the context of the national airspace system are presented. Unobtrusive measurements suitable for cockpit operations and procedures in part of full mission simulation are emphasized. Procedure, system performance, and human operator centered measurements are discussed as they apply to the manual control, communication, supervisory, and monitoring tasks which are relevant to aviation operations.
DE- *Aircraft accidents; *Error analysis; *Human factors engineering; *Man machine systems; *Pilot performance; Aircraft safety; Flight simulation ; Human reactions; Psychomotor performance
ID- NTISNASA
SH- 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0963082
AA- <NTIS> PB82-867169/XAB
TI- Military Helicopters. 1970-June, 1982 (Citations from the Engineering Index Data Base)
TI- <NOTE> Rept. for 1970-Jun 82
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jun 82
PG- 233p
NT- Supersedes PB81-863896.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8217
CP- United States
AB- This bibliography contains citations concerning military helicopters. Topics include helicopter airworthiness, design philosophy, airfoils, aerodynamics, rotor dynamics, operations and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, noise and vibration problems. (This updated bibliography contains 243 citations, 43 of which are new entries to the previous edition.)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircraft
ID- Gyroplanes; NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0957465
AA- <NTIS> N82-19848/2/XAB
TI- Interactions Between Helmet Mounted Sight Display and Sensor Platform

under the Influence of a Human Pilot
AU- Danneberg, E. ; Kohnen, E. ; Stein, H. ; Stolzke, U.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
CS- <CODE> 029496000; DO696666
SP- National Aeronautics and Space Administration, Washington, DC.
RN- DFVLR-FB-81-30
PY- Jun 81
PG- 182p
NT- In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-746).
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
DT- Translation
PC- PC A09/MF A01
JA- GRAI8215; STAR2010
CP- Germany, Federal Republic of
AB- For low altitude flight of helicopters at night and with poor visibility, the interaction of a helmet mounted sight display (HMS/D), a moving sensor platform and a human pilot as system user was investigated by means of laboratory, moving simulator, and flight tests. The technical potential of the HMS/D in the laboratory, the tracking accuracy achieved by the pilot on the moving simulator, and the practical application under real flight conditions are considered. Considerable improvements are possible compared to head down displays if the layout of the instrument readings and their combination with an environmental picture are favorable.
DE- *Helicopter control; *Helmet mounted displays; *Low altitude; *Man machine systems; Flight characteristics; Flight conditions; Flight simulators; Flight tests; Low visibility
ID- *Foreign technology; Translations; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0957188
AA- <NTIS> N82-19216/2/XAB
TI- Design Study into a High Endurance Mini-Rotorcraft
TI- <NOTE> B.S. Thesis
AU- Beedell, D. A. E. ; Hendy, J. C.
CS- Bristol Univ. (England). Dept. of Aeronautical Engineering.
CS- <CODE> 004430008; BX274147
SP- National Aeronautics and Space Administration, Washington, DC.
RN- BU-265
PY- Jun 81
PG- 71p
NT- Original Contains Color Illustrations.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8215; STAR2010
CP- United Kingdom
AB- Competing models in a minirotorcraft competition for maximum endurance with an all up weight no greater than 5 kg, must fly above a height of 5 m within an area 10 m square are discussed. A design in which aerodynamics, stability and control, and mechanical and structural aspects are considered to obtain the size and angular velocity of the rotor for minimum power, while sufficient stability and control for a long flight are still inherent in the overall system is presented. Weights of individual components are also examined. It is found that a rotor mounted engine configuration, with rotor radius about 1.6 m and rotational velocity 4 to 5 revs/sec, with engines half way along the rotors and with Hiller control rotors, is the most promising design. The possible endurance is some 12 hr and hence pilot error and mechanical failure become deciding factors.
DE- *Aircraft models; *Helicopter design; *Rotary wing aircraft; *Rotor aerodynamics; Control stability; Design analysis; Durability; Hiller aircraft; Human factors engineering
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0957163
AA- <NTIS> N82-19173/5/XAB
TI- Nasa/Haa Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> 011249000; NC452981
RN- NASA-TM-84146
PY- 5 Dec 80
PG- 149p

NT- Workshop Held at Palo Alto, Calif., 2-5 Dec. 1980.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A07/MF A01
JA- GRAI8215; STAR2010
CP- United States
AB- Helicopter user needs, technology requirements and status, and proposed research and development action are summarized. It is divided into three sections: flight dynamics and control; all weather operations; and human factors.
DE- *Helicopter design; *Helicopter engines; *Helicopter performance; *Helicopters; *Short takeoff aircraft; *User requirements; Technology assessment; Conferences; Papers; Proceedings; Research; Rotary wing aircraft; Tilting rotors
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 0956036
AA- <NTIS> AD-A112 524/4/XAB
TI- The Shock and Vibration Bulletin. Part 2. Structural Analysis, Design Techniques
CS- Naval Research Lab., Washington, DC. Shock and Vibration Information Center.
CS- <CODE> 000927002; 389004
RN- BULL-43-PT-2
PY- Jun 73
PG- 336p
NT- Presented at the Symposium on Shock and Vibration (43rd) Held at Pacific Grove, CA on 5-7 Dec 72. See also Part 3, AD-A112 525 and Supplement 1, AD-923 949, Supplement 2, AD-532 167 and Supplement 3, AD-532 171.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A15/MF A01
JA- GRAI8215
CP- United States
AB- Partial Contents: Vibration Analysis of Structural Systems Using Virtual Substructures; Response Bounds for Structures with Incompletely Prescribed Loading; A Digital Computer Program for Aircraft Runway Roughness Studies; Gunfire-Induced Vibration on the A-7E Airplane; Stress Wave Measurement Technique; Maximization and Minimization of Dynamic Load Factors; Mathematical Model of a Typical Floating Shock Platform Subjected to Underwater Explosions; Detunning as a Mechanical Design Approach; The Reduction of Impact Induced Pressures in Fuel Tanks; and Criteria Development of JK-1 and JK-2 Cargo Restraint Systems.
DE- *Shock(Mechanics); *Vibration; *Symposia; Instrumentation; Structural response; Ground shock; Nuclear explosions; Mathematical models; Dynamic response; Elastic properties; Impact; Damping; Computerized simulation; Sandwich construction; Runways; Surface roughness; Transients; Aircraft guns; Gunfire; Dynamic loads; Helicopters; Noise reduction; Floating platforms; Vibration isolators; Naval research
ID- Virtual substructures; NTISDODXA
SH- 46E (Physics--Structural Mechanics)

AZ- 0952946
AA- <NTIS> PB82-970113/XAB
TI- Internal Light Reflections in Helicopter Canopies: A computer model of internal light reflections is experimentally verified
TI- <NOTE> NTIS Tech Note
CS- Army Materiel Development and Readiness Command, Alexandria, VA.
SP- Department of the Army, Washington, DC.
PY- Feb 82
PG- 1p
NT- For information about subscribing to Tech Notes, please write NTIS Subscription Dept. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- Subscription
JA- GRAI8213
CP- United States
AB- This citation summarizes a one-page announcement of technology available for utilization. A report of the U.S. Army Human Engineering Laboratory concerns the experimental verification of a computer model of internal light reflections in helicopter canopies. Also included are

appendixes on test data and the statistical analyses thereof, primary-order reflections, and the computer program for reflections....FOR ADDITIONAL INFORMATION: Detailed information about the technology described may be obtained by ordering the NTIS report, order number: AD-A080 473, price code: A04.
DE- *Helicopters; *Reflectance; *Windows
ID- *Human factors; *Computer applications; NTN/A; NTN/D; NTISNTND
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0951787
AA- <NTIS> N82-17871/6/XAB
TI- An Evaluation of Helicopter Noise and Vibration Ride Qualities Criteria
AU- Hammond, C. E. ; Hollenbaugh, D. D. ; Clevenson, S. A. ; Leatherwood, J. D.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NASA-TM-83251
PY- Dec 81
PG- 14p
NT- Prepared in cooperation with Army Research and Technology Lab., Fort Eustis, VA. Presented at the Technol. For the Jet Smooth Ride, a Natl. Specialists' Meeting on Helicopter Vibration, Hartford, Conn., 2-4 Nov. 1981; Sponsored by the American Helicopter Society.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8213; STAR2008
CP- United States
AB- Two methods of quantifying helicopter ride quality; absorbed power for vibration only and the NASA ride comfort model for both noise and vibration are discussed. Noise and vibration measurements were obtained on five operational US Army helicopters. The data were converted to both absorbed power and DISC's (discomfort units used in the NASA model) for specific helicopter flight conditions. Both models indicate considerable variation in ride quality between the five helicopters and between flight conditions within each helicopter.
DE- *Aircraft noise; *Comfort; *Criteria; *Helicopters; *Riding quality; *Vibration; Human factors engineering; Noise intensity; Noise measurement; Vibration measurement
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0949374
AA- <NTIS> N82-16042/5/XAB
TI- Predesign Study for a Modern 4-Bladed Rotor for the NASA Rotor Systems Research Aircraft
AU- Bishop, H. E. ; Burkam, J. E. ; Heminway, R. C. ; Keys, C. N. ; Smith, K. E.
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> 058114000; BR870123
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-166153
CN- NAS2-10689
PY- Jan 81
PG- 312p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A14/MF A01
JA- GRAI8212; STAR2007
CP- United States
AB- Trade-off study results and the rationale for the final selection of an existing modern four-bladed rotor system that can be adapted for installation on the Rotor Systems Research Aircraft (RSRA) are reported. The results of the detailed integration studies, parameter change studies, and instrumentation studies and the recommended plan for development and qualification of the rotor system is also given. Its parameter variants, integration on the RSRA, and support of ground and flight test programs are also discussed.
DE- *Aerodynamics; *Helicopter design; *Rotary wings; *Structural design criteria; *Tradeoffs; Aerodynamic coefficients; Aerodynamic loads; Economic factors; Flight tests; Ground tests; Structural analysis
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0948439
AA- <NTIS> AD-A951 594/1/XAB

TI- Airworthiness and Flight Characteristics Test (Limited). AH-1G Helicopter with the Southeast Asia Multisensor Armament System Helicopter (SMASH)
TI- <NOTE> Final rept
AU- Bender, G. L. ; Buss, M. W.
CS- Army Aviation Systems Test Activity, Edwards AFB, CA.
CS- <CODE> 002245000; 036470
PY- Oct 70
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8212
CP- United States
AB- No abstract available.
DE- *Helicopters; *Airworthiness; Human factors engineering; Handling; External stores; Cockpits; Flight control systems; Autorotation; Acceleration; Weapon systems; Rotary wing aircraft; Military requirements
ID- AH-16 aircraft; SMASH(Southeast Asia Multisensor Armament); U/A reports ; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0947816
AA- <NTIS> AD-A110 505/5/XAB
TI- Helicopter Night Vision System Simulation Evaluation
TI- <NOTE> Final rept. on phase 3
CS- Martin Marietta Aerospace, Orlando, FL.
CS- <CODE> 057180000; 403238
RN- OR-16551
CN- N62269-80-C-0346
PY- Dec 81
PG- 138p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8212
CP- United States
AB- Simulation experiments demonstrated the ability of the pilot and copilot to fly a night mission at low altitudes, ranging from 50 to 150 feet AGL, in a CH-53D simulation with the night visionics equipment package described previously. Phases I and II HNVS simulation studies indicated that enroute flight profiles over the simulator's rolling terrain can be accomplished at airspeeds ranging from 60 to 80 knots with clearance altitudes averaging 100 feet. This study was conducted with a revised terrain model with improved altitude feedback cues that produced higher clearance altitudes and somewhat lower airspeeds than the prior simulations. The actual speeds and altitudes will be verified in the planned HNVS flight tests. The simulation confirmed the minimum system requirement of a gimballed FLIR with a navigation system and with ancillary hardware such as a symbol generator. Although this experiment required no data be generated on dead reckoning versus navigation system requirements, both pilot performance and opinion data reiterated the reduced crew station workload with Doppler command steering information. Incorporation of the navigation capability of the Control Display Unit also was instrumental in further reducing the navigation workload.
DE- *Helicopters; *Night vision devices; *Forward looking infrared systems; Helmet mounted displays; Display systems; Flight simulators; Terrain following; Models; Mission profiles; Performance(Human); Pilots; Human factors engineering; Low altitude; High velocity; Flight paths; Airspeed; Data bases; Computer programming; Flight testing; Navigation
ID- CH-53D aircraft; HNVS(Helicopter Night Vision System); FLIR(Forward Looking Infrared Systems); PMDS(Panel Mounted Displays); Work loads; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection)

AZ- 0945454
AA- <NTIS> AD-A110 278/9/XAB
TI- Performance and Loads Data from a Wind Tunnel Test of a Full-Scale, Coaxial, Hingeless Rotor Helicopter
TI- <NOTE> Technical memo
AU- Felker, F. F.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; 388090
SP- National Aeronautics and Space Administration, Washington, DC.; Army

Aviation Research and Development Command, St. Louis, MO.
RN- NASA-A-8732; NASA-TM-81329; USAAVRADC-TR-81-A-27
PY- Oct 81
PG- 347p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A15/MF A01
JA- GRAI8211
CP- United States
AB- A test of a full-scale XH-59A Advancing Blade Concept Helicopter was conducted in Ames Research Center's 40- by 80-Foot Wind Tunnel. The helicopter was tested with the rotor on and off, rotor hub fairings on and off, inter-rotor shaft fairing on and off, rotor instrumentation module on and off, and auxiliary propulsion thrust on and off. The investigation was accomplished over an advance ratio range of 0.25 and 0.45 with the rotor on and from 60 to 180 knots with the rotor off. This report presents data on aerodynamic forces and moments, rotor loads, rotor control positions and vibration for the XH-59A as well as the aerodynamic performance of the isolated rotor. (author)
DE- *Helicopters; *Rotor blades(Rotary wings); Counterrotation; Aerodynamic loading; Aerodynamic forces; Control systems; Aerodynamic drag; Reduction; Fairings; Hubs; Propulsion systems; Thrust; Instrumentation; Wind tunnel tests
ID- XH-59A aircraft; Full scale; NTISDODXA; NTISNASA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0942919
AA- <NTIS> AD-A109 594/2/XAB
TI- Integration of Controls and Displays in U.S. Army Helicopter Cockpits
TI- <NOTE> Technical rept
AU- Dasaro, J. A. ; Elliott, C. T.
CS- Army Aviation Research and Development Command, St. Louis, MO.
CS- <CODE> 055057000; 410330
RN- USAAVRADC-TR-81-E-4
PY- Nov 81
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8210
CP- United States
AB- The U.S. Army has embarked on a digital avionic program with the immediate goal of developing an integrated avionic system which would eliminate all dedicated communication, navigation, and identification (CNI) control and display units (CDU's) from the cockpit. The CNI equipments were viewed as a well defined set whose control and display functions could be integrated at minimal risk. After in-house government experiments, which provided the expertise needed to prepare a functional specification, the Army made a major investment in cockpit integration hardware. This effort resulted in the AN/ASQ-166 Integrated Avionics Control System. The integrated CDU developed can be used to in-service or developmental aircraft to alleviate space problems, reduce pilot workload, and increase CNI capability. The next step was the initiation of an exploratory effort to determine to what extent the integration concepts used successfully in the CNI area could be applied to the remaining cockpit functions. A four-phase effort consisting of design, hardware fabrication, system integration, and testing was established. A cockpit was synthesized for the BLACK HAWK helicopter in which all crew functions were accomplished using multifunction interactive controls and displays. The results of this effort are presented, together with the status of the hardware currently in fabrication and the Army's plans for bench and flight testing. This exploratory effort is called the Army Digital Avionic System (ADAS).
DE- *Data displays; *Flight control systems; *Avionics; *Human factors engineering; Microprocessors; Multiplexing; Integration; Man machine systems; Helicopters; Flight crews; Work measurement; Input; Keyboards; Night flight; Aerial warfare; Terrain following
ID- Nap of the earth flight; Constraints; AN/ASQ-166; CNI(Communication Navigation and Intelligence); NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0942753
AA- <NTIS> AD-A109 427/5/XAB
TI- Sea King Flight Tests Pitot-Static Probe and Directional Vane Instrumentation
TI- <NOTE> Technical memo
AU- Hourigan, D. T. ; Williams, M. J.

CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
RN- ARL/AERO-TM-332
PY- Jul 81
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8210
CP- Australia
AB- A short description is given of the pitot-static pressure probe and vanes mounted on a nose boom for Sea King flight tests. Also described is a probe which was trailed below the aircraft to determine the position error of the boom probe. Results of wind tunnel calibrations of these probes are given. (Author)
DE- *Pitot tubes; *Guide vanes; *Helicopters Airspeed indicators; *Foreign technology; Booms(Equipment); Probes; Static pressure; Air flow; tic pressure; Flight instruments; Angle of attack; Position(Location); Error analysis; Sideslip; Pitch(Motion); Air towed; Dynamic pressure; Noses; Calibration; Wind tunnel tests; Rotary wing aircraft; Flight testing
ID- Sea King aircraft; MK-50 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0938403
AA- <NTIS> AD-A108 131/4/XAB
TI- Vibration Levels in Army Helicopters--Measurement Recommendations and Data
TI- <NOTE> Final rept
AU- Johnson, J. C. ; Priser, D. B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-81-5
CN- 3E16277A878; AD
PY- Sep 81
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8208
CP- United States
AB- Surveys on vibration levels found in currently fielded helicopters were used to prepare a comparative summary of vibration exposure levels at crew stations and of the test methods used to measure these levels. This effort was initiated at the request of the Air Standardization Coordinating Committee (ASCC) Working Party 61 and because of the wide variety of methods used in data capture and instrumentation documentation. Sources of the literature reviewed included technical reports of U.S. Government agencies and papers in open literature. Articles were reviewed based upon three criteria: (1) quantitative description of vibration in currently fielded U.S. Army rotary winged aircraft, (2) article contents are unclassified and available for publication in open literature, (3) article describes human exposure levels of aircraft vibration. (Author)
DE- *Vibration; *Helicopters; Army aircraft; Measurement; Test methods; Cockpits; Aircraft seats; Pilot seats; Level(Quantity)
ID- UH-1H aircraft; YUH-60A aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0937042
AA- <NTIS> N82-12040/3/XAB
TI- Performance and Loads Data from a Wind Tunnel Test of a Full-Scale, Coaxial, Hingeless Rotor Helicopter
AU- Felker, Iii, F. F.
CS- National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
CS- <CODE> 019045001; NC473657
RN- NASA-TM-81329; A-8732
PY- Oct 81
PG- 350p
NT- Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, CA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A15/MF A01

JA- GRAI8207; STAR2003
CP- United States
AB- A full-scale XH-59A advancing blade concept helicopter was tested in Ames Research Center's 40 by 80 foot wind tunnel. The helicopter was tested with the rotor on and off, rotor hub fairings on and off, interrotor shaft fairing on and off, rotor instrumentation module on and off, and auxiliary propulsion thrust on and off. An advance ratio range of 0.25 and 0.45 with the rotor on and from 60 to 180 knots with the rotor off was investigated. Data on aerodynamic forces and moments, rotor loads, rotor control positions and viration for the XH-59A as well as the aerodynamic performance of the isolated rotor are presented.
DE- *Aerodynamic loads; *Helicopter performance; *Rigid rotors; *Rotor aerodynamics; Drag reduction; Hubs; Load tests; Structural vibration; Wind tunnel tests
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0936329
AA- <NTIS> AD-A108 121/5/XAB
TI- Ice Phobics Blade Tracking and Comparison of Vibration Analysis Techniques
TI- <NOTE> Final rept. Jun 79-Mar 80
AU- Abbott, W. Y. ; Dominick, F. L. ; Arthur, S.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-79-86
PY- May 81
PG- 64p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8207
CP- United States
AB- The United States Army Aviation Engineering Flight Activity conducted an evaluation of two vibration measuring devices, the Chadwick-Helmuth VIBREX and the Scientific-Atlanta Vibration Signature Recorder, as flight test instrumentation. Durint the course of those evaluations, it was determined that the Dow Corning E2460-40-1 (redesignated E2978-46) ice phobic coating applied to the rotor blades of a UH-1H helicopter, did not induce undesirable vibrations. It was also concluded that the VIBREX may be used as test instrumentation if the frequencies of interest are already known, and the Scientific-Atlanta device provides good 'quick look' spectral vibration data. (Author)
DE- *Rotor blades(Rotary wings); Vibration; Deicing materials; Protective coatings; Measuring instruments; Flight testing
ID- ICE phobic coatings; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0935792
AA- <NTIS> AD-A107 578/7/XAB
TI- Droplet Size and Liquid Water Characteristics of the USAAEFA (CH-47) Helicopter Spray System and Natural Clouds as Sampled by a JUH-1H Helicopter
TI- <NOTE> Final rept. Jan-Mar 80
AU- Humbert, M. E. ; Jahnsen, L. J. ; Dzamba, L. D.
CS- Meteorology Research, Inc., Altadena, CA.
CS- <CODE> 017899000; 227500
RN- MRI-80-FR-1748
CN- DAAK51-80-C-0003; 1L263209D103; 00
PY- Aug 80
PG- 271p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A01
JA- GRAI8207
CP- United States
AB- During the months of January, February, and March 1980, the US Army Aviation Engineering Flight Activity (AEFA) conducted natural and artificial icing tests in the vicinity of St. Paul, Minnesota. The natural events involved exposure of a fully instrumented JUH-1H 'Huey' Helicopter to extended periods of flight in supercooled stratiform clouds. The artificial portion of the testing required the same aircraft to fly in the cloud produced by the helicopter icing spray system (HISS) aboard a CH-47 'Chinook' Helicopter. The tanker cloud was sampled at various water flow drates, ranges, humidities, and temperatures. During the test period, the sampling helicopter was equipped with droplet sizing instrumentation provided by Meteorology Research, Inc. (MRI). A similar program was performed during the winter

of 1978-1979 (Anderson and Jahnsen, 1979), but nozzle reconfiguration and other modifications to the HISS were necessary to produce an artifical cloud that more closely resembled a natural one. The new nozzles required a new HISS calibration effort. (Author)
DE- *Ice formation; *Helicopters; *Sprays; Stratus clouds; Supercooling; Adhesion; Artificial precipitation; Flow rate; Water flow; Humidity; Atmospheric temperature; Winter; Ice; Optical detectors; Light scattering; drops; Particle size; Spray nozzles; Visibility; Spectrometers; Photodetectors; Flight testing; Airspeed
ID- H-1 aircraft; UH-1H aircraft; HISS(Helicopter Icing Spray System); H-47 aircraft; Ice detection; Artificial clouds; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 48H (Natural Resources and Earth Sciences--Snow, Ice, and Permafrost)

AZ- 0935791
AA- <NTIS> AD-A107 577/9/XAB
TI- Natural and HISS Cloud Droplet Data as Sampled during the 1980-1981 AEFA/St. Paul Field Program
TI- <NOTE> Final rept. Jan-Mar 81
AU- Humbert, M. E. ; Dzamba, L. D. ; Callander, S. M.
CS- Meteorology Research, Inc., Altadena, CA.
CS- <CODE> 017899000; 227500
RN- MRI-81-FR-1813
CN- DAAK51-81-C-0005; 1L263209D103; 00
PY- Sep 81
PG- 197p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8207
CP- United States
AB- During the months of January, February, and March 1981, the US Army Aviation Engineering Flight Activity (AEFA) conducted natural and artificial icing tests in the vicinity of St. Paul, Minnesota. The natural events involved exposure of a fully instrumented JUH-lH 'Huey' and a UH-60A 'Black Hawk' helicopter to extended periods of flight in supercooled stratiform clouds. The artificial portion of the testing required the same aircraft to fly in the cloud produced by the helicopter icing spray system (HISS) aboard a CH-47C 'Chinook' helicopter. The tanker cloud was sampled at various water flow rates, air speeds, humidities, and temperatures. During the test period, each sampling helicopter was equipped with droplet sizing instrumentation.
DE- *Ice formation; *Helicopters; *Sprays; Stratus clouds; Supercooling; Adhesion; Artificial precipitation; Flow rate; Water flow; Spray nozzles; Winter; Humidity; Ice; Optical detectors; Light scattering; Drops; Particle size; Spectrometers; Photodetectors; Sampling; Airspeed ; Flight testing; Visibility
ID- H-1 aircraft; UH-1H aircraft; H-47 aircraft; H-60 aircraft; HISS(Helicopter Icing Spray System); Ice detection; Artificial clouds WU034; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 48H (Natural Resources and Earth Sciences--Snow, Ice, and Permafrost)

AZ- 0935790
AA- <NTIS> AD-A107 576/1/XAB
TI- Test and Evaluation of Improved Aircrew Restraint Systems
AU- Singley, G. T.
CS- Army Aviation Research and Development Command, St. Louis, MO.
CS- <CODE> 055057000; 410330
RN- USAAVRADCOM-TR-81-D-27
CN- 1L162209AH76
PY- Sep 81
PG- 352p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A16/MF A01
JA- GRAI8207
CP- United States
AB- US Army aviation accident data shows that a majority of all injuries in attack helicopters could have been avoided if these aircraft had been equipped with crashworthy seat and restraint systems. The compactness of the cockpit and the close proximity of mission equipment to the aircrew in attack and scout helicopters pose serious crash impact hazards. Although not desirable from a crashworthiness standpoint, operational considerations may dictate that mission equipment and structure be located within the occupant's crash impact motion envelope, particularly for his head. The cockpit can be delethalized further when the improved restraint is complemented by padding potential strike surfaces in the cockpit; making contact surfaces frangible; and providing weapon system sights with frangibility,

telescoping, and/or swing-away features. This report presents the results of an effort to test and compare the potential of several aircrew restraint systems to reduce the crash impact motion envelope of helicopter aircrewmen. (Author)
DE- *Restraint; *Aircraft seats; *Aviation accidents; *Human factors engineering; Flight crews; Army aviation; Attack helicopters; Test and evaluation; Crashes; Impact; Pilots; Motion; Crashworthiness
ID- NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0934019
AA- <NTIS> AD-A107 379/0/XAB
TI- Inertial Surveying Technology
TI- <NOTE> Final rept
AU- Mancini, A.
CS- Defense Mapping Agency, Washington, DC.
CS- <CODE> 037953000; 390420
PY- 14 Nov 81
PG- 18p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8206
CP- United States
AB- Inertial Surveying is the process of ascertaining position and gravity field parameters from measured accelerations. Typically, the observer traverses the survey course in a vehicle such as a van or helicopter and operates instrumentation which records the vehicle's acceleration history as the survey proceeds. The instrumentation, similar to that used for inertial navigation, consists of very accurate and precise accelerometers, gyros, data recording equipment, a computer, and support electronics. The gyros provide a precise reference frame for the acceleration measurements. The computer integrates the acceleration measurements into velocity and position data to provide a real-time display during the traverse and stores information for later post-survey processing (smoothing). The general theory, operations, system description and results will be presented. (Author)
DE- *Position finding; *Gravitational fields; *Inertial systems; Accelerometers; Geodetic surveys; Algorithms; Vertical indicators
ID- *Inertial surveying; NTISDODXA
SH- 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

AZ- 0933996
AA- <NTIS> AD-A107 356/8/XAB
TI- The Impact of New Guidance and Control Systems on Military Aircraft Cockpit Design
TI- <NOTE> Conference proceedings
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-312
PY- Aug 81
PG- 227p
NT- Papers presented at the Guidance and Control Panel Symposium, 5-8 May 81, Stuttgart (Germany). See also Rept. no. AGARD-CP-312-SUPPL. Text in English and French.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- French
PC- PC A11/MF A01
JA- GRAI8206
CP- France
AB- Partial contents: How the Helicopter Cockpit Designer Uses Digital Avionics; Electronic Flight DEck Displays for Military Transport Aircraft; Color CRT Displays for the Cockpit; Head Up Displays; Integration of Controls and Displays in US Army Helicopter Cockpits; A Standard Control Display Unit for Multi-Aircraft Application; Development of a Miniaturised Digital Thrust Demand Unit; Utilisation de la Commande Vocale a Bord des Aeronefs de Combat; Command-Response Data Transmission Applied to Mechanical Systems-Management Effect on the Crew/System Interface; The Intelligent Use of Intelligent Systems--Problems in Engineering Man/Machine Symbiosis; Vision Monoculaire et Vol Tactique sur Helicoptere; Experimental Investigation of a Helmet Mounted Sight/Display for Helicopter; Use of a Helmet-Mounted Matrix Display for Presenting Energy-Manoeuvrability Information; Evaluation of a Pilot Workload Assessment Device to Test Alternate Display Formats and Control Handling Qualities; Tanker Avionics and Aircrew Complement Evaluation; and F/A-18 Hornet Crew Station.

DE- *Cockpits; *Display systems; Instrument panels; Flight decks; Avionics; Flight control systems; Military aircraft; Man computer interface; Helicopters; Integrated systems; Digital systems; Head up displays; Flight crews; Cathode ray tubes; Thrust control; Matrix displays; Aeronautics; Helmet mounted displays; Pilots; Job analysis
ID- *Foreign technology; NATO furnished; Workloads; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0933772
AA- <NTIS> AD-A107 131/5/XAB
TI- Cold Regions Testing of an Air-Transportable Shelter
AU- Flanders, S. N.
CS- Cold Regions Research and Engineering Lab., Hanover, NH.
CS- <CODE> 006594000; 037100
RN- CRREL-81-16
CN- 4A762730AT42
PY- Aug 81
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8206
CP- United States
AB- An air-transportable shelter designed and built at CRREL for use in cold regions underwent testing in Hanover, New Hampshire, and Ft. Greely, Alaska. The shelter demonstrated some of its capabilities for mobility by being towed for more than 60 miles behind various vehicles and by being transported on a C-130 cargo airplane, a CH-47 helicopter, and a trailer truck. The shelter proved to be very easy for a crew of two to four to set up in all weather conditions including -40 F cold. However, the gasoline-powered generator, which was a source for space heat as well as electricity, functioned very poorly. Overall, the prototype successfully demonstrated qualities of self-reliance, ease of operation and thermal efficiency. (Author)
DE- *Portable shelters; *Air transportable equipment; *Cold regions; Field tests; Test methods; Human factors engineering; Mobility; Installation; Heating; Efficiency; Operational effectiveness
ID- WUE1/9; NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 0929913
AA- <NTIS> PB82-115601/XAB
TI- Review of Rotorcraft Accidents, 1977-1979
TI- <NOTE> Special study
CS- National Transportation Safety Board, Washington, DC. Bureau of Technology.
CS- <CODE> 022327003
RN- NTSB-AAS-81-1
PY- 11 Aug 81
PG- 59p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Journal article
PC- PC A04/MF A01
JA- GRAI8204
CP- United States
AB- The National Transportation Safety Board has reviewed the data on the 890 rotorcraft accidents that occurred from 1977 through 1979 which are in its automated aviation accident data system. This report contains accident data on the rotorcraft, pilots, and operating environment which the Safety Board believes may be most useful to designers, manufacturers, operators, and regulators. The report includes tables and graphs presenting accident statistics, cause/factors, rotorcraft make and model data, pilot experience, weather conditions, and other data.
DE- *Aviation accidents; *Helicopters; Pilots; Statistical data; Tables(Data); Weather; Reprints
ID- Accident causes; Human factors; NTISNTSB
SH- 85D (Transportation--Transportation Safety); 85A* (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0928264
AA- <NTIS> AD-A105 516/9/XAB
TI- Electronic Master Monitor and Advisory Display System. Operation Functions Report
TI- <NOTE> Interim rept. no. 2, Jun 79-Oct 80
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.

CS- <CODE> 010739004; 389275
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- ACS-12-217; USAAVRADCOM-TR-79-0270-2
CN- DAAK80-79-C-0270; 1L262202AH85; 03
PY- Oct 80
PG- 197p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8204
CP- United States
AB- The development of non-mission-related status information is one area of rotary wing instrumentation which has not kept pace with the state-of-art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. This report describes the results of work done under Task I of contract No. DAAK80-79-C-0270, to establish basic system operating requirements for an Electronic Master Monitor and Advisory Display System (EMMADS). This system is being developed for use on U.S. Army helicopters to reduce crew workload by assuming responsibility for tasks associated with subsystem status monitoring. EMMADS will integrate all instrumentation normally dedicated to subsystem status monitoring (e.g. all pressures, temperatures, etc.) plus caution/warning/advisory indicators, into a computer controlled, solid state system. It will detect, analyze and provide emergency checklists for any faults that it is programmed to monitor for in these subsystems. This report represents a tieing together of Task I and II to provide a baseline for defining the requirements of the feasibility demonstration hardware. In Task I, helicopters representing all operational helicopter categories (cargo, utility, scout, and attack) were identified and a signal analysis was done on each. While the EMMADS functions described in this report are applicable to all helicopter categories studied under Tasks I and II, specific examples used herein are all related to the CH-47C helicopter.
DE- *Display systems; *Rotary wing aircraft; *Helicopters; Monitors; Faults ; Detection; Monitoring
ID- EMMADS(Electronic Master Monitor and Advisory Display System); NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0928259
AA- <NTIS> AD-A105 511/0/XAB
TI- Helicopter Model Studies for On-Board Electrostatic Sensors
TI- <NOTE> Final rept. 25 Sep 79-24 Jan 81
AU- Tranbarger, O. ; Duff, B. M. ; Owen, T. E.
CS- Southwest Research Inst., San Antonio, TX.
CS- <CODE> 014411000; 328200
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- SWRI-14-5863; USAAVRADCOM-TR-81-D-26
CN- DAAK51-79-C-0060; 1L162209AH76; 00
PY- Sep 81
PG- 286p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A13/MF A01
JA- GRAI8204
CP- United States
AB- Hovering helicopters accumulate excessive charge as a result of triboelectrification, surrouanding space charge, and external electric fields that result in high electrostatic potentials on the aircraft. Electrostatic energy stored on the helicopter can cause electrical discharges to occur from the cargo hook when contact is made with the ground or ground personnel. Laboratory model studies were conducted under electrostatic conditions simulating hovering aircraft to show that on-board instrumentation capable of measuring electric field intensity and charge density can provide the basis for indirectly inferring the correct potential relative to ground of a spherical model test body. Potential of the model was inferred for three cases involving electrostatic instrumentation located (1) on the ground below the model, (2) installed at the south pole of the model, and (3) mounted at the end of the simulated cargo hook. Analysis of laboratory test data resulted in empirical derivations of unique electric field curves for each of the three cases studied. The first two cases were also studied analytically by solving Poisson's equation for a sphere between two parallel plates, and the mathematical expressions substantiated the laboratory results. Methodology for developing a full-scale helicopter electrostatic discharger system to eliminate hazardous potentials on helicopter aircraft is described. (Author)
DE- *Electrostatic probes; *Electric discharges; *Helicopters; *Electrostatics; *Safety engineering; *Detectors; Experimental data;

Field intensity; Electric fields; Parallel orientation; Ground crews; Space charge; Charge density; Laboratory tests; Hovering; Hooks; Energy ; Spheres; Cargo; Measurement; Models; Plates; Instrumentation; Simulation; Aircraft; Onboard
ID- South magnetic poles; Electrostatic sensors; Triboelectrification; Charged aerosols; NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0928067
AA- <NTIS> PB82-801374/XAB
TI- Search and Rescue Methods and Equipment. 1964-October, 1981 (Citations from the NTIS Data Base)
TI- <NOTE> Rept. for 1964-Oct 81
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Nov 81
PG- 291p
NT- Supersedes PB80-812837, and NTIS/PS-79/0649.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8203
CP- United States
AB- Reports dealing with maritime and aviation search and rescue are presented. Studies are included on search and rescue planning, locating equipment, rescue beacons, communication devices, specialized aircraft and their components, and searching strategies. Underwater rescue and survival are excluded. (This updated bibliography contains 285 citations, 23 of which are new entries to the previous edition.)
DE- *Bibliographies; *Search and rescue; Air sea rescues; Rescue operations ; Rescue equipment; Searching; Detection; Radio beacons; Rescue beacons ; Crash locator beacons; Sea markers; Helicopters; Coast Guard; Aviation safety; Rescue systems; Computerized simulation; Communication satellites; Relay satellites; Transmitter receivers; Direction finding; Distress signals; Search radar; Downed aircraft; Survival kits; Loran; Omega navigation; Navigational aids; Crash rescue boats; Survival equipment; Life rafts
ID- Flying drift search tactics; Sprint drift search tactics; Sea loiter aircraft; Sea sitting aircraft; Loran C navigation systems; NTISNTISN
SH- 85GE* (Transportation--General); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0923053
AA- <NTIS> AD-A104 388/4/XAB
TI- Conceptual Design of a Computer-Generated Topographic Display System to Aid Mission Planning and Mission Conduct by Army Aviators
TI- <NOTE> Final technical rept. Mar 80-Jun 81
AU- Rogers, S. P.
CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> 029731000; 405951
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- 365-81; USAAVRADCOM-TR-78-0012-F
CN- DAHC19-78-C-0012
PY- Jun 81
PG- 136p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8202
CP- United States
AB- This report describes the requirements for a computer-generated topographic display for use by Army aviators during performance of mission-planning and in-flight tasks, and presents a conceptual design for a system. Section I of the report describes the background leading up to the conduct of the project, the project objective, the project approach, and the organization of the report. Section II of the report provides a background in the missions, organization, and procedures of Army aviation units for readers not thoroughly familiar with these topics. Much of the information in this section is based on data from in-depth interviews with aviators of the 101st Airborne Division. Section III of the report describes the configuration and operation of the recommended computer-generated topographic display system. The general philosophy guiding the conceptual design is discussed, followed by a description of the system components and their functions. Extensive descriptions of the interactive, multi-function, control-display units are provided, accompanied by summaries of the aviator requirements, present deficiencies, and computer capabilities that led to the incorporation of the various special features of the system. (Author)

DE- *Army aviation; *Mission profiles; *Computer aided design; Topographic maps; Computer graphics; Display systems; Pilots; Digital maps; Navigation; Terrain following; Human factors engineering; Theater level operations; Tactical analysis; Helicopters; Command and control systems ; User needs; Interactive graphics
ID- NTISDODXA; NTISDODA
SH- 48I (Natural Resources and Earth Sciences--Cartography); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 0922909
AA- <NTIS> AD-A104 244/9/XAB
TI- Electronic Master Monitor and Advisory Display System, Human Engineering Summary Report
TI- <NOTE> Interim rept. no. 3, Jun 79-Jun 81
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.
CS- <CODE> 010739004; 389275
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- ACS-12385; USAAVRADCOM-TR-79-0270-3
CN- DAAK80-79-C-0270; 1L262202AH85; 03
PY- Jun 81
PG- 227p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A01
JA- GRAI8202
CP- United States
AB- The development of non-mission-related status information is one area of rotary wing instrumentation which has not kept pace with the state-of-the-art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. General Electric Co., under contract to the US Army, is presently developing an Electronic Master Monitor and Advisory Display System (EMMADS), which will integrate and display this 'secondary' information on a single solid-state electroluminescent panel. Human Engineering effort in support of this development has assessed the information requirements, developed and tested information handling formats, and determined the necessary display/control design criteria. (Author)
DE- *Display systems; *Flight control systems; *Rotary wing aircraft; *Human factors engineering; Automation; Control panels; Electrooptics; Electroluminescence; Monitors; Warning systems; Requirements; Data links; Bus conductors; State of the Art; Formats; Matrix displays
ID- EMMADS(Electronic Master Monitor and Advisory Display System); NTISDODXA; NTISDODA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 0922908
AA- <NTIS> AD-A104 243/1/XAB
TI- Electronic Master Monitor and Advisory Display System, Data Transmission Study
TI- <NOTE> Interim rept. no. 1, Jun 79-Aug 80
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.
CS- <CODE> 010739004; 389275
SP- Army Aviation Research and Development Command, St. Louis, MO.
RN- ACS-12177; USAAVRADCOM-TR-79-0270-1
CN- DAAK80-79-C-0270; 1L262202AH85; 03
PY- Aug 80
PG- 57p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8202
CP- United States
AB- The development of non-mission-related status information is one area of rotary wing instrumentation which has not kept pace with the state-of-art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. The objective of this report is to define an efficient and cost effective data transmission method for an Electronic Master Monitor and Advisory Display System (EMMADS). Several current standard and non-standard data bus specifications which are applicable to the EMMADS system are introduced. Their tradeoff in terms of hardware, software and system considerations are compared. It should be noted that a typical standard bus specs addresses only the protocol and message formats, not the mechanization of the control algorithm. Hence there is a considerable variation in implementation and cost even for the same bus standard. The materials represent a snapshot of the current state-of-the-art technology. The use of optical fiber instead

of conventional electrical cable (such as coaxial) as the transmission medium is also investigated based on the current technical reports. The problems of electromagnetic interference (EMI), and rejection techniques are mentioned.
DE- *Data transmission systems; *Aircraft; *Helicopters; *Performance tests ; Self operation; Automation; Bus conductors; Fiber optics transmission lines; Multiplexing; Rotary wings; Nondestructive testing; Communications networks; Intercommunication systems; State of the art; Data rate
ID- MIL-STD-1553B; NTISDODXA; NTISDODA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 45C (Communication--Common Carrier and Satellite)

AZ- 0918955
AA- <NTIS> N81-30125/1/XAB
TI- Helicopter Technologies of the Future
AU- Pfleiderer, K.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
CS- <CODE> 064776001; MT620643
SP- National Aeronautics and Space Administration, Washington, DC.
RN- MBB-UD-314/80-OE
PY- 13 Oct 80
PG- 33p
NT- Presented at Soc. Of Automotive Engr., 1980.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8126; STAR1921
CP- Germany, Federal Republic of
AB- An assessment of the future possibilities for the helicopter is presented, within the broad spectrum of all transport systems. Special attention is paid to weight reduction by extensive use of composites such as Kevlar fiber reinforced plastics. Crash resistance, ergonomic configuration optimization, aerodynamic improvements, vibration reduction, specific fuel consumption and noise reduction are discussed. Examples from the BO 105 and BK 117 helicopters are given. By the end of the century the helicopter is expected to reach the discussed development limits.
DE- *Helicopters; *Weight reduction; Technology assessment; Aerodynamic characteristics; Fiber reinforced composites; Fuel consumption; Human factors engineering; Kevlar (Trademark); Noise reduction; Optimization; Trends
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0912564
AA- <NTIS> AD-A102 028/8/XAB
TI- The Effects of Various Fidelity Factors on Simulated Helicopter Hover
TI- <NOTE> Final rept. Mar 79-Jun 80
AU- Ricard, G. L. ; Parrish, R. V. ; Ashworth, B. R. ; Wells, M. D.
CS- Naval Training Equipment Center, Orlando, FL.
CS- <CODE> 046072000; 390462
RN- NAVTRAEQUIPC-IH-321
CN- W1200PN; W1200PN
PY- Jan 81
PG- 72p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8124
CP- United States
AB- The effects of the cues of aircraft motion, of delays in a visual scene, and of movement of a ship model were examined by measuring pilots' ability to hover a simulated helicopter near a destroyer class ship. Fourteen Navy helicopter pilots were tested in a within subjects, factorial combination of fixed base, moving base, and g-seat conditions where delays of approximately 66 or 128 milliseconds existed in the simulator's visual display, and the pilots were to hover near a moving or stationary ship. In addition, an effort was made to determine the effect a head-up display of aircraft position had on the measures of control. Best performance was seen with the moving base simulation while poorest control was associated with the fixed-base conditions and in-between performance was measured under the g-seat conditions. The addition of the longer delay uniformly elevated scores, but movement of the ship model had little effect. Also performance was not affected by removal of the head-up display. A recommendation is made for the configuration of trainers for aircrews of marginally stable vehicles. This is that motion cuing is likely to be useful for flight regimes

such as hover, and that currently platform technology is the recommended source of these cues. (Author)
DE- *Flight simulators; *Hovering; *Pilots; Cues(Stimuli); Acceleration; Pilot seats; Motion; Visual perception; Delay; Head up displays; Aircraft landings; Helicopters; Destroyers; Ship motion; Flight training; Man machine systems; Flight control systems; Naval aviation
ID- LAMPS Mark-3 aircraft; Fidelity; Motion cueing; VMS(Visual Motion Simulators); NTISDODXA; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0909988
AA- <NTIS> AD-A101 473/7/XAB
TI- A Compendium of Aircraft Cockpit Vision Surveys, 1950 through 1980. Volume I
TI- <NOTE> Final rept. 1950-1980
AU- Barile, A. J.
CS- Federal Aviation Administration Technical Center, Atlantic City, NJ.
CS- <CODE> 015213000; 411863
RN- FAA-CT-81-40-VOL-1
PY- May 81
PG- 149p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A07/MF A01
JA- GRAI8123
CP- United States
AB- This publication contains a history of cockpit of visibility surveys which were conducted to measure and record aircraft (General Aviation, Transport, Helicopter, Military) cockpit visibility. Many of the aircraft were involved in midair collisions, accident investigations, research and development, and the design up through production implementation. The Federal Aviation Administration (FAA) Binocular Camera is a standard means to accurately measure cockpit visibility, which in the certification process for civil aircraft is an invaluable tool for industry and the FAA. Therefore, the information contained in this document is intended to contribute to aviation safety. (Author)
DE- *Cockpits; *Visibility; *Surveys; Aviation safety; Civil aviation; Accident investigations; Helicopters; Military operations; Binoculars; Cameras; History; Man machine systems; Human factors engineering
ID- Binocular cameras; NTISDODXA; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0908678
AA- <NTIS> N81-26028/3/XAB
TI- Nasa's Role in Aeronautics: A Workshop. Volume 1: Summary
CS- National Research Council, Washington, DC. Panel on the Public Policy Implications of Earthquake Prediction.
CS- <CODE> 019026281; NB210513
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-164513
CN- NASW-3455; NASW-2342
PY- 1981
PG- 71p
NT- Workshop Held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A04/MF A01
JA- GRAI8122; STAR1917
CP- United States
AB- The state of the U.S. aeronautic industry and progressive changes in national priorities as reflected in federal unified budget outlays are reviewed as well as the contribution of NACA and the character and substance of U.S. aeronautical research under NASA. Eight possible roles for the future defined by NASA are examined and the extent to which the agency should carry out these activities is considered. The roles include: (1) national facilities expertise; (2) flight sciences research; (3) generic technology evolution; (4) vehicle class evolution; (5) technology demonstration; (6) prototype development; (7) technology validation; and (8) operations feasibility; How NASA's roles varies in the areas of military aviation, general aviation, transport aircraft aeronautics, rotorcraft aeronautics, engineering education, information dissemination, and cooperation with other organizations and agencies is discussed with regard to research in aerodynamics; structures and materials; propulsion; electronics and avionics; vehicle operations; and human engineering.
DE- *Aeronautical engineering; *Conferences; *Government/industry relations

; *Nasa programs; *Policies; *Research management; Aerodynamics; Aircraft structures; Avionics; Electronic equipment; Human factors engineering; Propulsion
ID- NTISNASA; NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0902282
AA- <NTIS> AD-A099 814/6/XAB
TI- The Background and Bases for the Proposed Military Standard on Acoustical Noise Limits in Helicopters
TI- <NOTE> Final rept
AU- Garinther, G. R. ; Hodge, D. C.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-5-81
PY- Mar 81
PG- 13p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8120
CP- United States
AB- A design standard for interior noise of helicopters has been prepared to provide the developer and user with realistic noise limits which consider hearing damage risk, speech intelligibility, mission profile, state-of-the-art in noise reduction, and helicopter weight. The levels selected meet the current hearing conservation limits of the Department of Defense and permit electrically aided sentence intelligibility of 98%. Helicopters below 20,000 pounds are treated separately from those above because of the strong positive relation between internal noise and vehicle gross weight. This standard defines the locations and flight conditions under which noise measurements shall be made for compliance. It also specifies the types of instrumentation and the test procedures to be used to collect interior noise level data. This degree of specificity in the instrumentation and measurements area is intended to insure that data collected by different development and test agencies will be both accurate and consistent. (Author)
DE- *Noise(Sound); *Aircraft noise; *Hearing; *Helicopters; Limitations; Military requirements; Standards; Damage; Risk; Noise reduction; Speech ; Intelligibility; Sound pressure; Level(Quantity); Measurement
ID- Hearing loss; NTISDODXA; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 57W (Medicine and Biology--Stress Physiology)

AZ- 0902113
AA- <NTIS> AD-A099 644/7/XAB
TI- 2.75 Inch Rocket/AH-1G Helicopter Weapons System Baseline Instrumentation Test Report. Volume II
AU- Tirabassi, B. ; Tognola, E.
CS- Army Electronics Command, Fort Monmouth, NJ. Avionics Lab.
CS- <CODE> 002519014; 387890
PY- Apr 72
PG- 117p
NT- See also Volume 1, AD-A099 643.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8120
CP- United States
AB- For complete abstract, See AD-A099 643.
DE- *Aircraft rockets; Attack helicopters; Aircraft fire control systems; Accuracy; Weapon system effectiveness; Firing tests(Ordnance); Data acquisition; Data bases; Instrumentation; Airborne; Rocket launchers; Test and evaluation; Avionics
ID- AH-1G aircraft; 2.75-in. rockets; NTISDODXA; NTISDODXA
SH- 79H (Ordnance--Rockets); 79F (Ordnance--Fire Control and Bombing Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0902112
AA- <NTIS> AD-A099 643/9/XAB
TI- 2.75 Inch Rocket/AH-1G Helicopter Weapons System Baseline Instrumentation Test Report. Volume 1
AU- Tirabassi, B. ; Tognola, E.
CS- Army Electronics Command, Fort Monmouth, NJ. Avionics Lab.
CS- <CODE> 002519014; 387890
PY- Apr 72
PG- 85p
NT- See also Volume 2, AD-A099 644.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8120
CP- United States
AB- THis report deals with the acquisition and retrieval of data pertinent to the analysis of the 2.75 Inch Rocket/AH-1G Weapons System Baseline Accuracy Tests. Volume I details the various phases of the 2.75 in Rocket Baseline Accuracy Test as they pertain to ECOM supported functions and its airborne data retrieval system. A complete description is included of the instrumentation system, aircraft flight configurations, alignment and preflight procedures and a comprehensive description of the major subsystems both procured and fabricated for the test program. Volume II is a presentation of retrieved data samples, recorded during Phase A and Phase B testing at the Yuma Proving Grounds, to verify airborne instrumentation performance. Analysis of the data is presented including plots of retrieved data, correlations between data samples taken with various transducers and a frequency analysis of the sampled data.
DE- *Aircraft rockets; *Attack helicopters; Aircraft fire control systems; Weapon system effectiveness; Firing tests(Ordnance); Data acquisition; Instrumentation; Accuracy; Airborne; Rocket launchers; Test and evaluation; Avionics
ID- AH-1G aircraft; 2.75-in. rockets; NTISDODXA; NTISDODXA
SH- 79H (Ordnance--Rockets); 79F (Ordnance--Fire Control and Bombing Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0897796
AA- <NTIS> N81-22013/9/XAB
TI- Scientific Report (1980) of the Research Department of Flight Mechanics/Guidance and Control
TI- <NOTE> Annual Report
AU- Holtz, H. J.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Cologne (Germany, F.R.).
CS- <CODE> 062739000; DO696939
SP- National Aeronautics and Space Administration, Washington, DC.
PY- 1980
PG- 83p
NT- Original Contains Color Illustrations.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8118; STAR1913
CP- Germany, Federal Republic of
AB- The activities of the German Institutes for Flight Guidance, Flight Mechanics, Aerospace Medicine, and Flight Systems Dynamics are discussed together with those of the Air Transport Science Division. These activities include aeronautics, flight simulation, inflight testing, model testing in wind tunnels, research in rescue and recovery systems, low noise take-off and landing studies, helicopters, human engineering, effects of weightlessness, vacuum and great depths at sea, multibody vehicles, orbit and trajectory mechanics, error analysis, and guided missiles.
DE- *Aeronautical engineering; *Aerospace environments; *Air traffic; *Air transportation; Aircraft safety; Helicopters; Human factors engineering ; Landing; Takeoff; Trajectory analysis; Weightlessness simulation; Wind tunnel tests
ID- *Foreign technology; NTISNASAE
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 0896836
AA- <NTIS> AD-A098 616/6/XAB
TI- Independent Evaluation Plan (IEP) for UH-60A Aeromedical Evacuation Kit. Revised
CS- Academy of Health Sciences (Army), Fort Sam Houston, TX.
CS- <CODE> 054881000; 391261
PY- 23 Mar 81
PG- 29p
NT- Revision of Report dated 29 Jan 81.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8118
CP- United States
AB- The MEDEVAC litter kit is being developed specifically for use on the

UH-60A. Early in the UTTAS conceptual phase it was determined that in addition to troop/cargo transport, the UTTAS would also be used for the aeromedical evacuation mission. As a result of a desire to improve and speed up the litter loading and unloading operations, make provisions for better inflight patient care and comfort, and to make the litter kit more survivable in the event of a crash, strict guidelines for fabrication of the MEDEVAC litter kit were placed in the UTTAS Material Need (MN) document. In addition to the requirements of the MN, the medical community was allowed to recommend several modifications/additions to the kit, which further enhance its utility. (Author)

DE- *Aeromedical evacuation; *Stretchers; *Kits; Helicopters; Operational effectiveness; Reliability; Human factors engineering

ID- NTISDODXA

SH- 44J (Health Care--Health Delivery Plans, Projects, and Studies); 57E (Medicine and Biology--Clinical Medicine)

AZ- 0896753

AA- <NTIS> AD-A098 533/3/XAB

TI- Vibration in a Helmet Mounted Sight (HMS) Using Mechanical Linkage

TI- <NOTE> Final rept

AU- Johnson, J. C. ; Priser, D. B. ; Verona, R. W.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> 026909000; 404578

RN- USAARL-81-3

CN- 3E162777A878; AD

PY- Mar 81

PG- 30p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A03/MF A01

JA- GRAI8118

CP- United States

AB- The purpose of this experiment was to determine the extent to which aircraft vibration was coupled to a crewman's flight helmet by the mechanical linkage of a helmet mounted sight (Fire Control Subsystem, Helmet Directed XM128). Two variations of the SPH-4 flight helmet were tested: (1) SPH-4 with standard web suspension, (2) SPH-4 with a form-fit foam liner suspension. The system was tested in the front seat of an AH-1S 'Cobra' helicopter. Five (5) flight conditions were used in the experiment: (1) hover, (2) 40kn, (3) 80kn, (4) 120kn, (5) standard left turn. Two conditions of the helmet mounted control linkage were tested: (1) connected, (2) disconnected. A triaxial accelerometer was mounted on top of the flight helmet to measure vibration. The data were analyzed using a fast Fourier transform analyzer and a desk-top computer. The following observations were made: (1) Both helmets vibrate more with the sight attached. (2) The response to the sight coupled vibration of the standard SPH-4 differed from that of the form-fit SPH-4. (3) The form-fit SPH-4 helmet vibrated more in a narrow band centered at about 30Hz. (4) The standard SPH-4 helmet vibrated more over a wide band of frequencies above 30Hz. Based on a review of published literature with respect to known or probable physiological problems related to the effects of vibration, we concluded that the significant increase in vibration of the helmet caused by the mechanical sight linkage may be expected to degrade pilot/gunner visual performance and hearing acuity, and increase fatigue rate to some extent.

DE- *Sights; *Flight helmets; *Helmet mounted displays; Vibration; Operational effectiveness; Helicopters; Fatigue(Physiology); Vision; Hearing; Linkages; Performance(Human); Degradation; Pilots; Gunners

ID- AH-1 aircraft; NTISDODXA

SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 0895267

AA- <NTIS> N81-21074/2/XAB

TI- Study of Oscillatory and Flight Dynamic Behavior of Helicopters in Atmospheric Turbulence

AU- Dahl, H. ; Weger, D.

CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.

CS- <CODE> 064776001; MT623300

SP- National Aeronautics and Space Administration, Washington, DC.

RN- BMVG-FBWT-80-4

PY- 1980

PG- 72p

NT- In German; English Summary. Sponsored by Bundesminister der Verteidigung.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- German

PC- PC A04/MF A01
JA- GRAI8117; STAR1912
CP- Germany, Federal Republic of
AB- A statistical model was developed which takes the nonuniform nature of the gust velocity distribution into account together with the dynamic transient oscillation of the rotor blades. Because gust effects depend strongly on the helicopter's control behavior, an analytic pilot function is included in the considerations. Hingeless and hinged rotor systems are compared. Physiological factors and data acquisition are also discussed. The results enable gust reduction systems to be incorporated in the design of helicopters.
DE- *Atmospheric turbulence; *Flight simulation; *Helicopter control; Aircraft models; Data acquisition; Flapping hinges; Flight characteristics; Gust loads; Physiological factors; Pilot performance; Rotor aerodynamics; Transient oscillations
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0894405
AA- <NTIS> AD-A098 185/2/XAB
TI- The Role Research Simulator in The Systems Development of Rotorcraft
TI- <NOTE> Technical rept
AU- Statler, I. C. ; Deel, A.
CS- Army Aviation Research and Development Command, St. Louis, MO.
CS- <CODE> 055057000; 410330
SP- National Aeronautics and Space Administration, Washington, DC.
RN- USAAVRADCOM-TR-81-A-7; NASA-TM-81276
PY- 1981
PG- 22p
NT- Presented at the AGARD Symposium of the Flight Mechsnics Panel on the Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design (58th), Paris, 6-9 Apr 81, Paper no. 13.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8117
CP- United States
AB- Over the last 20 years, flight simulators have become widely accepted as training tools. Moreover, research simulators have been used extensively by the fixed-wind industry in the design, testing, and certification of new aircraft. The rotorcraft industry, however, has been slow to use man-in-the-loop simulation to solve its design problems, primarily because of the difficulty of modeling complex rotorcraft for realtime simulation and because of the need for a wide-angle visual system for low-level flight. A joint U.S. Army and NASA program has been initiated to provide this simulation capability for exploitation by both government and industry. This paper, a status report of that program, discusses the potential application of the research simulator to future rotorcraft systems design, development, product improvement evaluations, and safety analysis. (Author)
DE- *Flight simulators; *Man machine systems; Helicopters; Flight maneuvers ; Real time; Research management; Aeronautical engineering; Aircraft industry; Army aircraft
ID- NATO furnished; NTISDODXA; NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0894381
AA- <NTIS> AD-A098 161/3/XAB
TI- Temporal Integration in Low Frequency Auditory Detection
TI- <NOTE> Final rept
AU- Horonjeff, R. ; Fidell, S. ; Teffeteller, S. ; Green, D. M.
CS- Bolt Beranek and Newman, Inc., Cambridge, MA.
CS- <CODE> 004246000; 060100
SP- Army Aviation Research and Development Command, St. Louis, MO
RN- BBN-4435; USAAVRADCOM-TR-81-D-8
CN- DAAK51-80-C-0008; 1L162209AH76; 00
PY- Mar 81
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8117
CP- United States
AB- This report describes research undertaken to determine whether the Applied Technology Laboratory's existing procedures for predicting detection ranges of helicopters require revision to account for any potential differences in the time period over which people integrate signal energy at different frequencies. Findings disclosed that over

the frequency range of 40 to 1000 Hz the integration time of the human auditory system was essentially invariant at approximately 240 milliseconds. Although no change to the ATL detection range program was required, incorporation of temporal effects was recommended to improve the generality of the program. (Author)
DE- *Auditory perception; *Acoustic detection; *Aircraft noise; *Helicopters; Acoustic signatures; Intensity; Range(Distance); Mathematical prediction; Frequency response; Target detection; Aircraft detection; Discrimination; Signal to noise ratio; Contrast
ID- Frequency domain; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63A (Detection and Countermeasures--Acoustic Detection)

AZ- 0894048
AA- <NTIS> AD-A097 827/0/XAB
TI- Aeronautical Systems Technology Needs: Escape, Rescue and Survival and Test Facilities and Test Equipment
TI- <NOTE> Annual rept. CY 1981
AU- Miller, C. J.
CS- Aeronautical Systems Div., Wright-Patterson AFB, OH.
CS- <CODE> 000409000; 008800
RN- ASD-TR-81-5008
PY- Feb 81
PG- 94p
NT- Supersedes Rept. nos. ASD-TR-80-5010, AD-A083 552 and ASD-TR-80-5011, AD-A083 553.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8117
CP- United States
AB- This report is a part of a compilation of formalized Technology Needs covering Equipment Subsystems as identified in the Aeronautical Systems Division. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., guidance for technology program, proven developmental potential, and engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. (Author)
DE- *Aeronautical engineering; *Life support systems; *Escape systems; *Man machine systems; Survival(General); Emergencies; Protective equipment; Flight simulation; Training devices; Checkout procedures; Oxygen; Biomedicine; Flight crews; Ejection seats; Parachute canopies; Operators(Personnel); Helicopter hoists; Radar mapping; Ground stations ; Avionics; Electrooptics; Test equipment; Microprocessors
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0893908
AA- <NTIS> AD-442 608/6/XAB
TI- Ninth Annual Army Human Factors Research and Development Conference
CS- Walter Reed Army Inst. of Research, Washington, DC.
CS- <CODE> 002789000; 368450
PY- Oct 63
PG- 250p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A01
JA- GRAI8117
CP- United States
AB- No abstract available.
DE- *Human factors engineering; Scientific research; Psychiatry; Retina; Performance (Human); Lasers; Range finding; Configuration; Television receivers; Neurology; Helicopters; Military personnel; Stress (Physiology); Environmental tests; Acclimatization; Heat; Shock (Pathology); Training; Weapon systems; Pulse modulation; Display systems
ID- NTISDODXD; NTISDODXDB

AZ- 0890052
AA- <NTIS> PB81-863896/XAB
TI- Military Helicopters. January, 1970-March, 1981 (Citations from the Engineering Index Data Base)
TI- <NOTE> Rept. for Jan 70-Mar 81
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000

PY- Mar 81
PG- 194p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8115
CP- United States
AB- The citations cover worldwide information on military helicopters. Topics include helicopter airworthiness, design philosophy, airfoils, aerodynamics, rotor dynamics, operations and flight testing, flight mechanics, structures, propulsion, avionics, human factors, v/stol and advance concepts, noise and vibration problems. (Contains 200 citations fully indexed and including a title list.)
DE- *Bibliographies; *Helicopters; *Military aircraft; Rotary wing aircraft ; Tandem rotor helicopters; Troop carrier helicopters; Compound helicopters; Folding rotors; Short takeoff aircraft; Vertical takeoff aircarft
ID- Gyroplanes; NTISNTISI; NTISNERACD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0887855
AA- <NTIS> AD-A096 870/1/XAB
TI- Flight Evaluation of the Concept of the Stage A Peripheral Vision Horizon Device (PVHD) Using the CH 135 Aircraft of 403 Squadron - CEB Gagetown
TI- <NOTE> Technical communication
AU- Rud, R. C. ; Michas, R. D.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986
RN- DCIEM-TC-80-C-66
PY- 8 Dec 80
PG- 9p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8115
CP- Canada
AB- The PVHD is an aircraft flight attitude instrument which uses the principle that visual sensory orientation information reaches the brain via the peripheral visual pathways. The instrument is currently in a developmental stage but six workable models have been manufactured under contract for the Development of National Defence (DND) by Varian Canda Incorporated (VCI). In order to evaluate the concept under operational conditions, it was necessary to install the system in an aircraft and fly it under variable weather conditions in various types of missions. The CH 135 (Huey) helicopter was chosen for the conceptual flight trials and 403 Squadron (CFB Gagetown) was tasked to fly the system. The system was flown for approximately 35 hours by several different pilots under visual meteorological conditions (VMC), instrument meteorological conditions (IMC), simulated instrument flying (SIF), in many missions both day and night. Daily and weekly utilization logs and reports were recorded by the pilots. At the end of the flight trial, each pilot reported his impressions on a questionnaire. Flying times under various conditions are reported along with the impressions of the pilots who flew the system. Recommendations for further operational studies are made. (Author)
DE- *Attitude indicators; *Human factors engineering; *Peripheral vision; *Man machine systems; Helicopters; Tactical aircraft; Flight testing; Flight maneuvers; Instrument flight; Flight simulation; Visual perception; Line of sight; Horizon; Questionnaires; Pilots; Test and evaluation; Performance(Engineering)
ID- *Foreign technology; CH-135 aircraft; PVHD(Peripheral Vision Horizon Device); NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0885333
AA- <NTIS> AD-A096 329/8/XAB
TI- R.A.N. Sea King Cabin Environment Survey. Part 2. Measurement of Temperature and Humidity
TI- <NOTE> Mechanical engineering note
AU- Rebbechi, B. ; Edwards, D. H.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
RN- ARL/MECH-ENG-NOTE-377
PY- Nov 79
PG- 19p
NT- See also Part 1, AD-B035 281L.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8114
CP- Australia
AB- Measurements of temperature and humidity have been made in a Royal Australian Navy Sea King over a period of four months. These measurements were carried out as part of a survey of the cabin environment which had been reported to be sufficiently adverse to cause impairment of crew efficiency, even when operating in moderate ambient temperatures. This survey has shown that the cabin temperature may be up to 12 C above the outside air temperature; this temperature differential, however, tends to decrease with increasing outside air temperature. Cabin wet bulb globe temperatures reached 32.3 C in an outside air temperature of 29 C. A WBGT level of 28 C is generally accepted as the level above which crew performance decreases; this level was reached at an outside air temperature of only 19 C. It is shown that operation of the Sea King to the extreme limits of outside environment such as the humid extremes of the Australian environment, or the United States MIL-STD-210B design environment (naval operations) would be quite impracticable, as it would be physiologically very hazardous to crew members. (Author)
DE- *Aircraft cabins; *Helicopters; *Human factors engineering; *Confined environments; Temperature; Humidity; Efficiency; Performance(Human)
ID- *Foreign technology; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0884762
AA- <NTIS> AD-530 975/2/XAB
TI- Operational Analysis of Airmobile Operations in South Vietnam during 1969. (Study I-Analysis of High Threat Areas)
TI- <NOTE> Technical memo
AU- Cassatt, R. K. ; Barnes, J. A.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM 25-70
PY- Sep 70
PG- 74p
NT- See also AD-515 928L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8114
CP- United States
AB- This report is one of a series of studies in support of a program entitled 'Human Factors in Army Aircraft Survivability.' The intent of this study was to identify the major high threat areas in South Vietnam during 1969, in terms of the number of Army aircraft damaged or lost. Data are presented on cumulated combat damage incidents as a function of aircraft mission, and comparisons of combat damage within specific UTM Grid Areas. Recommendations for future study are presented.
DE- *Airmobile operations; *Army aircraft; *Damage assessment; South Vietnam; Survival(General); Statistical analysis; Mission profiles; Threat evaluation; Losses; Ammunition damage; Data bases; Human factors engineering; Helicopters; Military intelligence; Computer programs; Flow charting
ID- NTISDODXD
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 79E (Ordnance--Detonations, Explosion Effects, and Ballistics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0884720
AA- <NTIS> AD-084 899/4/XAB
TI- Helicopter to Ground Radiological Surveying
CS- Chemical Warfare Labs., Army Chemical Center, MD.
CS- <CODE> 002350000; 036950
PY- 1955
PG- 7p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8114
CP- United States
AB- No abstract available.

DE- *Helicopters; *Radioactive contamination; Measurement; Radiation measuring instruments
ID- NTISDODXD
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 0882827
AA- <NTIS> AD-A095 748/0/XAB
TI- Evaluation of National SAR Manual. Probability of Detection Curves
TI- <NOTE> Interim rept. Jan 78-Sep 80
AU- Edwards, N. C. ; Mazour, T. J. ; Bemont, R. A. ; Osmer, S. R.
CS- Analysis and Technology, Inc., North Stonington, CT.
CS- <CODE> 061297000; 407767
SP- Coast Guard, Washington, DC. Office of Research and Development.
RN- USCG-D-41-80
CN- DOT-CG-81-79-2038
PY- Sep 80
PG- 60p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8113
CP- United States
AB- Since September 1978 three controlled visual detection experiments providing 966 target detection opportunities in 322 searches have been conducted by the U.S.C.G. Research and Development Center. These experiments involved 82 and 95-foot cutters, 41 and 44-foot boats, helicopters, and fixed wing aircraft searching for 16-foot boat and life raft targets. This report compares the detection performance of these search and rescue units (SRUs) with the probability of detection (POD) curves of the National Search and Rescue Manual, and recommends revised predictions based upon these results. Experiment results indicate that actual SRU detection performance falls below that of the present SAR Manual POD curves (based upon the inverse cube law of detection) and above that of the uniform random search curve. Recommendations are also provided for methods to predict POD directly from probability of detection versus lateral range curves for use with the Computer-Assisted Search Planning (CASP) model. (Author)
DE- *Searching; *Optical detection; Sea rescues; Search and rescue; Surface targets; Visual targets; Biological detection; Probability; Statistical analysis; Field tests; Aircraft; Ships; Boats
ID- *Visual detection; *Detection probability; NTISDODXA; NTISDOTCG
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 63F (Detection and Countermeasures--Optical Detection)

AZ- 0880678
AA- <NTIS> AD-A094 965/1/XAB
TI- Aircrew Safety and Survivability (Limited to Combat Aircraft)
TI- <NOTE> Conference proceedings
AU- Auffret, R.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-CP-286
PY- Oct 80
PG- 162p
NT- Presented at the Aerospace Medical Panel Specialists' Meeting held in Bode, Norway, 20-23 May 1980. Text in French and English.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8112
CP- France
AB- Contents: Part I Cold Protection; Prediction of Immersion Hypothermia in Men Wearing Anti-Exposure Suits and/or using Life Rafts, Radio-Temperature Transducers for Measurement of Thermal Stress in Cold Water Immersion Suit Research and Development, Laboratory Studies on Cooling in Single Seat Dinghies, Central Rewarming Technique in the Treatment of Profound Accidental Hypothermia, Principles of Teaching Winter Survival to Aircrew, Immersion Survival - the Key Factors. Part II - Accident Analysis. Ejection Emergency; Survival after Ejection 1968-1979, Selected Aeromedical Factors in U.S. Navy Combat-Type Aircraft Mishaps, Seat Pack for Fighter Aircraft Operating on the NATO Northern Flank, Neurotraumatological Aspects in Ejected Pilots, Traumatic Lesions of the Cervical Spine 1971-1979 - Incidence-Severity and Classification. Part III Survivability Equipment. Human Performance During Difficult Missions; An Option for Enhanced Aircrew Survivability, A Survival Avionics System for the 1980's.
DE- *Flight crews; *Safety; *Survival(Personnel); *Protective clothing;

*Aviation safety; NATO; Low temperature; Protection; Immersion; Hypothermia; Winter; Teaching methods; Ejection; Pilots; Trauma; Spinal column; Avionics; Restraint; Vision; Helicopters; Aerial warfare; Jet aircraft; Naval aircraft
ID- *Foreign technology; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0878355
AA- <NTIS> AD-A093 979/3/XAB
TI- AH-1 Helicopter In-Flight Escape System: A View from the Seat
TI- <NOTE> Technical rept
AU- Johnson, P. H. ; Lindsey, D.
CS- Army Agency for Aviation Safety, Fort Rucker, AL.
CS- <CODE> 061561000; 407361
RN- USAAVS-TR-76-1
PY- Nov 79
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8111
CP- United States
AB- Studies of AH-1 helicopter accidents indicate many of the fatalities occurring in these unfortunate events could have been prevented had an in-flight escape system been available. A questionnaire was developed and administered to 152 AH-1 pilots to determine their feelings concerning the need for an in-flight escape system in AH-1 aircraft. Analysis of responses shows (a) there are AH-1 in-flight emergencies in which the pilots feel they need and would not be reluctant to use such a system if available, (b) 94% of pilots surveyed responded that 'all attack helicopters should be equipped with an in-flight escape system,' and (c) 60% of the pilots had experienced in-flight situations in which they felt the tension and anxiety would have been reduced had an in-flight escape system been available. (Author)
DE- *Escape systems; Pilots; Attitudes(Psychology); Attack helicopters; Military requirements; Inflight; Emergencies
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0874632
AA- <NTIS> N81-14792/8/XAB
TI- The Rating of Helicopter Noise: Development of a Proposed Impulse Correction
AU- Berry, B. F. ; Fuller, H. C. ; John, A. J. ; Robinson, D. W.
CS- National Physical Lab., Teddington (England). Acoustics Unit.
CS- <CODE> 019379012; NK578831
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NPL-AC-93; ISSN-0143-7143
PY- Dec 79
PG- 45p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8109; STAR1905
CP- United Kingdom
AB- Efforts to the scale of effective perceived noise level (EPNL) to account for the subjective effects of impulsive helicopter noise are reported. Psychoacoustical studies of the annoyance of recorded and simulated helicopter noises are described and an objective descriptor of impulsiveness is developed. This descriptor forms the basis of a draft standard for an impulse correction to EPNL.
DE- *Aircraft noise; *Effective perceived noise levels; *Helicopters; Human factors engineering; Impulses; Noise tolerance; Psychoacoustics; Psychological tests; Standards
ID- *Foreign technology; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0874398
AA- <NTIS> N81-13958/6/XAB
TI- Evaluation of a Computer-Generated Perspective Tunnel Display for Flight Path Following
AU- Grunwald, A. J. ; Robertson, J. B. ; Hatfield, J. J.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley

Research Center.
CS- <CODE> 019041001; ND210491
RN- NASA-TP-1736; L-13253
PY- Dec 80
PG- 100p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8109; STAR1905
CP- United States
AB- The display was evaluated by monitoring pilot performance in a fixed base simulator with the vehicle dynamics of a CH-47 tandem rotor helicopter. Superposition of the predicted future vehicle position on the tunnel image was also investigated to determine whether, and to what extent, it contributes to better system performance (the best predicted future vehicle position was sought). Three types of simulator experiments were conducted: following a desired trajectory in the presence of disturbances; entering the trajectory from a random position, outside the trajectory; detecting and correcting failures in automatic flight. The tunnel display with superimposed predictor/director symbols was shown to be a very successful combination, which outperformed the other two displays in all three experiments. A prediction time of 4 to 7 sec. was found to optimize trajectory tracking for the given vehicle dynamics and flight condition. Pilot acceptance of the tunnel plus predictor/director display was found to be favorable and the time the pilot needed for familiarization with the display was found to be relatively short.
DE- *Aircraft equipment; *Display devices; *Evaluation; *Flight control; *Pilot performance; *Trajectory optimization; Ch-47 helicopter; Flight simulators; Indicating instruments; Real time operation
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0873410
AA- <NTIS> AD-A093 065/1/XAB
TI- An Investigation of the Five Point Restraint System for Aviators
TI- <NOTE> Final rept
AU- DeBellis, W. B.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-21-80
PY- Oct 80
PG- 29p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8109
CP- United States
AB- This report investigated a purported restriction on aircrew leg movements due to the anchor point location of the five point restraint system in the Advanced Attack helicopter (AAH). The system was investigated with aviators wearing both body armor and survival vest. An adjustable AAH crew seat mock-up was used which contained production cushions with anti-torque pedals with toe brakes. Results showed that the current configuration would not restrict the leg motion of the pilot. However, the restraint system did interfere with the body armor and survival vest. This effect confounded the results. (Author)
DE- *Restraint; *Human factors engineering; *Harnesses; Pilots; Aviation safety; Attack helicopters; Aircraft seats; Body armor
ID- NTISDODXA
SH- 94D (Industrial and Mechanical Engineering--Job Environment); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0872064
AA- <NTIS> N81-12742/5/XAB
TI- Mathematical Models of Pilot-Helicopter Systems
AU- Wewerinke, P. H.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-79026-U
PY- 27 Jun 79
PG- 22p
NT- Presented at 5TH European Rotocraft and Powered Lift Aircraft Forum, Amsterdam, 4-7 Sep. 1979.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English
PC- PC A02/MF A01
JA- GRAI8108; STAR1903
CP- Netherlands
AB- A theoretical framework in terms of state space optimization, estimation and decision theory is presented, to allow the description of meaningful (relevant with respect to overall system reliability) pilot functional characteristics. This involves continuous information processing both of display indicators and of the outside world resulting in an internal representation of the task. In the case of control tasks this information processing model is combined with a control response model. This is known as the optimal control model. Preliminary attempts to model pilot monitoring and decision making are described. The resulting integrated model of the man machine system provides measures of pilot workload and system performance. It is shown that the model is a useful tool to deal with many design and operational problems of pilot-helicopter systems.
DE- *Helicopter control; *Man machine systems; *Mathematical models; *Pilot performance; Decision making; Human performance; Manual control; Optimal control; Visual perception; Workloads (Psychophysiology)
ID- *Foreign technology; NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0866203
AA- <NTIS> AD-A091 668/4/XAB
TI- Crew Stress and Fatigue in the PAVE LOW III System
TI- <NOTE> Final rept. Jun 78-Dec 79
AU- Dowd, P. J. ; Brunstetter, F. H.
CS- School of Aerospace Medicine, Brooks AFB, TX.
CS- <CODE> 023467000; 317000
RN- SAM-TR-80-26
CN- 7930; 10
PY- Jul 80
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8106
CP- United States
AB- The purpose of the PAVE LOW III system is to demonstrate that helicopter crews can perform combat rescue at night and in marginal weather conditions. This report discusses the PAVE LOW III system crew stress and fatigue and human factors problems encountered during combat simulated exercises. From the subjective fatigue (SF) data and self-report rating scales it appears that the system significantly stressed experienced test pilots. Workload was extremely demanding of pilot attention, skill, and alertness during terrain following/terrain avoidance, approach to hovering, and hovering maneuvers. It is recommended that the maximum flying time should be no more than 6 hours for these types of missions, and there should be at least 8 hours of uninterrupted sleep or 12 hours of crew rest between missions. Attention should be given to improving the following features: seating, acoustic insulation, display illumination, maps and holders, and communication and ventilation systems. (Author)
DE- *Fatigue(Physiology); *Stress(Physiology); *Human factors engineering; *Rescues; Helicopters; Flight crews; Performance(Human); Military exercises; Simulation; Pilots; Attention; Skills; Vigilance; Terrain avoidance; Terrain following; Hovering; Heart rate; Measurement; Night warfare; Night flight; Recovery; Questionnaires; Ratings
ID- PAVE LOW 3 system; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0864890
AA- <NTIS> AD-465 310/1/XAB
TI- Modification and Outfitting of Instrument Barges
AU- Shellabarger, J. N. ; Cargile, A. M.
CS- Navy Electronics Lab., San Diego, CA.
CS- <CODE> 006868000; 253550
RN- AEC-WT-1032
PY- 1955
PG- 28p
NT- Report on Operation Wigwam, Project 3.9.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC$6.00
JA- GRAI8106
CP- United States
AB- Project 3.9 was primarily concerned with modifying and outfitting three

barges 260 ft in length by 50-ft beam (YFNB 12, 13, and 29) to serve as surface control stations for submersible targets and as support vessels for remote recording instrumentation. The project was developed and concluded in two phases: the first phase consisted of major structural modifications and outfitting, ending at initial sea trial of each individual barge; and the final phase included minor modifications and additional changes to meet operational requirements, terminating at the January sea trial, at which time the barges were considered to be adequate for the final task. The barges performed their intended function in the Wigwam array and proved adequate as target control stations and floating bases for instrumentation. During the rather rough sea conditions encountered, the YFNB's were sufficiently stable to remain as effective elements in the array, permitting uninterrupted helicopter service from their landing platforms at times when difficulty was experienced with other array components. Based on this experience, it is recommended that no element smaller than a 100-ft YC barge be used in a Wigwam type array during tests to be conducted on the open sea. (Author)
DE- *Nuclear explosions; *Barges; Measurement; Instrumentation; Underwater objects; Targets; Maintenance; Modification kits; Test equipment; Test facilities; Electronics laboratories; Effectiveness; Acceptability; Installation; Systems engineering; Electrical equipment; Manpower; Floating docks; Underwater explosions
ID- Wigwam shot; NTISDODXD; NTISDODXDB

AZ- 0864797
AA- <NTIS> AD-360 873/4/XAB
TI- In-Flight Structural Response of an Hss-1 Helicopter to a Nuclear Detonation
TI- <NOTE> Final rept
AU- Walls, J. H. ; Heslin, N. C.
CS- Bureau of Naval Weapons, Washington, DC.
CS- <CODE> 005069000; 068550
RN- AEC-WT-1430
PY- 25 Jul 60
PG- 88p
NT- Report on Operation Plumbob Proj. 5.1.
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8106
CP- United States
AB- An instrumented HSS-1 helicopter was flown in the vicinity of nuclear detonations to measure helicopter response to overpressure and gust and to determine the delivery capabilities of the HSS-1 for antisubmarine warfare as limited by blast effects. Measurements of overpressure and resulting stresses were obtained. Comparisons are shown of experimental gust response data obtained during these HSS-1 tests with prediction of helicopter gust response made possible by employing a six-degrees-of-freedom analysis of helicopter stability and control characteristics and maneuvering loads. Comparison of experimental fuselage stresses with analytical predictions are presented to show the accuracy of the stress analysis methods employed for determination of fuselage response to overpressure. The primary objective of the project was achieved to a certain extent. (Author)
DE- *Helicopters; *Antisubmarine warfare; Damage; Nuclear explosions; Effectiveness; Gusts; Blast; Thermal radiation; Aerodynamic loading; Stresses; Correlation techniques; Pressure; Measurement; Airframes; Mathematical analysis; Instrumentation; Feasibility studies; Nevada; Theory
ID- Diablo shot; H-34 aircraft; Owens shot; Plumbbob operation; Priscilla shot; NTISDODXD; NTISDODWT
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 77D (Nuclear Science and Technology--Nuclear Explosions and Devices)

AZ- 0864085
AA- <NTIS> N81-10703/9/XAB
TI- A Study on Pilot/Observer Interaction in Aligning a Helicopter with a Target
AU- Danneberg, E.
CS- European Space Agency, Paris (France).
CS- <CODE> 062987000; E6854803
SP- National Aeronautics and Space Administration, Washington, DC.
RN- ESA-TT-480; DFVLR-FB-79-04
PY- Jan 80
PG- 32p
NT- Transl. Into English of "Untersuchung des Zusammenwirkens von Pilot und Beobachter Beim Ausrichten des Hubschraubers Auf Ein Ziel", Rept. Dfvlr-FB-79-04, Dfvlr, Brunswick, Nov. 1978. Original Report in German Previously Announced as N79-30945.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- German
DT- Translation
PC- PC A03/MF A01
JA- GRAI8105; STAR1901
CP- France
AB- Speed and stability of the alignment of a helicopter with a target are investigated by means of a system simulation. Variables are the maximum yaw rate of the helicopter, the maximum pan rate of the steerable sight or sensor, and their optical magnification. The results obtained provided favorable combinations of these parameters for two different cases, i.e., target acquisition and target already picked up by means of the sight or sensor, respectively.
DE- *Aircraft maneuvers; *Military helicopters; *Target acquisition; Attack aircraft; Detection; Directional stability; Flight simulation; Optical measuring instruments; Optical tracking; Yaw
ID- *Foreign technology; Translation; NTISNASAT
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0863098
AA- <NTIS> AD-A091 129/7/XAB
TI- Helicopter In-Flight Validation System (HELIVALS)
TI- <NOTE> Final rept
AU- Frezell, T. L. ; Herald, G. ; Camden, R. S. ; Fry, C. A.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-17-80
PY- Aug 80
PG- 25p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8105
CP- United States
AB- This report described the Helicopter In-Flight Validation System (HELIVALS). The system monitors all six degrees of freedom of the helicopter flight control position to include cyclic, collective and anti-torque pedals; along with airspeed, altitude (both barometric and absolute), and geographic position. These data are recorded digitally on a magnetic tape recorder mounted in the helicopter. The recorded data is then processed and reduced in a ground station. (Author)
DE- *Flight recorders; *Degrees of freedom; *Flight; *Helicopters; Data acquisition; Flight paths; Flight maneuvers; Altitude; Tape recorders; Data processing; Telemetering transmitters; Ground stations; Instrumentation; Man machine systems; Performance(Human); Performance(Engineering); Monitors; Computer applications
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0861389
AA- <NTIS> N80-33398/2/XAB
TI- Pilot/Vehicle Model Analysis of Visual and Motion Cue Requirements in Flight Simulation
TI- <NOTE> Final Report
AU- Baron, S. ; Lancraft, R. ; Zacharias, G.
CS- Bolt Beranek and Newman, Inc., Cambridge, MA.
CS- <CODE> 004246000; BS628995
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-3312; REPT-4300
CN- NAS2-10145
PY- Oct 80
PG- 165p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8104; STAR1824
CP- United States
AB- The optimal control model (OCM) of the human operator is used to predict the effect of simulator characteristics on pilot performance and workload. The piloting task studied is helicopter hover. Among the simulator characteristics considered were (computer generated) visual display resolution, field of view and time delay.
DE- *Digital simulation; *Flight simulation; *Helicopter control; *Motion perception; *Pilot performance; *Visual perception; Display devices; Field of view; Hovering; Task complexity; Time lag; Visual tasks
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0861381
AA- <NTIS> N80-33381/8/XAB
TI- Civil Helicopter Wire Strike Assessment Study. Volume 1: Findings and Recommendations
TI- <NOTE> Final Report
AU- Tuomela, C. H. ; Brennan, M. F.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-152389; HUMRRO-FR-MTD(CA)-80-13
CN- NAS2-10505
PY- Oct 80
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8104; STAR1824
CP- United States
AB- Approximately 208 civil helicopter wire strike accidents for a ten year period 1970 to 1979 are analyzed. It is found that 83% of the wire strikes occurred during bright clear weather. Analysis of the accidents is organized under pilot, environment, and machine factors. Methods to reduce the wire strike accident rate are discussed, including detection/warning devices, identification of wire locations prior to flight, wire cutting devices, and implementation of training programs. The benefits to be gained by implementing accident avoidance methods are estimated to be fully justified by reduction in injury and death and reduction of aircraft damage and loss.
DE- *Aircraft accident investigation; *Civil aviation; *Helicopters; *Wire; Collision avoidance; Flight hazards; Pilot performance; Transmission lines
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 0860254
AA- <NTIS> AD-A090 751/9/XAB
TI- Evaluation of Army Aviator Human Factors (Fatigue) in a High Threat Environment
TI- <NOTE> Final rept
AU- Duncan, C. E. ; Sanders, M. G. ; Kimball, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-80-8
CN- 3E162773A819
PY- Sep 80
PG- 72p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8104
CP- United States
AB- Questionnaire data received from student and instructor pilots indicate significant levels of fatigue when flying in different flight altitudes and profiles; the lower the altitude flown, the more rapidly pilots experience fatigue. These data suggest night standard flight is 1.4 times as fatiguing as day standard flight; day terrain flight is 1.3 times as fatiguing as day standard flight; and night terrain flight, the most difficult flight profile examined, is 1.97 times as fatiguing as day standard flight. Army Regulation 95-1, 1 January 1980, sets a maximum of 140 hours per month per aviator of day flight in a combat environment. Existing doctrine emphasizes nap-of-the-earth techniques, and if so accomplished for 140 hours could possibly result in an unsafe and severely fatigued helicopter pilot. Field commanders utilizing the guidelines presented in this report may organize and more effectively continue their mission in Army aviation. (Author)
DE- *Fatigue(Physiology); *Army aviation; *Human factors engineering; Army personnel; Pilots; Helicopters; Altitude; Low Altitude; Flight; Questionnaires; Surveys; Night flight; Daylight
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 0860253
AA- <NTIS> AD-A090 750/1/XAB
TI- SPH-4 Helmet Damage and Head Injury Correlation
TI- <NOTE> Final rept. Apr 75-Jun 79
AU- Slobodnik, B. A.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-80-7
CN- 3E162773A819; 00
PY- Sep 80
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8104
CP- United States
AB- Human tolerance to head impact was assessed by correlating the force levels required to duplicate damage seen in 12 SH-4 aviator helmets retrieved from US Army helicopter crashes with resulting head injury. Head injury occurred at peak acceleration levels far below 400 G, which is the value currently used by the US Army as the pass-fail criterion in evaluating the impact attenuation performance of prospective aircrew helmets. Concussive head injuries occurred below Severity Index values of 1500 and below Head Injury Criterion values of 1000. These are considered concussive threshold values by the National Operating Committee on Standards for Athletic Equipment and by the Department of Transportation, respectively. (Author)
DE- *Flight helmets; Recovery; Damage; Head(Anatomy); Tolerances(Physiology); Simulation; Impact tests; Impact; Crash resistance; Aviation accidents; Wounds and injuries; Correlation techniques
ID- NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0860090
AA- <NTIS> AD-A090 585/1/XAB
TI- Measurements of Unsteady Turbulent Boundary Layers with Pressure Gradients
TI- <NOTE> Final rept. 1 Apr 76-31 May 79
AU- Simpson, R. L. ; Chew, Y. T. ; Shivaprasad, B. G.
CS- Southern Methodist Univ., Dallas, TX. Dept. of Civil and Mechanical Engineering.
CS- <CODE> 014528028; 408948
SP- Army Research Office, Research Triangle Park, NC
RN- WT-6; ARO-13367.4-EX
CN- DAAG29-76-G-0187
PY- Aug 80
PG- 58p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8104
CP- United States
AB- Although periodic unsteady turbulent boundary layers are of real significance in turbomachines and helicopters, little experimental velocity distribution data have been obtained, especially with flow separation. An unsteady turbulent boundary layer facility was developed at SMU to produce almost-sinusoidal waveforms for practical reduced frequencies of the order of unity. Separation occurred on the flat test-wall of the diverging test section. An active boundary layer control system was developed to prevent separation on non-test walls of the test section. Detailed measurements using laser and hot-wire anemometry were made at reduced frequencies of 0.55 and 1.0. Well upstream of separation the flow away from the wall behaved in a quasi-steady manner. Near the wall an unexpected phase shift occurs, which is incompletely explained and may be an instrumentation and apparatus dependent effect.
DE- *Turbulent boundary layer; *Nonuniform flow; *Pressure gradients; Turbulence; Flow separation; Laser velocimeters; Hot wire anemometers; Eddy currents; Periodic variations; Phase studies; Shear stresses; Reynolds number; Helicopters; Turbomachinery
ID- NTISDODXA; NTISDODA
SH- 46B (Physics--Fluid Mechanics); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0860032
AA- <NTIS> AD-A090 527/3/XAB
TI- Artificial and Natural Icing Tests Production UH-60A Helicopter
TI- <NOTE> Test plan 1979-1980
AU- Hanks, M. L.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-79-19
PY- Oct 79

PG- 40p
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8104
CP- United States
AB- The US Army requires the UH-60A helicopter (Black Hawk) to operate safely in an icing environment up to and including the moderate level of intensity. Artificial icing tests were previously conducted in Alaska in 1976 by the United States Army Aviation Engineering Flight Activity (USAAEFA) using a prototype YUH-60A with main and tail rotor deice system and anti-ice provisions for the pilot and copilot windshields, pitot-static tubes and their support struts, engines, and engine inlets. The objectives of this test are to conduct artificial and natural icing flight tests of the production UH-60A helicopter to: Substantiate the effectiveness of the production anti-ice/deice systems; Determine the effectiveness of the ice detection subsystem; Evaluate the effect of ice accumulation on handling qualities and performance. The anti-ice/deice systems will be operating for all tests in the icing environment; Provide data for inclusion in the operator's manual. (Author)
DE- *Deicing systems; *Helicopters; Aircraft equipment; Ice formation; Helicopter rotors; Flight testing; Cold weather tests; Human factors engineering; Aviation safety
ID- UH-60A aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety)

AZ- 0856872
AA- <NTIS> AD-D007 563/0/XAB
TI- Helicopter Extractable Cold Weather/Water Liferaft
TI- <NOTE> Patent Application
AU- Andrew, W. A. ; Shields, C. E. ; Hindlin, H. O. ; Hamilton, R.
CS- Department of the Navy, Washington, DC.
CS- <CODE> 001840000
RN- PAT-APPL-6-176 376
PY- Filed 8 Aug 80
PG- 22p
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Patent
PC- PC A02/MF A01
JA- GRAI8103
CP- United States
AB- The present invention is directed to providing an improvement for a liferaft having a base supporting sides above and a ballasting chamber below for protecting survivors from exposure. A means extends beneath and across the base and terminates above the raft for cradling it and its occupants in a supporting manner. Means is disposed at the termination above the base and sides of the liferaft for positioning a portion to engage a lifting hook and a means is disposed on the ballasting chamber for providing at least one opening for dumping water from the ballasting chamber as the liferaft is lifted from the water by the lifting hook. Thus, the liferaft and its occupants can be retrieved by, for example, a helicopter, without further exposure to allow more effective treatment at a remote aid station. A reflective coating on the inside of a canopy helps prevent hypothermia. It is a prime object of the invention to provide an improvement for liferafts. Another object is to provide an improvement for inflatable liferafts which reduces the exposure to survivors. Another object of the invention is to reduce the hazards attendant to final stages of the rescue operation.
DE- *Patent applications; *Life rafts; *Sea rescue equipment; Helicopters; Air sea rescues; Cold weather
ID- NTISGPN
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 90GE (Government Inventions For Licensing--General)

AZ- 0856389
AA- <NTIS> AD-A089 909/6/XAB
TI- AGARD Flight Test Instrumentation Series. Volume 10. Helicopter Flight Test Instrumentation
AU- Ferrell, K. R.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 056102000; 400043
RN- AGARD-AG-160-VOL-10
PY- Jul 80

PG- 48p
NT- See also Volume 9, AD-A065 938.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8103
CP- France
AB- The definition of flight test will vary as widely as the activity of those who are pursuing the subject. Perhaps the only consensus is that the vehicle be in free atmosphere as opposed to a wind tunnel or an enclosure. Scale models, unpiloted vehicles, tethered, or constrained vehicles are flight tested. The type of power or even the absence of power is not a decisive factor. Flight test may involve measurements, rely upon opinions, or simply be a demonstration of success or failure. This document will deal with flight testing of helicopters where it is necessary to record data which describe the vehicle operation and response to specified conditions and maneuvers. Individual sensors, systems, and recording devices must be incorporated into the test vehicles in a manner that will meet the data requirements within the known constraints. The total instrumentation system is best designed by starting with the data requirements. Accuracy, data quantity, reliability, and physical characteristics of the test vehicle are first considerations. Sensors can then be selected within cost, availability, and installation limitations. Characteristics of the sensor are evaluated to determine recording system requirements. Calibration schedules for sensors and systems can then be established.
DE- *Helicopters; *Flight testing; *Instrumentation; Test equipment; Test facilities; Interfaces; Recording systems; Data processing; Ground support
ID- *Foreign technology; NATO furnished; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0856274
AA- <NTIS> AD-A089 794/2/XAB
TI- Container Lift Adapter-Helicopter (CLAH) Operational Prototype (Preproduction) Militarized Units for Flight Evaluation and Operational Testing
TI- <NOTE> Final rept. Sep 78-Apr 80
AU- Ball, E. G.
CS- Martin Marietta Aerospace, Baltimore, MD. Baltimore Div.
CS- <CODE> 100102001; 403251
SP- Army Aviation Research and Development Command, St. Louis, MO
RN- ER-15047; USAAVRADCOM-TR-80-D-20
CN- DAAK51-78-C-0026; 1L162209AH76; 00
PY- Aug 80
PG- 77p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8103
CP- United States
AB- This report covers the efforts required to manufacture and test two operational preproduction militarized CLAHs for Army flight evaluation and operational suitability. The CLAH is an external load-carrying device that is suspended under a cargo helicopter and enables the helicopter flight crew to automatically align with, engage, lock on, pick up, transport, and deposit an 8- x 8- x 20-foot MILVAN or commercial container without assistance of ground crew. This production prototype CLAH design has evolved from a series of contracts involving research, study, development, and testing of experimental container lifting devices. The design change per this contract included eliminating the retractable guide system and the pyrotechnic emergency jettison system. Reliability, maintainability, logistic and cost analyses were conducted, and orientation/training sessions were provided to enable Government personnel to operate, maintain, repair, and provide logistic support for the CLAH field test program. (Author)
DE- *Helicopters; *Utility aircraft; *Transport aircraft; *Airlift operations; *Cargo handling; Containers; Shipping containers; External; Cargo; Slings; Suspension devices; Adapters; Prototypes; Aircraft equipment; Operation; Materials handling vehicles; Materials handling equipment; Logistics; Training; Maintenance
ID- CLAH(Container Lift Adapter Helicopter); NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74E (Military Sciences--Logistics, Military Facilities, and Supplies)

AZ- 0856236
AA- <NTIS> AD-A089 755/3/XAB
TI- Helicopter Electro-Optical System Display Requirements. I. The Effects of CRT Display Size, System Gamma Function, and Terrain Type on Pilots' Required Display Luminance

TI- <NOTE> Technical rept
AU- Hyman, A. ; Johnson, R. M. ; Gade, P. A.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-TR-441
CN- 2Q162722A765
PY- Mar 80
PG- 29p
NT- See also AD-A086 855.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8103
CP- United States
AB- Twenty-four Army helicopter pilots viewed videotaped segments of low-level and nap-of-the-earth (NOE) helicopter flights as presented on television monitors designed to simulate an airborne low-light-level television cockpit display system. While viewing these displays in an environment having no additional ambient illumination, these pilots were asked to set cockpit monitor luminance at the lowest level that they judged would permit successful flight control over the terrain being overflown. Each pilot adjusted luminance levels for eight different display conditions formed by the factorial combination of display size, type of terrain, and object-luminance to display-luminance transfer function (system gamma function). Results show that pilots used lower luminance settings when viewing the larger of the two display sizes presented. They also used significantly lower luminance settings when viewing wooded terrain, with the system gamma function modified to provide 'enhanced' contrast in the luminance range of interest, as against an unmodified system gamma function. The pilot's subjective impressions agreed with their measured settings. This report discusses the impact of these results on the specifications of display requirements for a low-light-level television system for aiding night NOE flight. (Author)
DE- *Television display systems; *Night flight; *Dark adaptation; *Performance(Human); *Cathode ray tube screens; Luminance; Low light levels; Brightness; Military requirements; Helicopters; Terrain following; Electrooptics; Sizes(Dimensions)
ID- Nap of the earth flight; Gamma functions; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 0855424
AA- <NTIS> N80-31391/9/XAB
TI- Helicopter-Ship Qualification Testing
AU- Renirie, L. T. ; Hoekstra, T.
CS- National Aerospace Lab., Amsterdam (Netherlands).
CS- <CODE> 016123000; NE736790
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NLR-MP-79027-U
PY- 3 Jul 79
PG- 16p
NT- Presented at 5TH European Rotorcraft and Powered Lift Aircraft Forum, Amsterdam, 4-7 Sep., 1979.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8102; STAR1822
CP- Netherlands
AB- A test method was developed for establishing limits for helicopter takeoff and landing imposed by turbulence and flight deck motion. An onboard recorder monitors the helicopter engine parameters, collective pitch lever position, pedal position, radar altitude, vertical and lateral acceleration, and instant of takeoff and landing. Onboard ship, relative wind speed and direction, pitching and rolling angles, and vertical and lateral acceleration are recorded. To quantify the human factors in controlling the helicopter a pilot rating technique is applied. It was found that operational limits for the helicopter in terms of relative wind speed and direction can be established straightforwardly. With respect to ship motion, it was found satisfactory to use the 2 sigma value of motion parameters as a representative measure to define limits. Wind tunnel tests of ship models are described.
DE- *Aircraft landing; *Flight tests; *Helicopter performance; *Ships; Data acquisition; Marine environments; Takeoff; Turbulence; Wind effects; Wind tunnel tests
ID- *Foreign technology; NTISNASAE
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0854718
AA- <NTIS> AD-A089 191/1/XAB
TI- Development of a Dust Cloud Mass Measuring System
TI- <NOTE> Final rept. 1 Jun-31 Dec 78
AU- Duke, R. K.
CS- Kaman Sciences Corp., Colorado Springs, CO.
CS- <CODE> 056307000; 389119
SP- Defense Nuclear Agency, Washington, DC; Shared Bibliographic Input Experiment
RN- K-79-9U; DNA-4829F; AD-E300 899
CN- DNA001-78-C-0207; H35HAXY; X956
PY- 1 Jan 79
PG- 87p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8102
CP- United States
AB- This report describes the concepts, design feasibility, fabrication and testing of a dust cloud mass measuring system. The early-time (less than 2 minutes) measuring system featured an aerodynamically designed measuring canister and a helicopter delivery and sighting technique specifically designed for use on MISERS BLUFF Phase II, Events 1 and 2. The report describes the development activities and field testing. Due to operational (not technical) problems, no dust measurements were made in either of the MISERS BLUFF events. Conclusions, recommendations and a detailed drawing package of the measuring canister are also presented. (Author)
DE- *Dust clouds; Instrumentation; Aerial delivery; Nuclear explosion simulation; Mass; Measurement; Dust; Distribution; Canisters; Aerodynamic characteristics; Targeting; Data acquisition; Air drop operations; Parachute descents; Feasibility studies; Field tests
ID- NTISDODXA; NTISDODSD
SH- 77D (Nuclear Science and Technology--Nuclear Explosions and Devices); 79E (Ordnance--Detonations, Explosion Effects, and Ballistics)

AZ- 0849811
AA- <NTIS> AD-A088 527/7/XAB
TI- Helicopter Electro-Optical System Display Requirements: III. The Effects of CRT Display Size and Luminance on Dark Adaptation of Helicopter Pilots
TI- <NOTE> Technical rept
AU- Johnson, R. M. ; Hyman, A. ; Gade, P. A.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-TR-443
CN- 2Q162722A765
PY- Mar 80
PG- 18p
NT- See also AD-A086 855.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8026
CP- United States
AB- Previous research has indicated that pilots may be able to successfully use a television display of low luminance level as an aid to nighttime nap-of-the-earth helicopter flight. This experiment was conducted to assess the effects of display luminance level and display size on pilots' visual dark adaptation. Brightness matches made by 12 Army helicopter pilots were used to determine the magnitude of the dark-adaptation loss that resulted from viewing a 13-cm and a 26-cm CRT display at relatively bright and dim luminance levels. In the procedure used, one eye was light adapted to the CRT panel display while the other eye remained dark adapted. Then, while the pilots viewed a simulated windscreen display, the luminance setting for the dark-adapted eye was adjusted independently until the display appeared equally bright to both eyes. Windscreen display luminance for the previously light-adapted eye remained fixed at a highlight brightness of 0.01 footlambert (equivalent to full-moon illumination). The larger display was judged to produce the greater dark-adaptation loss, even though the larger display could be successfully used at a lower luminance level. This result might have been due the the greater involvement of the peripheral rod retinal receptor cells when pilots made judgments following exposure to the larger light-adapting display. In such a case, selective attenuation of the blue end of the spectral energy output from the CRT phosphor could reduce the magnitude within 1 second after light adaptation to a dim 26-cm television display showed

a 67% loss in the apparent brightness of the windscreen display. This is equivalent to flying under one-third full-moon conditions.
DE- *Television display systems; *Night flight; *Dark adaptation; *Human factors engineering; Brightness; Cathode ray tube screens; Pilots; Helicopters; Terrain following; Cockpits; Low light levels; Night vision
ID- Nap of the earth flight; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0844119
AA- <NTIS> N80-28330/2/XAB
TI- Analytical Methodology for Determination of Helicopter Ifr Precision Approach Requirements
AU- Phatak, A. V.
CS- Analytical Mechanics Associates, Inc., Mountain View, CA.
CS- <CODE> 030966000; AU945491
SP- National Aeronautics and Space Administration, Washington, DC.
RN- NASA-CR-152367
CN- NAS2-10291
PY- Jul 80
PG- 124p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8024; STAR1819
CP- United States
AB- A systematic analytical approach to the determination of helicopter IFR precision approach requirements is formulated. The approach is based upon the hypothesis that pilot acceptance level or opinion rating of a given system is inversely related to the degree of pilot involvement in the control task. A nonlinear simulation of the helicopter approach to landing task incorporating appropriate models for UH-1H aircraft, the environmental disturbances and the human pilot was developed as a tool for evaluating the pilot acceptance hypothesis. The simulated pilot model is generic in nature and includes analytical representation of the human information acquisition, processing, and control strategies. Simulation analyses in the flight director mode indicate that the pilot model used is reasonable. Results of the simulation are used to identify candidate pilot workload metrics and to test the well known performance-work-load relationship. A pilot acceptance analytical methodology is formulated as a basis for further investigation, development and validation.
DE- *Approach control; *Glide paths; *Helicopter control; *Instrument flight rules; *Landing simulation; *Pilot performance; Aircraft landing ; All-weather landing systems; Man machine systems; Task complexity; Uh-1 helicopter
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0843346
AA- <NTIS> AD-916 572/1/XAB
TI- Proceedings of a Symposium on Visually Coupled Systems: Development and Application, Held at Brooks Air Force Base, Texas 8 - 9 - 10 November 1972
AU- Birt, J. A. ; Task, H. L.
CS- Aerospace Medical Div., Brooks AFB, TX.
CS- <CODE> 000522000; 009800
RN- AMD-TR-73-1
PY- Sep 73
PG- 622p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A99/MF A01
JA- GRAI8024
CP- United States
AB- This first VCS symposium was sponsored by the Air Force System Command's Aerospace Medical Division (AMD) at Brooks AFB, Texas, and by AMD's laboratory which has promoted Air Force VCS development and application work, the Aerospace Medical Research Laboratory from Wright-Patterson AFB, Ohio. Participants and papers from DOD agencies and industry brought together the major VCS ideas as of November 1972. A visually-coupled system integrates the natural visual and motor skills of an operator with the machine he is controlling. The VCS operator visually searches for, finds, and tracks an object of interest. His line-of-sight is measured and used to aim sensors and/or weapons toward the object. Information related to his visual/motor task from sensors, weapons, or central data sources is fed back directly to

his vision by special displays so as to enhance his task performance. Currently a helmet-mounted sight (HMS) is used to measure head position and line-of-sight and a helmet-mounted display (HMD) is used to feed back information to the eye. R and D efforts are underway to reduce size, weight, and increase the performance of future VCS devices. Such advanced VCS concepts as eye position sensing/control and dual field of view sensors/displays are being explored for future improved man-machine integration. (Author)

DE- *Helmets; *Head up displays; *Man machine systems; *Symposia; Display systems; Sights; Optical tracking; Target acquisition; Pilots; Military personnel; Human factors engineering; Helicopters; Computer graphics; Digital systems; Television display systems; Optics; Electrooptics; Ultrasonic radiation; Holography; Simulation

ID- *Visually coupled systems; Helmet mounted displays; Head aimed TV; Off-boresight weapons delivery; Sorcerers apprentice; Visual target acquisition system; VTAS(Visual target acquisition system); See through helmet mounted; Sight and display; NTISDODXD

SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 49B (Electrotechnology--Circuits); 79F (Ordnance--Fire Control and Bombing Systems); 46C (Physics--Optics and Lasers); 63F (Detection and Countermeasures--Optical Detection)

AZ- 0841328

AA- <NTIS> AD-A087 319/0/XAB

TI- Adhesive Coatings for DH-411 Helmets

TI- <NOTE> Technical communication

AU- Lazowski, J. C. ; Adams, J. W.

CS- Defence and Civil Inst of Environmental Medicine, Downsview (Ontario).

CS- <CODE> 062120000; 406986

RN- DCIEM-TC-80-C-02

PY- Jan 80

PG- 18p

NT- Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A02/MF A01

JA- GRAI8023

CP- Canada

AB- Helicopter helmets in the Canadian Forces are required in two interchangeable roles, white and camouflaged. At present, helmets used by members of tactical helicopter squadrons are painted green to achieve the camouflage effect. Painting and stripping of helmets are time-consuming tasks which may deteriorate the impact protection of the helmet. Two adhesive coatings, olive drab gun tape and an adhesive vinyl coating in a disruptive pattern, were evaluated to determine the effect of extremes of temperature upon the coatings and the coated helmet shell. It was found that a marked discolouration of the helmet shell occurred during seven-hour exposures to 200 f when coated with olive drab gun tape. It is concluded that the adhesive vinyl coating is superior to the gun tape on the basis of appearance and discolouration of the helmet shells. (Author)

DE- *Flight helmets; *Coatings; *Camouflage; Plastic coatings; Vinyl plastics; Adhesives; Tapes; Comparison; Discoloration; Flight crews; Helicopters; Military forces(Foreign)

ID- *Foreign technology; Olive drab; Gun tape; NTISDODXA

SH- 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0838471

AA- <NTIS> AD-A086 855/4/XAB

TI- Helicopter Electro-Optical System Display Requirements. II. Performance of Helicopter Pilots When Using a Low-Light-Level Television System during Simulated Night Nap-of-the-Earth Flight

TI- <NOTE> Technical rept

AU- Hyman, A. ; Johnson, R. M. ; Gade, P. A.

CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.

CS- <CODE> 054823000; 408010

RN- ARI-TR-442

CN- 2Q162722A765

PY- Mar 80

PG- 21p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

LA- English

PC- PC A02/MF A01

JA- GRAI8022

CP- United States

AB- Previous ARI research has shown that pilots feel they can successfully use a low-light-level television system as an aid in night nap-of-the-earth (NOE) flight, even when the highlight luminance of its

display is as little as 0.06 footlambert (fL). Videotaped presentations were used in this prior research, and estimations of the lowest usable display luminance were established on the basis of pilot judgment. The present experiment was designed to provide more objective evidence for determining the utility of such low-luminance displays when they are used as aids in night NOE flight. Each of 24 Army helicopter pilots made 24 simulated flights over a highly realistic three-dimensional terrain model as generated from an optical probe used in conjunction with an SIT television camera. The results showed that pilots had fewer crashes when using a larger display. All pilots flew as well with displays set so that highlight luminance was about 0.05 fL as they did with displays set so highlight luminance was about 0.2 fL. This report discusses the implications of these results for designing a usable low-light-level television system for night NOE flight. (Author)
DE- *Television display systems; *Night flight; Flight simulation; Low light levels; Pilots; Dark adaptation; Helicopters; Terrain following; Man machine systems; Low altitude; Cathode ray tube screens; Sizes(Dimensions); Cockpits; Electrooptics; Military requirements; Brightness
ID- Nap of the earth flight; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0838076
AA- <NTIS> AD-A086 458/7/XAB
TI- Tactical Night Terrain Flight Navigation
TI- <NOTE> Final rept
AU- Bynum, J. A. ; Holman, G. L.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RR-1226
CN- 2Q263743A772
PY- Sep 79
PG- 48p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8022
CP- United States
AB- This report documents two experiments which were conducted to determine the training required to improve tactical night terrain flight aircrew performance. These experiments sought, specifically, to identify critical factors which should be included in a program of instruction for tactical night terrain flight navigation training with unaided vision. In the first experiment a passive navigation task was used to establish an altitude which would provide adequate training with a safety margin, the types of terrain or other features which should be used for checkpoint identification, and the effect of daylight exposure to a route on subsequent navigation performance. Using Experiment I as a building block, Experiment II tested the effects on active navigation performance of light level, type of map, and order in which light level was experienced. Multiple step-wise linear regression was used to determine associations among the variables and provided an accounting of the variance attributable to each variable of interest. It was concluded that unaided vision navigation is possible at illumination levels as low as .0002 foot candles. Instructional programs must consider restrictions to visibility, map type, proper preflight planning, adequate dark adaptation, a standardized intra-cockpit phraseology, and should use natural terrain features with vertical relief for checkpoint identification. (Author)
DE- *Night flight; *Navigation; *Flight training; Flight paths; Low light levels; Pilots; Dark adaptation; Terrain; Maps; Visibility; Routing; Terrain following; Low altitude; Contours; Helicopters; Performance(Human)
ID- Terrain flying; Nap of the earth; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0837652
AA- <NTIS> PB80-809072/XAB
TI- Head Up Displays. 1976-April, 1980 (Citations from the International Aerospace Abstracts Data Base)
TI- <NOTE> Rept. for 1976-Apr 80
AU- Hippler, R.
CS- New England Research Application Center, Storrs, CT.
CS- <CODE> 040990000
SP- National Technical Information Service, Springfield, VA.
PY- May 80
PG- 80p
NT- Sponsored in part by National Technical Information Service,

Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8021
CP- United States
AB- Head up displays (HUDs) are the subject of this retrospective survey of much of the world aerospace literature. Design, fabrication and use, and applications to specific aircraft, such as the F-4E, Jaguar, Tornado, F-18, Viggin, A-10, AV-8B, Sea Harrier, Space Shuttle, helicopters, KC-135S, and in commercial aircraft, are discussed. A look at the future in this field is also presented. (Contains 70 citations)
DE- *Bibliographies; Display devices; Avionics; Design; Utilization; Abstracts
ID- *Head up displays; NTISNTIST
SH- 51E* (Aeronautics and Aerodynamics--Avionics); 49E (Electrotechnology--Optoelectronic Devices and Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0837651
AA- <NTIS> PB80-809064/XAB
TI- Head Up Displays. 1970-April, 1980 (Citations from the NTIS Data Base)
TI- <NOTE> Rept. for 1970-Apr 80
AU- Hippler, R.
CS- New England Research Application Center, Storrs, CT.
CS- <CODE> 040990000
SP- National Technical Information Service, Springfield, VA.
PY- May 80
PG- 133p
NT- Sponsored in part by National Technical Information Service, Springfield, VA.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8021
CP- United States
AB- Head up displays (HUDs) are the subject of this retrospective survey of much of the world aerospace literature. Design, fabrication and use, and applications to specific aircraft, such as the F-4E, Jaguar, Tornado, F-18, Viggin, A-10, AV-8B, Sea Harrier, Space Shuttle, helicopters, KC-1358, and in commercial aircraft, are discussed. A look at the future in this field is also presented. (Contains 116 citations)

DE- *Bibliographies; Display devices; Avionics; Design; Utilization; Abstracts
ID- *Head up displays; NTISNTISN
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 48E (Natural Resources and Earth Sciences--Soil Sciences)

AZ- 0835347
AA- <NTIS> PB80-812837/XAB
TI- Search and Rescue Methods and Equipment. 1964-June, 1980 (A Bibliography with Abstracts)
TI- <NOTE> Rept. for 1964-Jun 80
AU- Kenton, E.
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 055665000
PY- Jul 80
PG- 269p
NT- Supersedes NTIS/PS-79/0649 and NTIS/PS-78/0539.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI8020
CP- United States
AB- Reports dealing with maritime and aviation search and rescue are presented. Studies are included on search and rescue planning, locating equipment, rescue beacons, communication devices, specialized aircraft and their components, and searching strategies. Underwater rescue and survival are excluded. (This updated bibliography contains 262 abstracts, 30 of which are new entries to the previous edition.)
DE- *Bibliographies; *Search and rescue; Air sea rescues; Rescue operations

; Rescue equipment; Searching; Detection; Radio beacons; Rescue beacons ; Crash locator beacons; Sea markers; Helicopters; Coast Guard; Aviation safety; Rescue systems; Computerized simulation; Communication satellites; Relay satellites; Transmitter receivers; Direction finding; Distress signals; Search radar; Downed aircraft; Survival kits; Loran; Omega navigation; Navigational aids; Crash rescue boats; Survival equipment; Life rafts
ID- Flying drift search tactics; Sprint drift search tactics; Sea loiter aircraft; Sea sitting aircraft; Loran C navigation systems; NTISNTISN
SH- 85GE* (Transportation--General); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0834051
AA- <NTIS> AD-A085 812/6/XAB
TI- Results of a Simulator Investigation of Control System and Display Variations for an Attack Helicopter Mission
AU- Aiken, E. W. ; Merrill, R. K.
CS- Army Research and Technology Labs., Moffett Field, CA.
CS- <CODE> 041432000; 410540
PY- May 80
PG- 25p
NT- Presented at the Annual Forum of the American Helicopter Society (36th) held in Washington, DC, May 80.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8020
CP- United States
AB- A piloted simulator experiment designed to assess the effects on overall system performance and pilot workload of variations in control system characteristics and display format and logic for a nighttime attack helicopter mission is described. The simulation facility provided a representation of a helmet-mounted display image consisting of flight-control and fire-control symbology superimposed on the background video from a simulated forward-looking infrared sensor. Control systems ranging from the baseline stability and control augmentation system to various hover augmentation schemes were investigated together with variations in the format and logic of the superimposed symbology. Selected control system and display failures were also simulated. The results of the experiment indicate that the baseline control/display system is unsatisfactory without improvement for the evaluation task which included a hovering target search and acquisition. Significant improvements in pilot rating were achieved by both control system and display variations. (Author)
DE- *Flight maneuvers; *Man machine systems; Flight control systems; Aircraft fire control systems; Helmet mounted displays; Forward looking infrared systems; Attack helicopters; Night flight; Pilots; Human factors engineering; Flight simulators; Hovering; Target acquisition; Target designators
ID- Workload; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 79F (Ordnance--Fire Control and Bombing Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0830386
AA- <NTIS> AD-A085 135/2/XAB
TI- Advanced Subsystems Status Monitor
TI- <NOTE> Final rept. Oct 78-Oct 79
AU- McGee, J. ; Harper, H.
CS- United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
CS- <CODE> 064899001; 323800
SP- Army Aviation Research and Development Command, St. Louis, MO
RN- SER-510025; USAAVRADCOM-TR-80-D-5
CN- DAAK51-78-C-0023; 1L162209AH76; 00
PY- Apr 80
PG- 261p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A12/MF A01
JA- GRAI8019
CP- United States
AB- Five tasks were completed toward the design of an advanced Subsystem Status Monitor that will reduce crew workload during the monitoring of helicopter subsystems: (1) Analysis of parameters currently monitored in the UH-60A, CH-47C, OH-58C, and AH-1G Army helicopters, and recommendation of information requirements for these helicopters, (2) Development of prioritization, logic, and display formats for the presentation of subsystem information on multi-function electronic displays for the above-mentioned helicopters, (3) Preliminary design of system architectures incorporating state-of-the-art, near-term and

long-term technologies into an advanced Subsystem Status Monitor, (4) Evaluation of preliminary designs to determine predicted impacts on flight safety, workload, reliability and maintainability, survivability and vulnerability, aircraft space and volume, aircraft weight, and life cycle costs, (5) Design of keyboard and associated display formats for the following peripheral functions: checklist presentation, performance calculation, and load monitoring. (Author)
DE- *Helicopters; *Display systems; *Monitors; Data processing; Systems analysis; Formats; Experimental design; Computer logic; Army aircraft; Cockpits; Man computer interface
ID- NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0825742
AA- <NTIS> AD-A084 231/0/XAB
TI- Visual Problems and Night Landing Guidance of the CH-47 (Chinook) Helicopter
TI- <NOTE> Technical memo
AU- Clark, B. A. J.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> 000377000; 008650
RN- ARL/SYS-TM-50
PY- Nov 79
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8018
CP- Australia
AB- Visual ergonomics problems in the Chinook helicopter were investigated in a study following an earlier, broader ergonomics study by ARL Cybernetics Group. Important visual problems do occur in the Chinook and solutions or further studies are suggested as appropriate. Brief trials of tactical night landing devices were observed, and these are discussed in the light of previous DSTO participation in the development of visual landing guidance systems. Improvements to the devices currently in use are necessary to improve operational effectiveness and flight safety. (Author).
DE- *Night landings; Human factors engineering; Helicopters; Landing aids; Approach lights; Approach indicators; Pilots; Ergonomics; Night vision; Reflection; Instrument panels; Pilot seats
ID- *Foreign Technology; H-47 aircraft; CH-47 aircraft; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0823488
AA- <NTIS> AD-A084 015/7/XAB
TI- Flight Evaluation of a Radar Cursor Technique as an Aid to Airborne Radar Approaches
TI- <NOTE> Interim rept. Jul-Aug 79
AU- Perez, J.
CS- National Aviation Facilities Experimental Center, Atlantic City, NJ.
CS- <CODE> 015247000; 240550
SP- Federal Aviation Administration, Washington, DC. Systems Research and Development Service
RN- FAA-NA-80-8; FAA-RD-80-18
PY- Mar 80
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8017
CP- United States
AB- This report presents preliminary results of a flight test evaluation of a radar cursor technique to be used as an aid in acquiring and tracking the desired ground track during airborne radar approaches. The test was performed using a Sikorsky CH-53A helicopter on loan from NASA and based at NAFEC. The airborne radar system used was a BENDIX RDR-1400A modified to electronically produce a radar cursor display of course error. Airborne radar approaches were made to an offshore and an airport test environment located within a 60 nautical mile radius of NAFEC. Systems Control, Inc. (SCI), provided contractor services in the areas of test planning, data reduction, and final report preparation. The specific purpose of the test was to evaluate the practical utility of the radar cursor as an aid to performing airborne radar approaches. The preliminary conclusion of this test was that the use of the radar cursor improved course acquisition and ground tracking significantly with pilotage errors and total system cross-track errors reduced by one-half or better. The radar cursor technique showed potential in

reducing airspace requirements for airborne radar approaches. SCI is presently completing data reduction and analysis and will publish a final report in the near future. (Author)
DE- *Display systems; *Radar tracking; *Radar beacons; *Approach; Flight testing; Errors; Helicopters; Airborne
ID- IFR(Instrument Flight Rules); ARA(Airborne Radar Approach); Radar approaches; Radar cursors; CH-53A aircraft; Course acquisition; Cursor errors; NTISDODXA; NTISDOTFAA
SH- 63H (Detection and Countermeasures--Radiofrequency Detection); 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0823250
AA- <NTIS> AD-A083 777/3/XAB
TI- Study to Determine the Impact of Aircrew Anthropometry on Airframe Configuration
TI- <NOTE> Final rept. 30 Jun 74-31 Oct 76
AU- Atkins, E. R. ; Dauber, R. L. ; Karas, J. N. ; Pfaff, T. A.
CS- Vought Corp., Dallas, TX. Systems Div.
CS- <CODE> 047967003; 409686
SP- Army Aviation Systems Command, St. Louis, MO
RN- 2-57110/5R-3244; USAAVSCOM-75-47
CN- DAAJ01-74-C-1107
PY- 31 Oct 76
PG- 522p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A22/MF A01
JA- GRAI8017
CP- United States
AB- This technical report presents the results of a study to determine the impact of aircrew anthropometry on airframe shape, size, weight, and cost, and their influence on flight performance factors of hover ceiling, maximum rate of climb, and maximum level flight airspeed. Definition of crew station variables was completed for both human factors and machine factors corresponding to various percentile ranges. These defined variables were used to determine the influence the selection of percentile range has on the final airframe configuration in terms of size, weight, performance, and cost. (Author)
DE- *Anthropometry; *Man machine systems; *Helicopters; Airframes; Flight crews; Aircraft equipment; Human factors engineering; Army aircraft; Statistical distributions; Trade off analyses; Envelope(Space); Flight clothing; Aircraft seats; Life support systems; Line of sight; Performance(Engineering); Cost analysis; Sizes(Dimensions); Weight
ID- Reach envelopes; NTISDODXA; NTISDODA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0820855
AA- <NTIS> AD-A083 219/6/XAB
TI- Prediction of Body Temperatures during Exercise in Flying Clothing
AU- Belyavin, A. J. ; Gibson, T. M. ; Anton, D. J. ; Truswell, P.
CS- Flying Personnel Research Committee, London (England).
CS- <CODE> 017340000; 140500
RN- FPRC/1378
PY- Mar 79
PG- 10p
NT- Pub. in Aviation, Space, and Environmental Medicine, v50 n9 p911-916 Sep 79 (No copies furnished by DTIC/NTIS).
LA- English
DT- Journal article
PC- Not available NTIS
JA- GRAI8016
CP- United Kingdom
AB- No abstract available.
DE- *Exercise(Physiology); *Protective clothing; *Flight clothing; Body temperature; Measurement; Mathematical models; Males; Helicopters; Mathematical prediction; Reprints
ID- *Foreign Technology; NTISDODXR
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 57W (Medicine and Biology--Stress Physiology)

AZ- 0820737
AA- <NTIS> AD-A083 101/6/XAB
TI- Resolving Power of the Eye Using Color Cathode-Ray Tubes. (Pouvoir Separateur de l'Oeil sur Tube Cathodique Couleur)
AU- Santucci, G. F.
CS- Army Medical Intelligence and Information Agency Fort Detrick MD
CS- <CODE> 409112
RN- USAMIIA-K-9921

PY- 24 Mar 80
PG- 16p
NT- Trans. of Operational Helicopter Aviation Medicine (Paris) p39-1-39-10 Dec 78, Rept no. AGARD-CP-255, AD-A065 234.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Translation
PC- PC A02/MF A01
JA- GRAI8016
CP- France
AB- No abstract available.
DE- *Visual acuity; *Colors; Color television; Contrast; Television display systems; Flight; Flight crews; Images; Helicopters
ID- *Foreign Technology; Translations; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0819404
AA- <NTIS> N80-20231/0/XAB
TI- Operational Implications of Some Naca/NASA Rotary Wing Induced Velocity Studies
AU- Heyson, H. H.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
CS- <CODE> 019041001; ND210491
RN- NASA-TM-80232
PY- Feb 80
PG- 53p
NT- Presented at 3D Midwest Helicopter Safety Seminar, Joliet, Ill., 26-27 Feb., 1980; Sponsored by FAA and Ill. Dept. Of Transportation.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8015; STAR1811
CP- United States
AB- Wind tunnel measurements show that the wake of a rotor, except at near-hovering speeds, is not like that of a propeller. The wake is more like that of a wing except that, because of the slow speeds, the wake velocities may be much greater. The helicopter can produce a wake hazard to following light aircraft that is disproportionately great compared to an equivalent fixed-wing aircraft. This hazard should be recognized by both pilots and airport controllers when operating in congested areas. Even simple momentum theory shows that, in autorotation and partial-power descent, the required power is a complex function of both airspeed and descent angle. The nonlinear characteristic, together with an almost total lack of usable instrumentation at low airspeeds, has led to numerous power-settling accidents. The same theory shows that there is a minimum forward speed at which a rotor can autorotate. Neglect of, or inadequate appraisal of this minimum speed has also led to numerous accidents. Ground effect and the problems it creates is discussed.
DE- *Aircraft safety; *Flow distribution; *Flow velocity; *Helicopter wakes ; Aircraft accidents; Airspeed; Autorotation; Ground effect (Aerodynamics); Momentum theory
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 85D (Transportation--Transportation Safety)

AZ- 0818025
AA- <NTIS> AD-A082 964/8/XAB
TI- A Fire Simulator/Shutter System for Testing Protective Fabrics and Calibrating Thermal Sensors
TI- <NOTE> Final rept
AU- Knox, F. S. ; Sauermilch, P. W. ; Wachtel, T. L. ; McCahan, G. R. ; Trevethan, W. P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-79-4
CN- 3E762173A819
PY- Mar 79
PG- 77p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI8015

CP- United States
AB- The design, construction, calibration, and use of a JP-4 fueled, shuttered furnace is described. Based on a NASA design, this furnace simulates the radiative and convective thermal environment of a postcrash fire in rotary-wing aircraft. Heat fluxes ranged from 0.5 to 3.6 + or - 3% calories per square centimeter per second with steady-state furnace wall temperatures from 519 C (967 F) to 1353 C (2450 F) and a radiative/total flux ratio of approximately 0.9. A pneumatically propelled, water cooled shutter, mounted in a rolling animal carrier, controlled the exposure of pigs and thermal sensors to the fire. An electronic data acquisition and control system is also described. This system automatically controlled the opening and closing of the shutter and provided strip chart and FM magnetic tape records of exposure time, furnace wall temperature, heat flux, and sensor output. Sources of error including nonuniformity of flame front and shutter dynamics are discussed. Methods of animal handling, burn grading, and photographic documentation are introduced along with a brief description of some nine experimental protocols carried out using this fire simulator shutter system. (Author)
DE- *Fire protective clothing; *Test methods; *Fires; *Simulators; Fabrics; Shutters(Optics); Detectors; Control systems; Photography; Thermal properties; Furnaces; Heat flux; Rotary wing aircraft; Crashes; Exposure(General); Flames; Charts; Documents
ID- Protective fabrics; Fire simulators; Bioassay methods; NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0817893
AA- <NTIS> AD-A082 831/9/XAB
TI- Flight Evaluation of Nondimensional Static Longitudinal Stability Test Methods
TI- <NOTE> Final rept. Nov 74-Feb 75
AU- Ferrell, K. R. ; Boirun, B. H. ; Jenks, J. E.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-74-87
PY- Jul 79
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8015
CP- United States
AB- Stability and control testing of helicopters at this activity has included performing discrete tests at representative mission conditions, as well as extremes of altitude, airspeed, vertical speed, rotor speed, gross weight, and center of gravity location. Special studies and tests concluded that the use of nondimensional parameters commonly used in performance analysis such as the thrust coefficient, advance ratio, and advancing tip Mach number could be used to reduce the number of independent test variables in stability and control testing. These studies also indicated that constant referred rotor speed might be better for isolation of compressibility effects than the conventional constant rotor speed method for obtaining nondimensional test data. This test investigated the relative advantage of obtaining static longitudinal stability and trim control data as a function of the nondimensional parameters using both the constant referred and constant rotor speed methods on a UH-1M helicopter. Within the accuracy of the test instrumentation, the static longitudinal trim control position data were found to be a function of thrust coefficient and advance ratio. The collective fixed static longitudinal stability was primarily a function of advance ratio only. The advancing tip Mach number did not have a significant effect on the longitudinal stability data on this test helicopter. Static longitudinal stability and control trim position can be defined by obtaining data over the full range of the thrust coefficient and advance ratio envelope and then using the nondimensional method to calculate intermediate value. (Author)
DE- *Static stability; Helicopters; Pitch(Motion); Gradients; Test methods; Flight testing; Helicopter rotors; Flight control systems; Thrust; Coefficients; Airspeed; Center of gravity; Parametric analysis; Rotor blades(Rotary wings); Wing tips; Mach number
ID- H-1 aircraft; UH-1M aircraft; Nondimensional parameters; Trim testing; Level flight; Advance ratio; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0816356
AA- <NTIS> AD-A082 203/1/XAB
TI- A Dynamic Evaluation of the Integrated Avionics Control System (IACS)
TI- <NOTE> Final rept
AU- DeBellis, W. B.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-2-80

PY- Feb 80
PG- 55p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8014
CP- United States
AB- The Integrated Avionics Control System (IACS) was developed to reduce crew member workload and save cockpit space by controlling all airborne communication systems from a single control panel. This investigation compares the IACS with a suite of standard communication radios through the use of computer graphics, mockups, and hardware. It was concluded (1) that there is a definite savings in cockpit space, (2) the crew workload is reduced, and (3) cockpit 'bookkeeping' related to communications is a significant portion of the workload. (Author)
DE- *Avionics; *Human factors engineering; Integrated systems; Control systems; Airborne; Cockpits; Space(Room); Helicopters; Flight crews; Pilots
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0809197
AA- <NTIS> AD-A080 958/2/XAB
TI- Research Needs Relating to Aircrew Visual Requirements: Proceedings of the 1979 Symposium Held at the National Academy of Sciences, Washington, DC
AU- Rosenwasser, H. ; Chisum, G. T. ; Morway, P. E.
CS- Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> 032381022; 393532
RN- NADC-79253-60
CN- WR04101; WR0410101
PY- 11 Apr 79
PG- 171p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8012
CP- United States
AB- Contents: Fixed Wing Operations; Helicopter/Search and Rescue; Visual Operational Considerations in Vertical/Short Take-off and Landing (V/STOL) Aircraft; Advanced Display Concept; Visual and Clinical Considerations; Human Factors Vision R&D Program at NAMRL; The U.S. Army Aeromedical Research Laboratory Vision Research Program; Monitoring Eye Movements for Wide Angle Displays; Retinal Disparity: Detection and Processing; Continuous Evoked Responses as an Indicator of 'g' Tolerance; Dependence of Foveal Visual Acuity on the Size of the Receptive of Retinal Ganglion Cells; Eye Responses in a Virtual Image Display Environment.
DE- *Vision; *Flight crews; Retina; Helicopters; Short takeoff aircraft; Eye movements; Display systems; Response(Biology); Human factors engineering; Vertical takeoff aircraft
ID- Visual requirements; NTISDODXA
SH- 57S (Medicine and Biology--Physiology)

AZ- 0807054
AA- <NTIS> AD-A080 138/1/XAB
TI- Airworthiness and Flight Characteristics Evaluation. OH-58C Interim Scout Helicopter
TI- <NOTE> Final rept. Jun-Dec 78
AU- Spring, S. C. ; Niemann, J. R. ; Burch, T. E. ; Buckanin, R. M.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 061576000; 409025
RN- USAAEFA-76-11-2
PY- Apr 79
PG- 205p
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8011
CP- United States
AB- The United States Army Aviation Engineering Activity conducted an airworthiness and flight characteristics evaluation of the OH-58C Interim Scout helicopter. Performance, handling qualities, and vibration characteristics were evaluated to provide engineering test

data for use in the OH-58C Operator's Manual and to detect any aircraft deficiencies or shortcomings. The OH-58C was tested at Edwards Air Force Base, California (elevation 2302 feet), and alternate test site elevations of 4120, and 9980 feet. A total of 97 flights were conducted for a total of 123.5 flight hours. Due to the more powerful T63-A-720 engine installed in the helicopter, the hover and takeoff capability at heavy gross weights and high altitudes and the forward flight climb performance of the OH-58C is significantly improved over the OH-58A. Performance in terms of power required and fuel flow is slightly degraded when compared to the OH-58A at similar gross weights and altitudes and in general did not meet the estimates of the detail specification for the OH-58C. The handling qualities and vibrations of the OH-58C are similar to the OH-58A when operating at similar gross weights and altitudes. Three handling qualities deficiencies relative to the low speed flight characteristics were identified.
DE- *Helicopters; Performance(Engineering); Flight testing; Flight envelope ; Human factors engineering; Handling; Airworthiness; Reliability; Maintainability
ID- *OH-58C aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0804792
AA- <NTIS> PB80-134380/XAB
TI- An Airborne Magnetometer Survey for Shipwrecks and Associated Underwater Test Excavations
AU- Arnold, J. B.
CS- Texas Antiquities Committee, Austin. Underwater Archeological Research Section.
CS- <CODE> 064393001
RN- TXAC/UARS-79/1; TAC/TR-38
PY- Jan 79
PG- 23p
NT- Proceedings of the Conference on Underwater Archaeology (10th) Held at Nashville, Tennessee on January 2-5, 1979.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8009
CP- United States
AB- During June, 1978, the Underwater Archeological Research Section of the Texas Antiquities Committee carried out a magnetometer survey in Search of historic shipwreck sites in two areas of Matagorda Bay, Texas. Portions of the survey areas were inaccessible to our survey vessel, being obstructed by sandbars and breakers or consisting of shallow water, mud flat, and beach areas. A helicopter was therefore selected as the best vehicle for systematic coverage of the search areas. An instrumentation package was utilized consisting of the full complement of a proton magnetometer interfaced with a microprocessor and microwave radar positioning system. The magnetometer survey was followed by a six week campaign of checking anomalies by underwater site test excavation in July and August, 1978. Twelve anomalies were tested and five of these proved to be shipwreck sites.
DE- *Magnetic surveys; *Underwater excavation; *Marine salvage; Matagorda Bay; Aerial surveys; Magnetometers; Microwave equipment; Radar; Ships; Underwater objects; Ocean bottom; Archaeology; Texas
ID- Shipwrecks; NTISSLRS
SH- 47A (Ocean Technology and Engineering--Marine Engineering)

AZ- 0802929
AA- <NTIS> PB80-911401/XAB
TI- Aircraft Accident Reports - Brief Format, U.S. Civil Aviation, Issue Number 4 of 1979 Accidents
CS- National Transportation Safety Board, Washington, DC. Bureau of Technology.
CS- <CODE> 022327003
RN- NTSB-BA-80-1
PY- 4 Jan 80
PG- 170p
NT- Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC$10.00
JA- GRAI8008
CP- United States
AB- This publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1979. The 300 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format

presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors.
DE- *Aviation accidents; *Civil aviation; Aircraft collisions; Crash landing; Aircraft fires; Casualties; Damage assessment; Accident investigations; Statistical data; Pilots; Licenses; Helicopters; Gliders; Passenger aircraft; Cargo aircraft
ID- General aviation accidents; Accident causes; Human factors; NTISNTSB
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0802928
AA- <NTIS> PB80-911400/XAB
TI- Aircraft Accident Reports, Brief Format, U.S. Civil Aviation
TI- <NOTE> Irregular repts
CS- National Transportation Safety Board, Washington, DC. Bureau of Technology.
CS- <CODE> 022327003
PY- 1980
PG- Open series
NT- Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote. Single copies also available. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- Subscription
JA- GRAI8008
CP- United States
AB- This subscription offers publications presenting aircraft accident reports, in brief formats, occurring in U.S. civil aviation operations during calendar year 1979. The publications are issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors. A supplemental issue released as the final publication for the year, contains additional statistical tables for all accident records during the year.
DE- *Aviation accidents; *Civil aviation; Aircraft collisions; Crash landing; Aircraft fires; Casualties; Damage assessment; Accident investigations; Statistical data; Pilots; Licenses; Helicopters; Passenger aircraft; Cargo aircraft
ID- General aviation accidents; Accident causes; Human factors; NTISNTSB
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0802450
AA- <NTIS> N80-14697/0/XAB
TI- Preliminary Investigation of Pilot Scanning Techniques of Dial Pointing Instruments
AU- Harris, R. L.
CS- National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
RN- NASA-TM-80079
PY- Nov 79
PG- 22p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8008; STAR1805
CP- United States
AB- Two pilots' methods of looking at instruments with needle pointers in a fixed base helicopter simulation were observed. A total of 45 runs were analyzed for each pilot. The data indicated that two apparently different techniques were being used; one looking at the needle point, the other looking at a fixed spot on the instrument and reading the needle direction parafoveally. The latter technique is found to be somewhat faster with both pilots accomplishing the flying task.
DE- *Aircraft instruments; *Pilots (Personnel); Indicating instruments; Viewing; Dials; Display devices; Visual discrimination; Visual fields
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0801730
AA- <NTIS> AD-A078 643/4/XAB
TI- Effect of Noise Spectra and a Listening Task Upon Passenger Annoyance in a Helicopter Interior Noise Environment
TI- <NOTE> Technical paper
AU- Clevenson, S. A. ; Leatherwood, J. D.
CS- National Aeronautics and Space Administration, Hampton, VA. Langley

Research Center.
CS- <CODE> 019041001; 387543
SP- National Aeronautics and Space Administration, Washington, DC
RN- NASA-L-13233; NASA-TP-1590
PY- Dec 79
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8008
CP- United States
AB- A laboratory study was conducted to determine the effects of helicopter interior noise on passenger annoyance. Bothe reverie and listening situations were studied as well as the relative effectiveness of several descriptors (i.e., overall sound pressure level, A-weighted sound pressure level, and speech interference level) for quantifying annoyance response for these situations. The noise stimuli were based upon recordings of the interior noise of the NASA Civil Helicopter Research Aircraft. These noises were presented at levels ranging from approximately 68 to 86 dB(A) with various gear clash tones selectively attenuated to give a range of spectra. The listening tasks required the subjects to listen to and record phonetically balanced words presented within the various noise environments. Results indicate that annoyance during a listening condition is generally higher than annoyance during a reverie condition for corresponding interior noise environments. Attenuation of the planetary gear clash tone results in increases in listening performance but has negligible effect upon annoyance for a given noise level. The noise descriptor most effective for estimating annoyance response under conditions of reverie and listening situations is shown to be the A-weighted sound pressure level. (Author)
DE- *Helicopters; *Aircraft noise; *Aircraft engine noise; Helicopter engines; Passengers; Irritation; Sound pressure; Level(Quantity); Hearing; Performance(Human); Gears; Propulsion gears; Transmission gears; Spectra
ID- Gear clash tone; Listening; Helicopter interior noise; NTISDODXA; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0801381
AA- <NTIS> AD-A078 291/2/XAB
TI- A Study of the Canopy Design for the Advanced Attack Helicopter by Use of Computer Graphics
TI- <NOTE> Final technical rept
AU- Smyth, C. C.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 054879000; 172850
RN- HEL-TM-13-79
PY- Aug 79
PG- 137p
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8008
CP- United States
AB- A package of computer programs has been developed for use in helicopter canopy design. The programs compute point-wise measures of three important design factors for the transparent surfaces of an attack helicopter canopy. These factors are: (1) the internal glare; (2) the external glint; and (3) the optical distortions exhibited by the canopy design. The programs have been applied to modifications in the present canopy design on the YAH-64 Advanced Attack Helicopter. The results suggest that reduced internal glare is possible with slight additional glint and distortion by displacing the side windows 4 inches from the plane of the frame vertices and rotating the axis of curvature of the top window by 90 degrees and displacing it 1.5 inches.
DE- *Aircraft canopies; *Computer aided design; *Cockpits; Attack helicopters; Human factors engineering; Internal reflection; Glare; Transparence; Glint; Distortion; Optical properties; Windows; Position(Location); Computer graphics; Optics
ID- H-64 aircraft; H-1 aircraft; YAH-64 aircraft; AH-1S aircraft; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0800239
AA- <NTIS> AD-D006 727/2/XAB
TI- Swimmer Protective Helmet
TI- <NOTE> Patent

AU- Robertson, D. G.
CS- Department of the Navy, Washington, DC.
CS- <CODE> 001840000
RN- PAT-APPL-615 264; PATENT-4 134 155
PY- Filed 22 Sep 75 patented 16 Jan 79
PG- 4p
NT- Supersedes PAT-APPL-615 264-75, AD-D002 267.
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.
LA- English
DT- Patent
PC- Not available NTIS
JA- GRAI8007
CP- United States
AB- A swimmer protective helmet designed to protect the cranium of a swimmer from impacts with hard or sharp surfaces, thereby preventing lacerations and concussions of the skull or other physical disablement arising from being struck on the head while engaged in activities on the surface, underwater, or while taking entry into or leaving a body of water. The protective helmet is particularly designed to prevent injuries while engaging in search and rescue operations during over water flights, in helicopters wherein an air crewman may be required to descend from a helicopter either by free jump or by rescue hoist to the water's surface to aid in recovery of an injured or disabled survivor and subsequently re-enter the hovering helicopter. (Author)
DE- *Patents; *Helmets; *Protective equipment; Concussion; Swimmers; Surfaces; Head(Anatomy); Skull
ID- PAT-CL-2-412; NTISGPN
SH- 95GE (Biomedical Technology and Human Factors Engineering--General); 90A (Government Inventions For Licensing--Mechanical Devices and Equipment)

AZ- 0798060
AA- <NTIS> AD-A077 181/6/XAB
TI- Flight Path Displays
TI- <NOTE> Final rept. 15 Mar-1 Nov 78
AU- Warner, D. A.
CS- Bunker-Ramo Corp., Wright-Patterson AFB, OH.
CS- <CODE> 058333000; 410376
SP- Air Force Flight Dynamics Lab., Wright-Patterson AFB, OH
RN- AFFDL-TR-79-3075
CN- F33615-78-C-3614; 2403; 04
PY- Jun 79
PG- 104p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8006
CP- United States
AB- Aircraft display technology has advanced to the state where the flight path display--an integrated format on which both the vertical and horizontal path are graphically represented--is feasible. This report researches efforts made to design flight paths for use in both fixed wing and rotary wing aircraft. Results from comparison evaluations of flight path and non-flight path displays are discussed and conclusions drawn with respect to desirable display symbology. An hypothetical flight path display designed as a result of the findings in the referenced studies is proposed for future testing and evaluation. (Author)
DE- *Display systems; *Aircraft equipment; *Flight paths; Symbols; Channels ; Three dimensional; Glide slope; Human factors engineering
ID- NTISDODXA; NTISDODAF
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0796020
AA- <NTIS> AD-A076 824/2/XAB
TI- NOE Navigation. An Overview of ARI Experiments
TI- <NOTE> Research memo
AU- Fineberg, M. L. ; Meister, D. ; Farrell, J. P.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RM-76-26
CN- 2Q763743A772
PY- Nov 76
PG- 10p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English

PC- PC A02/MF A01
JA- GRAI8005
CP- United States
AB- Thirty-five Army rotary wing aviators with varying levels of flight experience were tested in a series of three field experiments during which they flew simulated operational missions in a UH-1H aircraft to determine their proficiency in Nap-of-the-Earth (NOE) navigation. The mission was to navigate a specified route starting from an initial point (IP) and identify all landing zones (LZ) while staying within 250 meters of the course line. Those pilots given additional terrain analysis training, as part of the study, performed their missions more effectively, than the group which did not receive this training. Pilots with greater flight experience performed slightly less effectively than pilots who were less experienced but were recent graduates of the Aviation School. Based on the results of this study, improvements in work methods and training are suggested. (Author)
DE- *Navigation; *Flight simulation; *Performance(Human); Pilots; Helicopters; Proficiency; Flight training; Human factors engineering; Operational effectiveness; Measurement
ID- Nap of the earth; UH-1H aircraft; Helicopter pilots; NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 0795914
AA- <NTIS> AD-A076 718/6/XAB
TI- Human Factors Evaluation of a Heliborne Electronic Warfare System (AN/ALQ-151, Quick Fix)
AU- Smutz, E. R.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RES PROBLEM-REV-78-14
CN- 2Q763743A775
PY- Aug 78
PG- 103p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI8005
CP- United States
AB- The AN/ALQ-151, Quick Fix system is a recently developed, special-purpose electronic warfare (EW) system that is configured in an UH-1H helicopter. The system has an electronic countermeasures capability that enables it to interfere with enemy radio transmissions and an electronic-surveillance capability that can be used to interrupt and determine the location of enemy emitters. Any military system should be made as effective as possible because of the high stakes involved in an armed conflict. It is even more important, however, that an airborne EW system be as effective as possible because of the limited time it can be in operation because of its vulnerability and fuel limitations. To insure maximum effectiveness in the Quick Fix system, the human factors evaluation presented in this report was conducted while Quick Fix was undergoing an Operational Test II by TCATA at Fort Hood, Tex. The purpose of the research was to identify any man-machine interface problems that might reduce the effectiveness of the system and to develop changes in hardware design, operating procedures, and training programs to optimize the effectiveness of the system. In addition to improving the Quick Fix system, the results of this report can be used to improve the design of similar systems in the future. (Author)
DE- *Electronic countermeasures; *Aircraft equipment; *HUman factors engineering; Helicopters; Electronic warfare; Questionnaires; Data reduction; Man machine systems; Control panels; Display systems; Plasma devices; Inertial navigation; Direction finding
ID- *Quick fix project; *AN/ALQ-151; UH-1H aircraft; Avionics; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63B (Detection and Countermeasures--Electromagnetic and Acoustic Countermeasures); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0795856
AA- <NTIS> AD-A076 660/0/XAB
TI- Behavioral and Functional Requirements for a Visual Flight Research Facility
AU- Ozkaptan, H.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RES PROBLEM REV-78-28
CN- 2Q162106A723
PY- Sep 78
PG- 152p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A08/MF A01
JA- GRAI8005
CP- United States
AB- A proposed helicopter research program served as the frame of reference. The functional and behavioral requirements for a visual flight research facility (VFRF) emphasize visual and motion simulation but include performance assessment, laboratory calibration, and control and test station requirements. Information collected from special helicopter flights at NOE altitudes, pilot interviews, analysis of relevant data, and review of other pertinent research facilities was used in engineering analyses and trade-off studies to determine specific performance values and alternative facility concepts. Eight alternative facility configurations and capabilities were considered, including simulation of a day-and-night (color) capability or a monochrome night capability. A night visual display system with sensor aiding was selected because it represented the most cost-effective approach to an acceptable range of high-priority, night NOE studies in the earliest time frame. The pilot's night vision capability along with ways to improve his performance and increase his survivability, represents a most critical NOE problem. Low-cost sensor aids and techniques would permit wide utilization by present and planned helicopters.
DE- *Behavior; *Performance(Human); *Research facilities; Visual perception ; Flight simulation; Pilots; Helicopters; Flight training; Vision; Cost effectiveness; Motion; Control systems; Display systems; Human factors engineering
ID- Nap of the earth; Helicopter pilots; NTISDODXA
SH- 70E (Administration and Management--Research Program Administration and Technology Transfer); 92B (Behavior and Society--Psychology)

AZ- 0795837
AA- <NTIS> AD-A076 641/0/XAB
TI- Review of Flight Training Technology
TI- <NOTE> Human performance enhancement rept
AU- Roscoe, S. N.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> 054823000; 408010
RN- ARI-RES PROBLEM REV-76-3
CN- 2Q162107A745; 2Q764715A757
PY- Jul 76
PG- 32p
NT- See also rept. no. ARI-RM-76-2, AD-A076 805.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8005
CP- United States
AB- The state of the art of aircrew training technology, particularly in simulation, was reviewed as part of a program to identify areas in which nap-of-the-earth (NOE) aircrew training might be most readily improved. Ground-based devices that simulate flight are both effective and cost-effective for initial flight training; with time, as a student's skill increases, the simulator becomes decreasingly cost-effective compared with actual flight. The more complex and costly the simulator, the sooner it will cease to be cost-effective but the more realistic its simulation is likely to be. Optimum fidelity must be determined for each training objective; although more realistic simulation does not necessarily produce more effective transfer of training generally, exact fidelity is vital in teaching procedural skills. Present flight simulators are much less useful in NOE training than in general helicopter pilot training because they cannot properly reproduce the visual field outside the cockpit. Of other innovations in pilot training, computer-assisted instruction can be used for any lecture-type training; measurement of residual attention could be useful in assessing NOE pilot performance.
DE- *Flight training; *Pilots; *State of the art; Flight crews; Flight simulation; Cost effectiveness; Computer aided instruction; Measurement ; Performance(Human); Display systems; Interactive graphics; Automatic
ID- Helicopter pilots; Nap of the earth; NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 0795791
AA- <NTIS> AD-A076 595/8/XAB
TI- The Barkhausen Effect and its Applications to Nondestructive Evaluation
AU- Matzkanin, G. A. ; Beissner, R. E. ; Teller, C. M.
CS- Nondestructive Testing Information Analysis Center, San Antonio, TX.
CS- <CODE> 057140000; 411227
RN- NTIAC-79-2
CN- DLA900-79-C-1266

PY- Oct 79
PG- 59p
NT- Nondestructive Testing Information Analysis Center, San Antonio, TX. HC $30.00 (No copies furnished by DTIC).
LA- English
PC- Not available NTIS
JA- GRAI8005
CP- United States
AB- Measurement of the Barkhausen effect has been developed into a useful approach for the nondestructive evaluation of magnetic materials. Most of the effort has been directed toward applications involving residual stress measurement, however, research in recent years has also demonstrated the applicability of the method for the nondestructive measurement of a variety of material properties, such as grain size and orientation, defect structure and metallurgical composition. Instrumentation systems have been developed for practical application of the Barkhausen method, and in a few cases, the method is in use for routine inspection, e.g., the inspection of helicopter rotor blades and bearing races for residual stress. A number of other specific NDE applications have been suggested such as measurement of grain size, evaluation of anisotropy, determination of carbide precipitation, measurement of pearlite morphology, determination of iron loss, analysis of ferrite content, inservice inspection of pipelines to determine overheating, creep strength and fatigue damage, and supervision of irradiation damage in nuclear reactor pressure vessels.
DE- *Nondestructive testing; *Test and evaluation; *Measurement; *Magnetic materials; Radiation damage; Defects(Materials); Irradiation; Stresses; Pipelines; Supervision; Residual stress; Iron; Visual inspection; Fatigue(Mechanics); Microstructure; Grain size; Creep; Anisotropy; Bearing races; Rotor blades(Rotary wings); Instrumentation
ID- *Barkhausen effect; NTISDODXA
SH- 94J (Industrial and Mechanical Engineering--Nondestructive Testing)

AZ- 0794474
AA- <NTIS> GJBX-126(79)(V.1)/XAB
TI- Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washinton. Volume 1. Instrumentation and Methods. Final Report
CS- Texas Instruments, Inc., Dallas.
CS- <CODE> 013046000; 6196000
SP- Department of Energy.
CN- EY-76-C-13-1664
PY- Mar 79
PG- 68p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8004; NSA0400
CP- United States
AB- Instrumentation and methods described were used for a Department of Energy (DOE) sponsored high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the Butte, Choteau, Cut Bank, Great Falls, Havre, Lewistown, Shelby (Montana); Pocatello, Twin Falls (Idaho); Ritzville (Washington); Hot Springs (South Dakota); and St. Johns (Arizona-New Mexico) NTMS, 1:250,000-scale quadrangles. The survey was carried out by Texas Instruments Incorporated under Bendix Field Engineering Corporation Sub-contract No. 78-184-L. The objective of the work was to define areas showing surface indications of a generally higher uranium content where detailed exploration for uranium would most likely be successful. A Sikorsky S-58T helicopter equipped with a high-sensitivity gamma-ray spectrometer and ancillary geophysical and electronic equipment was employed for areas having the ruggedest terrain, including all of Butte and Choteau Quadrangles. A DC-3 aircraft carrying a more sensitive gamma-ray spectrometer system was used in regions of flatter terrain, including all of Shelby and Lewistown Quadrangles. The systems were calibrated using DOE calibration facilities at Grand Junction, Colorado, and Lake Mead, Arizona. Gamma-ray spectometric data were processed to correct for variations in atmospheric, flight, and instrument conditions and were statistically evaluated to remove the effects of surface geologic variations. The resulting first-priority uranium anomalies (showing simultaneously valid eU, eU/eTh, and eU/K anomalies) were interpreted to evaluate their origin and significance. Results of the interpretation in the form of a preferred anomaly map, along with significance-factor profile maps, stacked profiles, histograms, and descriptions of the geology and known uranium occurrences are presented in the individual quadrangle volumes of this final report. (ERA citation 04:051145)
DE- *Uranium deposits; Arizona; Idaho; Montana; New Mexico; South Dakota; Washington; Aerial prospecting; Aerial surveying; Data compilation; Magnetic surveys; Maps; Radiometric surveys; Tables
ID- *Radioactivity prospecting; ERDA/050200; Instrumentation; NTISDE
SH- 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0792294
AA- <NTIS> N79-32834/0/XAB
TI- Performance and Workload Analysis of Inflight Helicopter Missions
AU- Wewerinke, P. H.
CS- National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
RN- NLR-MP-77013-U
PY- 10 Apr 79
PG- 34p
NT- Subm-Sponsored by Res. Branch of the Directorate of Mat. Air Rnlaf. Conf-Presented at 13th Ann. Conf. On Manual Control, Cambridge, Mass., 15-17 Jun. 1979.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8003; STAR1723
CP- Netherlands
AB- The potentials of an optimal control model for predicting the characteristics of realistic operational helicopter missions were assessed. The theoretical and experimental results indicate that the optimal control model succesfully predicts the best attainable (rather than the average) performance of a group of well-trained, highly motivated subjects. Furthermore, the model allows a description of inter-subject variability. The control effort model predictions are supported by subjective ratings. The model provides a meaningful representation of pilot workload relative to complex control tasks.
DE- *Helicopter control; *Optimal control; *Performance prediction; *Pilot performance; *Task complexity; *Workloads (Psychophysiology); Man machine systems; Manual control; Mathematical models; Ratings; Se-3160 helicopter
ID- NTISNASAE
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0792132
AA- <NTIS> N79-32205/3/XAB
TI- Low-Cost Inertial Navigation for Moderate-G Missions
AU- Merhav, S.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RN- NASA-TM-78611; A-7920
PY- Sep 79
PG- 61p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8003; STAR1723
CP- United States
AB- A low cost inertial navigation system (INS) concept is described for flight missions characterized by moderate accelerations and limited attitude variations. These missions involve general aviation aircraft, helicopters, or remotely piloted vehicles. The significance of the moderate acceleration and limited attitude is reviewed with respect to platform mechanization and instrumentation. A hybrid mechanixation, partially gimballed and partially strapdown, is presented. The INS is implemented by an unbalanced two axis gimbal system and controlled by a two degree of freedom gyro. The INS provides locally level two axis acceleration information along with pitch and roll measurements. Heading information is provided by a second gyro mounted in the inner gimbal. The system error model is equivalent to that of a conventional platform with a tilt error determined by the integral of the gyro drift rate and an equivalent accelerometer type errors are also cancelled. Rapid gyro-compassing, implemented with opened gimbal control loops, and a strapdown procedure provides calibration of gyro drift rate biases.
DE- *Air navigation; *Attitude gyros; *Gimbals; *Gyrocompasses; *Hybrid navigation systems; *Inertial navigation; Low cost; Accelerometers; General aviation aircraft; Gyroscopic pendulums; Mathematical models; Microcomputers; Position errors; Strapdown inertial guidance; Torquers
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

AZ- 0791878
AA- <NTIS> AD-A075 610/6/XAB
TI- A Direct Measure of CRT Image Quality
AU- Verona, R. W. ; Task, H. L. ; Arnold, V. C. ; Brindle, J. H.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> 026909000; 404578
RN- USAARL-79-14

CN- 3A161101A91C; 4E464207D425; 00
PY- Sep 79
PG- 24p
NT- Presented at the Society of Photo-Optical Instrumentation Engineers International Symposium, San Diego, 27 Aug-1 Sep 79.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI8003
CP- United States
AB- This paper describes a direct measuring technique for determining the image quality of raster-scanned cathode-ray tube (CRT) displays. This technique is based on the Modulation Transfer Function (MTF) theory and human visual psychophysical data. The rationale for the technique is discussed from a theoretical as well as functional viewpoint. The instrumentation necessary to obtain these measures in manual and automatic modes is discussed. Data obtained using this measurement technique are analyzed and compared with the theoretical performance of the displays. The image quality of new CRT displays procured for the U.S. Army's Advanced Attack Helicopter is being specified and tested using this direct measuring technique. (Author)
DE- *Helmet mounted displays; *Images; *Television display systems; Cathode ray tubes; Quality; Display systems; Measurement; Information systems; Video signals; Helicopters; Military requirements; Specifications; Modulation; Transfer functions
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems)

AZ- 0791834
AA- <NTIS> AD-A075 566/0/XAB
TI- CH-46 Composite Rotor Blade Flight Stress Survey Data. Volume I
AU- Aiello, R. ; Bendo, J.
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> 058114000; 403682
RN- D210-11168-3-VOL-1
CN- N00019-75-C-0396
PY- 7 Jul 78
PG- 149p
NT- See also Volume 2, AD-A075 570.
NT- Microfiche copies only. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- MF A01
JA- GRAI8003
CP- United States
AB- This document (13 volumes) presents plotted and tabulated flight data for all stress parameters measured during the CH-46 composite rotor blade flight stress survey and structural demonstration. This volume contains a description of test conditions, a summary of flight logs, calibrated blade section moduli and a complete description of instrumentation. The components under test were the A02R1702 composite rotor blades and the A02R1710 blade socket. Volumes 1 through 12 of this report contain the test results for the flight stress survey. Volume 13 contains the results of the structural demonstration.
DE- *Rotor blades(Rotary wings); *Composite materials; *Flight loads; *Helicopter rotors; Stresses; Airspeed; Flight testing; Flight maneuvers; Aerodynamic loading; Data bases; Tables(Data); Graphs; Helicopters
ID- H-46 aircraft; CH-46E aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 71F (Materials Sciences--Composite Materials)

AZ- 0791694
AA- <NTIS> AD-A075 426/7/XAB
TI- Effects of Fatigue from Wearing the AN/PVS-5 Night Vision Goggles on Skills Involved in Helicopter Operations
TI- <NOTE> Technical rept. 13 May-29 Dec 78
AU- Chastain, G. D. ; Kubala, A. L.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> 045614000; 405260
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA
RN- HUMRRO-FR-WD-TX-78-18; ARI-RR-1217
CN- MDA907-78-C-2017; 2Q763743A775
PY- Jul 79
PG- 49p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI8003
CP- United States
AB- Reviews of the literature on rotary wing flight and interviews with aviators were conducted to determine which helicopter tasks and maneuvers are performed most frequently and/or are the most critical. Those operations found to be most critical were analyzed into perceptual and psychomotor components, and a battery of perceptual and psychomotor tests was selected to measure these factors. Aviators were tested both before and after flying with the AN/PVS-5 goggles. Eye-hand coordination was marginally affected following flight, and reaction time to lights was significantly affected. (Author)
DE- *Night vision devices; *Goggles; *Fatigue(Physiology); Helicopters; Psychomotor tests; Skills
ID- AN/PVS-5; NTISDODXA; NTISDODA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0790576
AA- <NTIS> AD-A074 808/7/XAB
TI- Detecting Tactical Targets with Motion Pictures from Low Slow Aircraft
TI- <NOTE> Technical rept
AU- Self, H. C.
CS- Aerospace Medical Research Lab Wright-Patterson AFB OH
CS- <CODE> 009850
RN- AMRL-TR-79-31
CN- 7184; 12
PY- Jul 79
PG- 71p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI8002
CP- United States
AB- Finding and recognizing small unbriefed tactical targets with a narrow-angle forward-looking airborne sensor was examined at a simulated aircraft speed of 60 knots, in the helicopter and hovercraft speed range. A motion picture camera depressed 7 degrees downward flown near noon on sunny days at 340 feet above the terrain along country roads in Florida collected black-and-white pictures, with a narrow field of view of 6 degrees 4 minutes high and 8 degrees 21 minutes wide. Displayed scene resolution for observers in the laboratory was about 1-3/4 minutes of arc. Fourteen university students searched the motion picture screen for heavy construction equipment, trucks, cars, and people. Performance measures were correlated with each other and with target characteristics. Acquisition ranges, percentage of targets detected (%D), and response accuracy increased with target size. Acquisition range and response time varied significantly with response accuracy only for cars, and with contrast only for trucks. Average contrast of detected targets was, except for trucks, unrelated to %D, accuracy, and reaction time. Relative ranks of observers on %D were not maintained across target types, and neither was rank on accuracy, but reaction time had some consistency across target types. Observer selection was discussed. (Author)
DE- *Target detection; *Human factors engineering; Tactical reconnaissance; Target recognition; Performance(Human); Accuracy; Tactical warfare; Targets; Moving targets; Target acquisition; Helicopters; Simulation; Motion pictures; Low altitude; Aerial reconnaissance; Photographic reconnaissance; Reconnaissance film; Images; Sizes(Dimensions); Predictions
ID- NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 63F (Detection and Countermeasures--Optical Detection)

AZ- 0789413
AA- <NTIS> N79-31222/9/XAB
TI- A Compilation and Analysis of Helicopter Handling Qualities Data. Volume 2: Data Analysis
AU- Heffley, R. K.
CS- Systems Technology, Inc., Mountain View, CA.
RN- NASA-CR-3145; TR-1087-2-V-2
CN- NAS2-9344
PY- Aug 79
PG- 176p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI8001; STAR1722

CP- United States
AB- A compilation and an analysis of helicopter handling qualities data are presented. Multiloop manual control methods are used to analyze the descriptive data, stability derivatives, and transfer functions for a six degrees of freedom, quasi static model. A compensatory loop structure is applied to coupled longitudinal, lateral and directional equations in such a way that key handling qualities features are examined directly.
DE- *Aircraft maneuvers; *Controllability; *Helicopter control; *Helicopter performance; *Helicopters; *Manual control; *Pilot performance; Atmospheric turbulence; Directional stability; Hovering stability; Lateral control; Longitudinal control; Pitch (Inclination); Roll; Wind shear; Yaw
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0782125
AA- <NTIS> AD-A073 084/6/XAB
TI- Helicopter Canopy Internal Reflection Investigation
TI- <NOTE> Final report Jul 78-Jan 79
AU- Piccione, D.
CS- Boeing Vertol Co Philadelphia PA
CS- <CODE> 403682
SP- Army Research and Technology Labs., Fort Eustis, VA
RN- D210-11494-1; USARTL-TR-79-14
CN- DAAK51-78-C-0009; 1L162209AH76; 00
PY- Jul 79
PG- 39p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI7925
AB- The reflections on helicopter canopies from instrument panel light sources adversely affect night flight operations. A program objective was to investigate the application of Light Control Film, such as 3M or equivalent material, as a technique for eliminating helicopter canopy reflections in the AH-1S from instrument panel lighting which cause the pilot and copilot night flight operational problems. A mock-up of the AH-1S was used to test and evaluate the reflection conditions. Light control technology was reviewed to uncover corrective techniques or materials. The most promising approach was to apply 3M Light Control Film on the face of instruments and control panels. Most reflections were eliminated using this technique. A few problem areas still remain which appear to be treatable by applying a soft glare shield extension that enshrouds the cockpit. (Author)
DE- *Electromagnetic wave reflections; *Instrument panels; *Helicopters; Cockpits; Light; Aircraft canopies; Windshields; Control; Polymeric films; Masks; Kits
ID- AH-1S aircraft; Microlouvers; H-1 aircraft; Huey Cobra; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0779007
AA- <NTIS> AD-A071 882/5/XAB
TI- A Human Performance/Workload Evaluation of the AN/PVS-5 Bifocal Night Vision Goggle
TI- <NOTE> Final rept
AU- Stone, L. W. ; Sanders, M. G. ; Glick, D. D. ; Wiley, R. ; Kimball, K. A.
CS- Army Aeromedical Research Lab Fort Rucker AL
CS- <CODE> 404578
RN- USAARL-79-11
CN- 3E762173A819; 00
PY- Jul 79
PG- 98p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI7924
AB- Eight experienced US Army aviators performed various maneuvers in an instrumented helicopter to test the relative usability of two bifocally configured night vision goggles. Both configurations were statistically better than the unmodified arrangement when looking at a pilot's ability to hold a precise altitude at night. The subjective data, supported by flight performance observed betweeen the two bifocals, further suggested that a 24% bifocal version was more desirable than a 14% configuration. The inference is that the reduced inside field-of-view presented by the 14% bifocal interferes with a pilot's ability to rapidly locate instruments once he has directed his

attention inside the cockpit. (Author)
DE- *Night vision devices; *Goggles; Performance(Human); Protective equipment; Night flight; Pilots; Flight instruments; Flight control systems
ID- *AN/PVS-5 bifocal night vission goggle; NTISDODXA
SH- 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0778487
AA- <NTIS> AD-A071 359/4/XAB
TI- Head Aiming/Tracking Accuracy in a Helicopter Environment
TI- <NOTE> Final rept
AU- Verona, R. W. ; Johnson, J. C. ; Jones, H. D.
CS- Army Aeromedical Research Lab Fort Rucker AL
CS- <CODE> 404578
RN- USAARL-79-9
CN- 3A161101A91C; 4E464207D425
PY- May 79
PG- 86p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI7924
AB- This experiment was conducted to measure man's head aiming/tracking capability using a helmet mounted sighting device. The influences of target speed, helmet suspension types, and helmet weighting parameters on head aiming/tracking were investigated. If the aiming/tracking accuracy was sensitive to manipulation of these man-machine interface parameters, then it would seem to indicate that improved aiming/tracking accuracy could be obtained by improving the interface. The factors analyzed were eye dominance, helmet weighting, target speed, and helmet suspension. The eye dominance, helmet weighting, and target speed factors were statistically significant; however, the only factor of practical significance was target speed. A subject aiming at a static target with his head had an RMS error of about 3 milliradians. Then the target began to move 4 degrees/second, the error increased to about 10.5 milliradians. When the subject began to vibrate too, the error increased to 13 milliradians. When the target speed doubled, the vibrating error increased to 16.8 milliradians. (Author)
DE- *Man machine systems; *Display systems; *Flight helmets; *Tracking; Visual perception; Operators(Personnel); Helicopters; Motor reactions; Control systems; Airborne; Computerized simulation
ID- Head aiming; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0772945
AA- <NTIS> N79-26374/5/XAB
TI- Investigation of a Laser Doppler Velocimeter System to Measure the Flow Field around a Large Scale V/STOL Aircraft in Ground Effect
AU- Zalay, A. D. ; Brashears, M. R. ; Jordan, A. J. ; Shrider, K. R. ; Vought, C. D.
CS- Lockheed Missiles and Space Co., Inc., Huntsville, AL. Research and Engineering Center.
RN- NASA-CR-152212; LMSC-HREC-TR-D568
CN- NAS2-8959
PY- May 79
PG- 76p
NT- Misc- Document Includes a Microfiche Supplement.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI7921; STAR1717
AB- The flow field measured around a hovering 70 percent scale vertical takeoff and landing (V/STOL) aircraft model is described. The velocity measurements were conducted with a ground based laser Doppler velocimeter. The remote sensing instrumentation and experimental tests of the velocity surveys are discussed. The distribution of vertical velocity in the fan jet and fountain; the radial velocity in the wall jet and the horizontal velocity along the aircraft underside are presented for different engine rpms and aircraft height abouve ground. Results show that it is feasible to use a mobile laser Doppler velocimeter to measure the flow field generated by a large scale V/STOL aircraft operating in ground effect.
DE- *Flow distribution; *Ground effect (Aerodynamics); *V/stol aircraft; Laser doppler velocimeters; Aircraft models; Atmospheric circulation; Hovering; Jet aircraft; Remote sensors; Static tests
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0772131
AA- <NTIS> AD-A069 707/8/XAB
TI- Design Rationale and Performance Specifications for a Visual Flight Research Facility (VFRF)
TI- <NOTE> Final technical rept
AU- King, B. C. ; Griffin, E. L. ; Ohmart, J. G. ; Riebenack, A. D.
CS- Martin Marietta Aerospace Orlando FL
CS- <CODE> 403238
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA
RN- ARI-RN-79-15
CN- DAHC19-74-C-0065; 2Q162106A723
PY- Nov 75
PG- 180p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A09/MF A01
JA- GRAI7921
AB- This report documents a concept definition study for a Visual Flight Research Facility (VFRF) oriented toward research on nighttime Nap-of-the-Earth flight. A VFRF System Specification includes performance, design, development, and test requirements for an approach to achieving displayed windscreen image fidelity to actual night viewing conditions, and to allowing measurement of visually dependent flight crew tasks. (Author)
DE- *Display systems; *Flight simulation; *Flight training; Research facilities; Visual perception; Specifications; Night flight; Performance tests; Visual aids; Systems analysis; Safety; Flight crews; Performance(Human); Night vision; Design to cost; Army training; Helicopters
ID- VERF(Visual Flight Research Facility); NAP of the earth; NTISDODXA; NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development)

AZ- 0767229
AA- <NTIS> AD-A068 482/9/XAB
TI- Technical Evaluation Report on the Guidance and Control of Helicopters and V/STOL Aircraft at Night and in Poor Visibility
TI- <NOTE> Advisory rept
AU- Howell, G. C.
CS- Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
CS- <CODE> 400043
RN- AGARD-AR-142
PY- May 79
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A02/MF A01
JA- GRAI7919
AB- The GCP Symposium was held in The Hague, The Netherlands, 9-12 October 1978. The Programme as presented at the symposium is appended to this report. The complete compilation of papers has been published as Conference Proceedings CP-258. The technical evaluation for each session has been done partly by the session chairmen and edited by the programme chairman. The evaluation includes most of the comments and recommendations which were received from the particpants in the symposium. (Author)
DE- *Flight control systems; *Terrain avoidance; All weather aviation; Helicopters; Vertical takeoff aircraft; Short takeoff aircraft; Aircraft landings; Night flight; Night landings; Night vision; Low light levels; Display systems; Forward looking infrared systems; Man machine systems
ID- NATO furnished; Meetings; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0765927
AA- <NTIS> NTIS/PS-79/0649/8/XAB
TI- Search and Rescue Methods and Equipment (A Bibliography with Abstracts)
TI- <NOTE> Rept. for 1964-Jun 79
AU- Kenton, E.
CS- National Technical Information Service, Springfield, VA.
CS- <CODE> 391811
PY- Jul 79
PG- 239p
NT- Supersedes NTIS/PS-78/0539, NTIS/PS-77/0498 and NTIS/PS-76/0285.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI7918
AB- Reports dealing with maritime and aviation search and rescue are presented. Studies are included on search and rescue planning, locating equipment, rescue beacons, communication devices, specialized aircraft and their components, and searching strategies. Underwater rescue and survival are excluded. (This updated bibliography contains 232 abstracts, 36 of which are new entries to the previous edition.)
DE- *Bibliographies; *Search and rescue; Air sea rescues; Rescue operations ; Rescue equipment; Searching; Detection; Radio beacons; Rescue beacons ; Crash locator beacons; Sea markers; Helicopters; Coast Guard; Aviation safety; Rescue systems; Computerized simulation; Communication satellites; Relay satellites; Transmitter receivers; Direction finding; Distress signals; Search radar; Downed aircraft; Survival kits; Loran; Omega navigation; Navigational aids; Crash rescue boats; Survival equipment; Life rafts
ID- Flying drift search tactics; Sprint drift search tactics; Sea loiter aircraft; Sea sitting aircraft; Loran C navigation systems; NTISNTIS
SH- 85GE* (Transportation--General); 95D* (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0765708
AA- <NTIS> N79-23080/1/XAB
TI- Comparison of Electromechanical and Cathode-Ray-Tube Display Mediums for an Instrument Approach Display
AU- Abbott, T. S.
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RN- NASA-TM-80069; L-12805
PY- May 79
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI7918; STAR1714
AB- The effect on pilot performance of replacing a single electromechanical display with similar cathode-ray-tube displays was studied. The effects of dimensionality, color, and shading were evaluated with respect to the pilot's ability to interpret and respond to displayed information.
DE- *Cathode ray tubes; *Display devices; *Electromechanical devices; *Flight instruments; Color; Dimensions; Flight simulation; Flight tests ; Helicopters; Pilot performance; Qualitative analysis
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 49E (Electrotechnology--Optoelectronic Devices and Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0765193
AA- <NTIS> AD-A068 044/7/XAB
TI- Military Organizations and Systems: Human Factors Research Projects
TI- <NOTE> Technical rept
AU- Kubala, A. L.
CS- Human Resources Research Organization Alexandria VA
CS- <CODE> 405260
SP- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA
RN- HUMRRO-FR-WD(TX)-77-9; ARI-TR-78-A33
CN- DAHC19-75-C-0025; 2Q763743A775
PY- Nov 78
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI7918
AB- This report summarizes five reserach efforts conducted between May 1976 and May 1977 at Fort Hood, Texas and dealing with aspects of the field assessment of human performance factors in developmental military systems. Separate reports provide more detail for each effort: (1) Study of target Handoff Techniques, ARI TR-78-A34, investigated the verbal interchange in simulated ground-to-air and air-to-ground target handoffs. (2) A Study of Selected Problems in Armor Operations, ARI TR-78-A35, investigated target acquisition performance and internal temperatures in buttoned-up tanks; escape modes; and crew effectiveness

measures. (3) Problems in Helicopter Gunnery, ARI TR-78-A36, investigate distance recognition of target vehicles. (4) Statistical Analysis of the Fort Hood Quality-of-Life Questionnaire, ARI Research Memorandum 78-25, tabulated variables, analyses, and computer correlations (available directly from the Army Research Institute). (5) The Detection Ranges of Features of Armored Vehicles, ARI TR-78-A37, investigated the actual ranges at which specific identification of target vehicles can be made. (Author)
DE- *Military organizations; *Human factors engineering; Performance(Human) ; Armor; Army research; Questionnaires; Statistical analysis; Armored vehicles; Helicopters; Target recognition
ID- *Research projects; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0756028
AA- <NTIS> AD-A065 268/5/XAB
TI- Helicopter Transparent Enclosures. Volume I. Design Handbook
TI- <NOTE> Final rept
AU- Kay, B. F.
CS- United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
CS- <CODE> 323800
SP- Army Research and Technology Labs., Fort Eustis, VA.
RN- SER-50966; USARTL-TR-78-25A
CN- DAAJ02-74-C-0065
PY- Jan 79
PG- 461p
NT- See also Rept. nos. USARTL-TR-78-25B and USARTL-TR-78-26.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A20/MF A01
JA- GRAI7914
AB- The Volume I design handbook is a comprehensive guide to the development of helicopter transparent enclosures. The handbook is structured in a manner that generally parallels the sequence of considerations used to develop helicopter transparencies. Separate chapters are devoted to subjects pertinent to the design, analysis and testing of transparent enclosures. Special characteristics and material properties are presented as applicable.
DE- *Helicopters; *Cockpits; *Windshields; *Human factors engineering; Transparence; Visibility; Laminates; Ice prevention; Glint; Abrasion; Windows; Canopies; Inspection; Acceptance tests; Protection; Bird strikes; Small arms ammunition; Structural analysis; Optics; Radar cross sections
ID- Structural design; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0755995
AA- <NTIS> AD-A065 234/7/XAB
TI- Operational Helicopter Aviation Medicine
TI- <NOTE> Conference proceedings
AU- Knapp, S. C.
CS- Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
CS- <CODE> 400043
RN- AGARD-CP-255
PY- Dec 78
PG- 600p
NT- Presented at the Aerospace Medical Panel's Specialists' Meeting, 1-5 May 78, Fort Rucker, AL.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding; Journal article
PC- PC A25/MF A01
JA- GRAI7914
AB- Helicopters have become increasingly complex. Their operational missions can be extremely demanding for aircrews and significantly differ from those of fixed wing aircraft. Rotary wing operations are compounded by specific stresses and environments, special safety and workload aspects, unique performances and goals. Combat flexibility and air mobility in land and sea warfare, medical evacuation, search and rescue, fatigue related accidents, human factors of helicopter design, visual and acoustic aspects of helicopter operations, and crashworthiness of fuel systems and aircraft, are some of the elements of the scenarios staged by the authors. The papers presented in the 6 sessions of the Specialists' Meeting, held by the Aerospace Medical Panel at Fort Rucker, USA, 1-5 May 1978, highlight the medical problems of operational helicopter flying in an exhaustive review.
DE- *Aviation medicine; *Helicopters; Symposia; NATO; Search and rescue;

Flight crews; Fatigue; Human factors engineering; Safety; Reprints
ID- *Meetings; NTISDODXA
SH- 57W (Medicine and Biology--Stress Physiology); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0755833
AA- <NTIS> AD-A065 072/1/XAB
TI- Flight Evaluation MK II Integrated Controller Installed in an OH-58A Helicopter
TI- <NOTE> Final rept
AU- Hagen, J. F. ; Moe, P. J. ; Woratschek, R.
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> 409025
RN- USAAEFA-77-11
PY- Apr 78
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A04/MF A01
JA- GRAI7914
AB- This Activity conducted a limited handling qualities and pilot workload evaluation of the MK II integrated controller installed in an OH-58A helicopter. The evaluation consisted of 22 flights for 15.2 hours of productive flight test time. The OH-58A could be safely flown throughout the recommended flight envelope using the integrated controller. The pilot workload when using the integrated controller with two hands was not reduced from and was sometimes greater than the workload when using conventional controls for all maneuvers except level forward flight. Single hand control during flight and landing could be safely accomplished, but required increased pilot workload in all cases. The two most serious unsatisfactory characteristics identified were lack of an adequate system-decoupled warning and excessive workload during left sideward flight between approximately 15 to 25 knots true airspeed. Three unsatisfactory characteristics that contributed to the increased workload when using the integrated controller were excessive longitudinal and lateral integrated controller response and sensitivity, lack of control displacement harmony between the integrated controller cyclic and collective controls, and inadvertent cyclic control inputs with collective control movement. The reduced longitudinal and lateral control authority, which limited the aircraft's forward flight capability at aft center of gravity, rearward flight capability at forward center of gravity, and slope landing capability, was also an unsatisfactory characteristic. Eight additional unsatisfactory characteristics were also identified.
DE- *Flight control systems; Helicopters; Flight testing; Pilots; Man machine systems; Handling; Flight maneuvers; Job analysis; Aircraft landings; Turning flight; Integrated systems; Manual operation; Decoupling(Interaction); Roll; Pitch(Motion)
ID- Workloads(Human); H-58 helicopters; OH-58A helicopters; Mark-2 integrated controllers; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0751838
AA- <NTIS> N79-17553/5/XAB
TI- An Analysis of Helicopter Pilot Control Behavior and Workload During Instrument Flying Tasks
AU- Smit, J. ; Wewerinke, P. H.
CS- National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
RN- NLR-MP-78003-U
PY- 14 Feb 78
PG- 14p
NT- Conf-Presented at AGARD Aerospace Med. Panel Specialists Meeting on Operational Helicopter Aviation Med., Fort Rucker, AL., 1-5 May 1978.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A02/MF A01
JA- GRAI7912; STAR1708
AB- During helicopter instrument hover- and navigation (tracking) tasks a number of flight data, physiological measures and subjective ratings were collected. Mathematical models were used to describe and analyze the pilot's control behavior and attentional workload. The optimal control model seems to offer a suitable framework for the description of control tasks as complex as helicopter instrument flying. A control effort model, which was formulated in terms of the optimal control model, describes the relationship between performance and attention paid to the task. The physiological variables and subjective ratings in general reflected the variations in control effort connected with the various tasks.

DE- *Automatic control; *Helicopter control; *Pilot performance; *Workloads (Psychophysiology); Manual control; Mathematical models; Multivariate statistical analysis; Optimization; Physiological factors; Tracking (Position)
ID- Netherlands; NTISNASAE
SH- 92B (Behavior and Society--Psychology); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0750760
AA- <NTIS> AD-A064 318/9/XAB
TI- Design, Test, and Acceptance Criteria for Helicopter Transparent Enclosures
TI- <NOTE> Final rept. 27 Jan 74-26 Jul 76
AU- Kay, B. F.
CS- United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
CS- <CODE> 323800
SP- Army Research and Technology Labs., Fort Eustis, VA.
RN- SER-50967; USARTL-TR-78-26
CN- DAAJ02-74-C-0065; 1F262203AH86; 03
PY- Nov 78
PG- 327p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A15/MF A01
JA- GRAI7912
AB- This report describes a series of analytical and experimental studies that were performed to develop and substantiate the design, acceptance, and test criteria for Army helicopter transparent enclosures. Primary emphasis was placed on structural substantiation methods and the airframe interface. Wind-shield endurance tests were performed in a manner intended to duplicate actual service conditions. Suitable instrumentation was used to determine critical loading combinations. A NASTRAN finite-element analysis was performed to demonstrate the applicability of this type of structural analysis for helicopter cockpits. The analysis showed the benefits of using NASTRAN to evaluate transparency stresses in curved panels, and stresses resulting from fuselage wracking. As abrasion has been the primary cause for helicopter transparency replacements, a series of tests were conducted to enable simulation of the various forms of abrasion in the laboratory. The tests were conducted on glass, acrylic, and polycarbonate; the acrylic and polycarbonate materials were with and without abrasion-resistant hard coats. Ballistic tests were performed on a variety of transparent materials to quantify spall characteristics. The test data were compared to empirical relationships used to equate spall energy with probability of skin penetration. (Author)
DE- *Transparent panels; *Windshields; *Helicopters; Structural analysis; Endurance(General); Abrasion; Finite element analysis; Optical properties; Stress analysis; Ammunition damage; Reliability; Terminal ballistics; Acrylic resins; Polycarbonates; Laminated glass
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0750645
AA- <NTIS> AD-A064 203/3/XAB
TI- An Interface Evaluation of the XM-29 Protective Mask and the AH-1S Telescopic Sight Unit
TI- <NOTE> Final rept
AU- Garrett, P. F.
CS- Human Engineering Lab., Aberdeen Proving Ground, MD.
CS- <CODE> 172850
RN- HEL-TN-12-78
PY- Oct 78
PG- 35p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI7912
AB- A field evaluation was conducted to determine the effect of the XM-29 protective mask on the mission performance of pilots in scout utility, and attack helicopters. The pilots flew air cavalry-type training missions while wearing the XM-29 and the M-24 protective mask. The evaluation was in accordance with unit training requirements, safety requirements and published standard operating procedures. The maneuvers we evaluated included; hovering, out-of-ground effect hovering, nap-of-the-earth flight, aerial reconnaissance and target engagement with BTM 71A1 (inert TOW missile). Objective performance assessments were made by each pilot and his safety pilot. Subjective data was collected by using a bipolar adjective technique, debriefings and panel

discussions. The data collected indicates an apparent user preference for the XM-29 protective mask.
DE- *Protective masks; *Helmet mounted displays; *Telescopic gun sights; Field tests; Human factors engineering; Attack helicopters; Pilots; Performance(Human); Test and evaluation; Man machine systems; Interfaces
ID- *XM-29 protective masks; *M-24 protective masks; H-1 aircraft; AH-1S aircraft; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 79F (Ordnance--Fire Control and Bombing Systems); 51B (Aeronautics and Aerodynamics--Aeronautics); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0743943
AA- <NTIS> N79-14083/6/XAB
TI- Development and Validation of a Piloted Simulation of a Helicopter and External Sling Load
AU- Shaughnessy, J. D. ; Deaux, T. N. ; Yenni, K. R.
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RN- NASA-TP-1285; L-11925
PY- Jan 79
PG- 113p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A06/MF A01
JA- GRAI7909; STAR1705
AB- A generalized, real time, piloted, visual simulation of a single rotor helicopter, suspension system, and external load is described and validated for the full flight envelope of the U.S. Army CH-54 helicopter and cargo container as an example. The mathematical model described uses modified nonlinear classical rotor theory for both the main rotor and tail rotor, nonlinear fuselage aerodynamics, an elastic suspension system, nonlinear load aerodynamics, and a loadground contact model. The implementation of the mathematical model on a large digital computing system is described, and validation of the simulation is discussed. The mathematical model is validated by comparing measured flight data with simulated data, by comparing linearized system matrices, eigenvalues, and eigenvectors with manufacturers' data, and by the subjective comparison of handling characteristics by experienced pilots. A visual landing display system for use in simulation which generates the pilot's forward looking real world display was examined and a special head up, down looking load/landing zone display is described.
DE- *Ch-54 helicopter; *Flight simulation; *Pilot performance; *Suspension systems (Vehicles); Mathematical models; Computer programs; Display devices; Linear systems; Military helicopters; Rotor aerodynamics
ID- CH-54 aircraft; H-54 aircraft; NTISNASA
SH- 92A (Behavior and Society--Job Training and Career Development); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0742609
AA- <NTIS> AD-A062 112/8/XAB
TI- Study to Assess Cockpit Indicator Marking and Lighting Requirements of U.S. Army Helicopters
TI- <NOTE> Final rept. Jun 74-Nov 75
AU- Strock, R. R.
CS- Sperry Rand Corp Phoenix AZ Sperry Flight Systems Div
CS- <CODE> 403873
RN- 71-0851-00-00; USAAVSCOM-TR-75-46
CN- DAAJ01-74-C-0967
PY- Feb 76
PG- 87p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI7909
AB- This project used the results of an initial examination of various types of aircraft indicator lighting systems and an evaluation of dial marking philosophies to construct 16 lighted indicator mockups. The mockups were constructed to facilitate subsequent investigations of indicator display and lighting requirements of U.S. Army aircraft on night missions, nap-of-the-earth flights, and flights utilizing night vision goggles. A simulated aircraft panel and a lighting control assembly were constructed for use with the mockups. Two additional tasks were also included in this project: a survey of the readability through night vision goggles of various types of displays which might be used in Army aircraft, and a measurement of the lighted intensities of various colors of fluorescent paint when illuminated by Aviation Red lighting. (Author)

DE- *Helicopters; *Lighting equipment; Flight simulators; Instrument panels ; Human factors engineering; Requirements; Night vision devices; Goggles; Night flight
ID- Cockpit lighting; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0740435
AA- <NTIS> N79-13036/5/XAB
TI- Helicopter Mission Optimization Study
TI- <NOTE> Final Report
AU- Olson, J. R.
CS- United Technologies Corp., Stratford, CT. Sikorsky Div.
RN- NASA-CR-3060
CN- NAS1-1498
PY- Dec 78
PG- 122p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A05/MF A01
JA- GRAI7907; STAR1704
AB- The feasibility of using low-cost, portable computer technology to help a helicopter pilot optimize flight parameters to minimize fuel consumption and takeoff and landing noise was demonstrated. Eight separate computer programs were developed for use in the helicopter cockpit using a hand-held computer. The programs provide the helicopter pilot with the ability to calculate power required, minimum fuel consumption for both range and endurance, maximum speed and a minimum noise profile for both takeoff and landing. Each program is defined by a maximum of two magnetic cards. The helicopter pilot is required to key in the proper input parameter such as gross weight, outside air temperature or pressure altitude.
DE- *Flight optimization; *Helicopters; *Pilot performance; Computer techniques; Aircraft instruments; Feasibility analysis; Fuel consumption; Noise reduction; Portable equipment
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0737496
AA- <NTIS> AD-A061 351/3/XAB
TI- Analysis of Noise in US Army Aircraft
TI- <NOTE> Final rept. Jul 76-Mar 78
AU- Brouns, A. J. ; Ely, R. A.
CS- Vought Corp Advanced Technology Center Inc Dallas TX
CS- <CODE> 389797
RN- ATC-94100/8CR-41; USAAVRADCOM-TR-76-1746-F
CN- DAAB07-76-C-1746
PY- Nov 78
PG- 240p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A11/MF A01
JA- GRAI7906
AB- Tape recordings were made of acoustical and electrical noise in the crew compartments and on the interphone lines of 7 models of U.S. Army aircraft, during flight operations. The data were analyzed to determine noise and speech levels in the communication channel, especially at crew members' ears. Calculations were then performed to estimate hearing damage risk and estimate the intelligibility of speech. The purpose of the project was to identify harmful noise levels and sources in the communication channel and to make recommendations for reducing such noise. At frequencies below about 1000 Hz, noise in the communications channel is due primarily to ambient noise which enters the circumaural earcup through leaks between the cushion and the head. Above 1000 Hz, the noise in the channel is due primarily to ambient noise which is picked up by the microphone and transmitted to the earphone. The hearing damage risk calculations show that less than 1% of air crewmen would suffer more than a 10 dB hearing loss at speech frequencies after 10 years of flight duty. This is based on 4 hours per day of flight. Typical inter- and intra- aircraft speech intelligibilities were predicted to be greater than 95%.
DE- *Communication and radio systems; *Acoustic properties; *Army aircraft; *Helicopters; *Hearing; *Aircraft noise; *Voice communications; Losses; Risk; Flight testing; Speech; Intelligibility; Damage; Aircraft cabins; Microphones; Inflight
ID- Hearing loss; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45C (Communication--Common Carrier and Satellite); 45F

(Communication--Verbal)

AZ- 0734790
AA- <NTIS> AD-A060 563/4/XAB
TI- An Assessment of the Navigation Performance of Army Aviators Under Nap-of-the-Earth Conditions
TI- <NOTE> Research rept
AU- Fineberg, M. L. ; Meister, D. ; Farrell, J. P.
CS- Army Research Inst for the Behavioral and Social Sciences Alexandria VA

CS- <CODE> 408010
RN- ARI-RR-1195
CN- 2Q164715A757
PY- Aug 78
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
PC- PC A03/MF A01
JA- GRAI7905
AB- The introduction of Nap-of-the-Earth (NOE) tactics presents special difficulties to Army rotary wing aviators, particularly in navigation. The extent of terrain in the navigator's field of view is greatly reduced, owing to the proximity to the ground; also, the interpretation of the terrain features depicted on an aerial map is difficult because the view is much more oblique than in normal flight. This research effort had four specific goals: (1) To determine the present level of aviation NOE performance, (2) To develop and evaluate a qualitative NOE navigation performance measure, (3) To measure the effects of additional terrain-analysis training, and (4) To measure the effects of flight experience on NOE performance. The findings from this study formulated the departure point for a thorough analysis of the NOE navigation requirements leading toward an NOE navigation instructional program for Initial Entry Rotary Wing (IERW) and operational units.
DE- Navigation charts; Navigation reference; Navigators; Army training; Map reading; Helicopters; Performance(Human); Transfer of training; Instructional materials; Human factors engineering; Skills
ID- *Nap of the Earth navigation; *Navigation training; *Pilots(Personnel); Air navigation; Performance evaluation; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0733020
AA- <NTIS> N79-10843/7/XAB
TI- Helicopter Acoustics, Part 2
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RN- NASA-CP-2052-PT-2; L-12339-PT-2
PY- Aug 78
PG- 438p
NT- Conf-Presented at the Intern. Specialists Symp., Hampton, VA., 22-24 May 1978; Sponsored by the AM. Helicopter Soc. And Arod.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A19/MF A01
JA- GRAI7903; STAR1701
AB- No abstract available.
DE- *Aeroacoustics; *Aircraft noise; *Conferences; *Helicopters; Auditory fatigue; Human factors engineering; Noise reduction; Prediction analysis techniques; Rotary wings; Rotor aerodynamics
ID- *Meetings; *Noise pollution; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0730381
AA- <NTIS> AD-A059 452/3/XAB
TI- Icing Testing for Aircraft Engines
TI- <NOTE> Conference proceedings
CS- Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
CS- <CODE> 400043
RN- AGARD-CP-236
PY- Aug 78
PG- 208p
NT- Presented at the Propulsion and Energetics Panel Specialists Meeting (51st) (A) Held in London, 3-4 Apr 78. Part of text in French.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
LA- English
DT- Conference proceeding
PC- PC A10/MF A01
JA- GRAI7902
AB- The Conference Proceedings contain the papers presented and the discussions held at the Propulsion and Energetics Panels's 51st (A) Specialists' Meeting which was convened at Church House, Westminster, London, UK on 3 and 4 April 1978. The Technical Evaluation Report on this meeting is also included. Thirteen papers were presented. During the first session, three papers dealt with meteorological icing conditions, the microphysical structure of icing clouds and the measurement of snow concentration. Icing test facilities and their instrumentation currently used in the US, UK and France were reported in the second session, while the third session contained six papers on experiences of different kinds: measurement systems, icing of aircraft engines either installed in aircraft and helicopters, or when taken into test facilities. The Round Table Discussion and Technical Evaluation Report identify the survey achieved by this meeting and the conclusions to be drawn for future work. (Author)
DE- *Aircraft engines; *Ice formation; *Symposia; Test facilities; Meteorology; Clouds; Test and evaluation; NATO; Surveys; Cloud physics; Ice prevention; Measuring instruments; Mathematical analysis
ID- NTISDODXA
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 0719606
AA- <NTIS> AD-A057 666/0/XAB
TI- Helicopter Pilot Workload Evaluation
TI- <NOTE> Technical rept
AU- Gasparian, R. G.
CS- Air Force Instrument Flight Center Randolph AFB Tex
CS- <CODE> 407583
RN- USAFIFC-TR-78-2
PY- May 78
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7823
AB- This report covers the work accomplished during an inflight investigation of short duration operational helicopter missions. The project objective was to determine the level of pilot stress encountered by evaluating the changes in pilot performance, control activity, and biochemical levels that occurred during these missions. Flying activities were conducted by pilots assigned to the USAF Instrument Flight Center, Research and Development Division (USAFIFC/RD), Randolph Air Force Base, Texas. Flights were conducted in the USAFIFC's TH-1F helicopter. The subject pilots participating in the study consisted of USAFIFC Instructor Pilots, pilots attending the USAFIFC Instrument Pilot Instructor School (IPIS), and U.S. Army helicopter pilots assigned to the Fort Sam Houston Flight Detachment based at Randolph AFB.
DE- *Pilots; *Helicopters; *Stress(Physiology); *Work measurement; Work; Performance(Human); Test and evaluation; Test vehicles; Methodology; Missions; Biochemistry; Flight maneuvers; Flight control systems
ID- TH-1F aircraft; Biochemical action; H-1 aircraft; NTISDODXA
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 57W (Medicine and Biology--Stress Physiology)

AZ- 0719384
AA- <NTIS> AD-A057 443/4/XAB
TI- AH-1G Helicopter Main Rotor Flow Survey
TI- <NOTE> Final rept. May-Oct 75
AU- Boirun, B. H. ; Bailes, E. E. ; Jefferis, R. P. ; Arnold, J. A. ; Meiss, J. C.
CS- Army Aviation Engineering Flight Activity Edwards AFB Calif
CS- <CODE> 409025
RN- USAAEFA-74-02
PY- Apr 78
PG- 90p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7823
AB- The Army requirement to fire unguided missiles from attack helicopters in hover and low-speed flight conditions has generated a need to accurately predict the rotor flow environment through which the missile must travel. Representative flight test airflow data is presented with which to determine the launch behavior of missiles and assess the

accuracy of theoretical flow field prediction models. A UH-1M helicopter was previously used to develop instrumentation and test methodology for conducting the airflow survey which were applied to the AH-1G test program. The general test objective was to define the rotor wake boundary and three-dimensional airflow velocity components as a function of forward speed.
DE- *Air flow; *Helicopter rotors; Wake; Downwash; Attack helicopters; Flight envelope; Aircraft rockets; Aerodynamic loading; Flight paths; Perturbations; Mathematical prediction; Three dimensional flow
ID- H-1 aircraft; AH-1G aircraft; Huey Cobra; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0716341
AA- <NTIS> AD-096 282/9/XAB
TI- Instrumentation of a Tandem Helicopter for Static and Dynamic Stability and Control Flight Tests
AU- DURBIN, E. ; SECKEL, E.
CS- Princeton Univ N J James Forrestal Research Center
CS- <CODE> 190500
RN- 338
CN- N6ONR27024
PY- Mar 56
PG- 56p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7822
AB- No abstract available.
DE- *Helicopters; Control systems; Dynamics; Flight testing; Instrumentation; Stability
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0716106
AA- <NTIS> AD-085 557/7/XAB
TI- Tandem Helicopter Stability Program
AU- GOL, L.
CS- Princeton Univ N J James Forrestal Research Center
CS- <CODE> 190500
CN- N6ONR27024
PY- Jan 56
PG- 3p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7822
AB- No abstract available.
DE- *Helicopters; Instrumentation; Stability; Tests
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0714372
AA- <NTIS> AD-A056 489/8/XAB
TI- Internal Cockpit Reflections of External Point Light Sources for the Model YAH-64 Advanced Attack Helicopter
AU- Smyth, C. C.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
PY- Jun 78
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7821
AB- The US Army Human Engineering Laboratory (HEL) has developed a computer program for computing internal cockpit reflections on the transparent canopy surfaces of external point light sources. This work is part of a three-stage effort to determine optimum canopy designs for the Model 209 AH-1S Cobra Helicopter and the Model YAH-64 Advanced Attack Helicopter (AAH). The low glare canopy design presently used on both models consists of flat, transparent panels on the front surfaces and simple cylindrical panels on the sides and top. The design is a reasonable choice for reducing both solar glint to outside observers during daytime operations and internal reflections of outside light sources during nighttime operations. This work effort is directed

toward a closer study of the two problems of glint and reflections, and developing an optimum design for the canopy's transparent surfaces.
DE- *Aircraft canopies; *Attack helicopters; Glint; Internal reflection; Cockpits; Computer programs; Transparent panels; Glare; Solar radiation ; Night flight; Orientation(Direction); Man machine systems; Human factors engineering; Pilots
ID- H-64 aircraft; YAH-64 aircraft; H-1 aircraft; AH-1S aircraft; Huey cobra; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0706844
AA- <NTIS> N78-24515/6/XAB
TI- Non-Destructive Method for Applying and Removing Instrumentation on Helicopter Rotor Blades
TI- <NOTE> Patent
AU- Long, W. C. ; Williams, M. L.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- PATENT-4 082 001; PAT-APPL-788 705
PY- Filed 19 Apr 77 patented 4 Apr 78
PG- 8p
NT- Supersedes PAT-APPL-788 705-77, N77-22452 (15 - 13, p 1725).
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7818; STAR1615
AB- A nondestructive method of applying and removing instrumentation on airfoils.
DE- *Helicopters; *Nondestructive tests; *Rotor blades; *Patents; Airfoils; Pressure distribution; Rotary wing aircraft
ID- PAT-CL-73-756; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94J (Industrial and Mechanical Engineering--Nondestructive Testing); 90GE (Government Inventions For Licensing--General)

AZ- 0705425
AA- <NTIS> AD-A054 970/9/XAB
TI- Crashworthy Gunner Seat Testing Program
TI- <NOTE> Final rept. May 75-Dec 77
AU- Reilly, M. J.
CS- Boeing Vertol Co Philadelphia Pa
CS- <CODE> 403682
RN- D210-11327-1; USARTL-TR-78-7
CN- DAAJ02-75-C-0032; 1F262209AH76; 00
PY- Mar 77
PG- 155p
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PC- PC A08/MF A01
JA- GRAI7818
AB- A crashworthy gunner seat swivel concept developed under a previous contract was refined and detail drawings were made. Six seats were fabricated, four for static testing and two for dynamic testing. Modifications were made after the first four static tests. Additional static tests were successfully performed on two of the modified seats. A vertical drop test and a horizontal dynamic test were performed on the remaining two modified seats. The vertical test was successful but the horizontal test resulted in failure due to the seat not automatically rotating to a forward-facing position. Five seats were refurbished and modified to eliminate the deficiencies found in testing and to convert four seats to a fixed side-facing configuration. The swivel seat was dynamically tested in the horizontal plane with the seat facing 30 degrees to the direction of impact. The test results were successful and the dummy accelerations were reduced to well within human tolerance limits. Both types of seats tested have advantages as well as disadvantages.
DE- *Aircraft seats; *Helicopters; *Gunners; *Crash resistance; Dynamic tests; Static tests; Restraint; Drop tests; Aviation safety; Crash landing; Crash injuries; Human factors engineering; Modification; Failure(Mechanics)
ID- *Crashworthiness; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0701796
AA- <NTIS> AD-A054 305/8/XAB
TI- Bibliography of USAARL Letter Reports, 1964 - 1977
AU- Messer, L. M.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578

RN- USAARL-SPECIAL BIB-SER-9-SUP-1
PY- Mar 78
PG- 50p
NT- Supersedes Rept. no. USAARL-SPECIAL BIB-SER-9, AD-A030 013.
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DT- Bibliography
PC- PC A03/MF A01
JA- GRAI7817
AB- Letter reports published at the U. S. Army Aeromedical Research Laboratory, Ft. Rucker, Alabama from 1964 through 1977 are included in this bibliography. Subject areas covered include aviation medicine, human engineering, optics, acoustics, and psychology. Arrangement is alphabetical by title of report, with an author index, a subject index, and an index by letter report number. (Author)
DE- *Aviation medicine; *Bibliographies; Indexes; Bioengineering; Optics; Psychology; Acoustics; Human factors engineering; Helicopters
ID- *Medical research; NTISDODXA
SH- 57GE* (Medicine and Biology--General); 95C* (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0698005
AA- <NTIS> AD-095 898/3/XAB
TI- Application of Boundary Layer Control to Helicopter Rotor Blades
TI- <NOTE> Final rept. 29 Feb 56
AU- Hinton, S. H. ; Lodge, D. W.
CS- Prewitt Aircraft CO Clifton Heights PA
CS- <CODE> 288300
RN- 1360
CN- NONR89800
PY- 29 Feb 56
PG- 10p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7816
AB- No abstract available.
DE- *Airfoils; *Helicopter rotors; *Helicopters; *Rotor blades(Rotary wings); Boundary layer control; Gas flow; Suction slots; Aerodynamic characteristics; Boundary layer; Design; Effectiveness; Exhaust systems ; Fatigue (Mechanics); Instrumentation; Mathematical analysis; Oscillation; Stresses; Tests
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0696429
AA- <NTIS> N78-20128/2/XAB
TI- A Rotor-Mounted Digital Instrumentation System for Helicopter Blade Flight Research Measurements
AU- Knight, V. H. ; Haywood, W. S. ; Williams, M. L.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TP-1146; L-11956
PY- Apr 78
PG- 49p
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PC- PC A03/MF A01
JA- GRAI7815; STAR1611
AB- A rotor mounted flight instrumentation system developed for helicopter rotor blade research is described. The system utilizes high speed digital techniques to acquire research data from miniature pressure transducers on advanced rotor airfoils which are flight tested on an AH-1G helicopter. The system employs microelectronic pulse code modulation (PCM) multiplexer digitizer stations located remotely on the blade and in a hub mounted metal canister. As many as 25 sensors can be remotely digitized by a 2.5 mm thick electronics package mounted on the blade near the tip to reduce blade wiring. The electronics contained in the canister digitizes up to 16 sensors, formats these data with serial PCM data from the remote stations, and transmits the data from the canister which is above the plane of the rotor. Data are transmitted over an RF link to the ground for real time monitoring and to the helicopter fuselage for tape recording. The complete system is powered by batteries located in the canister and requires no slip rings on the rotor shaft.
DE- *Digital systems; *Flight instruments; *Flight tests; *Pressure sensors ; *Rotary wings; Airfoils; Data transmission; Frequency division

multiplexing; Helicopters; Pulse code modulation
ID- H-1 aircraft; AH-1G aircraft; Huey Cobra; NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0695590
AA- <NTIS> AD-A053 238/2/XAB
TI- Automatic Target Cueing Study for Helicopter Fire Control. Phase II
CS- Westinghouse Defense and Electronic Systems Center Baltimore Md Systems Development Div
CS- <CODE> 405897
CN- DAAA25-72-C-0154
PY- 15 May 72
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7815
AB- In March 1971, Westinghouse proposed a program to the U.S. Army Materiel Command, Frankford Arsenal, for improving target acquisition with FLIR systems in helicopters, using automatic cueing techniques. The improvement would make use of a digital image processor for automatic detection and recognition of targets. The processor would operate on the FLIR video signals. It would provide an alarm to the pilot/gunner to indicate the presence of specific classes of targets in the FLIR field of view. In addition, the location of the target in his display would be marked by visual cues.
DE- *Aircraft fire control systems; *Forward looking infrared systems; *Target acquisition; Helicopters; Cues(Stimuli); Visual perception; Image processing; Digital systems; Video signals; Infrared images; Human factors engineering; Fatigue(Physiology); Performance tests; Display systems
ID- NTISDODXA
SH- 79F (Ordnance--Fire Control and Bombing Systems); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0695551
AA- <NTIS> AD-A053 196/2/XAB
TI- Test Operations Procedures Physical Characteristics (Aviation Materiel)
AU- Miller, R. L.
CS- Army Test and Evaluation Command Aberdeen Proving Ground Md
CS- <CODE> 041750
RN- TOP-7-3-500
PY- 29 Nov 77
PG- 15p
NT- Supersedes report dated 16 Sep 70, AD-876 410 and the aviation portions of TOP-1-3-504, AD-755 626 and TOP-1-3-505, AD-751 154.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7815
AB- This document identifies testing methods and techniques necessary to determine the degree to which Army aviation materiel's physical characteristics are determined. (Author)
DE- *Army equipment; *Test and evaluation; Fixed wing aircraft; Rotary wing aircraft; Avionics; Electronic equipment; Communication and radio systems; Aircraft equipment; Ground support equipment; Test facilities; Instrumentation; Runways; Workplace layout; Machine tools; Machine shop practice; Weapons; Ammunition; Maintenance; Specifications; Military requirements
ID- NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0689124
AA- <NTIS> AD-A051 691/4/XAB
TI- Evaluation of Seating and Restraint Systems and Anthropomorphic Dummies Conducted during Fiscal Year 1976
AU- Chandler, R. F. ; Trout, E. M.
CS- Federal Aviation Administration Washington D C Office of Aviation Medicine
CS- <CODE> 264320
RN- FAA-AM-78-6
PY- Feb 78
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7813

AB- The results of test programs conducted by the Protection and Survival Laboratory to investigate the performance of prototype or operational seating and restraint systems relative to their ability to provide protection against crash injury and to investigate the performance of anthropomorphic dummies in the dynamic environment are reported. The data in this report were previously presented in a memorandum report and are subject to additional evaluation or change upon review, conduct of additional testing, or receipt of additional facts. (Author)
DE- *Anthropometry; *Aircraft seats; Restraint; Energy absorbers; Crash injuries; Protection; Aviation safety; Prototypes; Test methods; Photographic analysis; Impact; Impulse loading; Helicopters
ID- NTISDODXA; NTISDOTFAA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0685633
AA- <NTIS> N78-16026/4/XAB
TI- Research Requirements to Improve Safety of Civil Helicopters
AU- Waters, K. T.
CS- Boeing Vertol Co., Philadelphia, Pa.
RN- NASA-CR-145620
CN- NAS1-13624
PY- Nov 77
PG- 77p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7811; STAR1607
AB- Helicopter and fixed-wing accident data were reviewed and major accident causal factors were established. The impact of accidents on insurance rates was examined and the differences in fixed-wing and helicopter accident costs discussed. The state of the art in civil helicopter safety was compared to military helicopters. Goals were established based on incorporation of known technology and achievable improvements that require development, as well as administrative-type changes such as the impact of improved operational planning, training, and human factors effects. Specific R and D recommendations are provided with an estimation of the payoffs, timing, and development costs.
DE- *Aircraft safety; *Helicopters; *Safety management; *Technology assessment; Accident investigation; Cost effectiveness; Human factors engineering; Management planning; Research and development
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 0684094
AA- <NTIS> AD-134 893/7/XAB
TI- Integrated Instrument Development Program and Ideal Man-Helicopter Engineering Project
CS- Bell Helicopter Co Fort Worth Tex
CS- <CODE> 054200
CN- NONR-1076(00); NONR-1670(00)
PY- 1957
PG- 105p
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PC- PC A06/MF A01
JA- GRAI7811
AB- No abstract available.
DE- *Helicopters; *Man-machine systems; Instrumentation
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0682212
AA- <NTIS> AD-A050 370/6/XAB
TI- An Analysis of Smoke Transmittance Measurements and Techniques
TI- <NOTE> Final rept
AU- Reitz, R. G.
CS- Ballistic Research Labs Aberdeen Proving Ground Md
CS- <CODE> 050750
RN- BRL-MR-2798
CN- 1R765702D620
PY- Nov 77
PG- 63p
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email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7810
AB- The Ballistic Modeling Division has made transmittance measurements at selected regions of the electromagnetic spectrum through various aerosols in field environments. The measurements have been obtained with visual, near infrared, far infrared, and millimetre wave instrumentation. Live firings were conducted at Fort Sill, Oklahoma, using mortar- and artillery-delivered hexachloroethane (HC) and white phosphorous (WP) munitions. At Fort Hood, Texas, 2.75-inch rockets were launched from helicopters to deliver WP wick-produced smoke. The smoke testing has also included HC and fog oil smoke pots as well as red phosphorous grenades launched from vehicles. The aerosol testing has included measurements through both smoke and dust clouds. A discussion of the tests, the spectral regions measured, the equipment used, the type of data collected, and an analysis of the results are presented. (Author)
DE- *Smoke; *Transmittance; *Smoke screens; Aerosols; White phosphorus; Smoke generators; Rockets; Artillery; Motors; Grenade launchers; Dust; Infrared radiation; Visual perception
ID- Obscuration; NTISDODXA
SH- 79A (Ordnance--Ammunition, Explosives, and Pyrotechnics)

AZ- 0677071
AA- <NTIS> AD-A048 975/7/XAB
TI- Crashworthy Troop Seat Testing Program
TI- <NOTE> Final rept. May 74-Dec 76
AU- Reilly, M. J.
CS- Boeing Vertol Co Philadelphia Pa
CS- <CODE> 403682
RN- D210-11169-1; USAAMRDL-TR-77-13
CN- DAAJ02-74-C-0036; 1L262209AH76; 03
PY- Nov 77
PG- 206p
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PC- PC A10/MF A01
JA- GRAI7808
AB- Crashworthy troop seat designs developed under a previous contract were reviewed and design refinements were made. Component testing was planned and tests were performed. Malfunctioning components were redesigned and were retested satisfactorily. A new tubular-strut energy attenuator was developed to replace the rolling helical-wire energy attenuator which did not function properly. Crashworthy troop seats fabricated under a previous contract were modified, with new components developed during component testing. Additional seats were fabricated for static testing in various crash impact attitudes. A total of six static tests, including two retests required as a result of minor failures, were performed by Dynamic Science as a subcontractor. Analysis of the test results showed that the forward- and aft-facing seat configurations were highly successful in meeting the test objectives in all attitudes, with the exception of the lateral loading. Eleven dynamic tests were performed by FAA-Civil Aeromedical Institute in three series of tests.
DE- *Helicopters; *Seats; *Crash resistance; *Safety; Loads(Forces); Survival(Personnel); Human factors engineering; Infantry; Assault; Impact tests; Restraint; Simulation; Test and evaluation; Safety equipment; Dynamic response; Energy absorbers; Inertia
ID- *Crashworthiness; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety)

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AZ- 0675140
AA- <NTIS> AD-A048 798/3/XAB
TI- Proceedings of the DICE THROW Symposium 21-23 June 1977. Volume 1
CS- General Electric Co Santa Barbara Calif Dasiac
CS- <CODE> 407445
RN- DNA-4377P-1; AD-E300 079
CN- DNA001-75-C-0023; P99QAXD; C008
PY- Jul 77
PG- 589p
NT- See also Volume 2, AD-A048 799.
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DT- Conference proceeding
PC- PC A25/MF A01
JA- GRAI7807
AB- Contents: ANFO Charge Development Program Summary; Dice Throw Overview;

Charge/Detonation System; Dice Throw Main Event-Explosive Diagnostics; Technical Photography; Instrumentation Noise Problems; Free-Field Airblast Definition; Theoretical Air Blast Calculations; Blast Effects on Helicopters; and Mobility Experiments.
DE- *Blast; *High explosives; *Nuclear explosion simulation; *Explosion effects; *Meetings; Airburst; Ground motion; Noise; Photographs; Craters; Shock waves; Detonation waves; Dust clouds; Data reduction; Bending moments; Dynamic pressure; Overpressure; Ammonium nitrate; Fuel oil
ID- Air blasts; ANFO explosives; DICE THROW shot; Blast effects(Aerospace); Blast effects(Structures); Nuclear effects simulation; Particle velocity; Pre-dice throw shots; Pressure time histories; High explosive tests; Blast tests; NTISDODXA
SH- 79A (Ordnance--Ammunition, Explosives, and Pyrotechnics); 79E (Ordnance--Detonations, Explosion Effects, and Ballistics)

AZ- 0675126
AA- <NTIS> AD-A048 784/3/XAB
TI- Human Engineering Laboratory Identification Friend or Foe Test (HELIFF)
TI- <NOTE> Final rept
AU- Barnes, J. A.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-30-77
PY- Oct 77
PG- 50p
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PC- PC A03/MF A01
JA- GRAI7807
AB- This study tested the ability of qualified helicopter gunners to detect and to identify moving tactical vehicles of the United States and its allies and the Warsaw Pact countries as either friend or foe. The gunners observed the vehicles from a tower which simulated a gunship in the hover position. The data shows the mean time and mean range differences between the detection and the identification of the moving tactical vehicles both with the use of 10-power optics and with unaided vision. The percentage of correct identifications is also given. (Author)
DE- *IFF systems; *Target detection; *Human factors engineering; *Target classification; Air to surface; Helicopters; Gun crews; Performance(Human); Optical augmentation; Test methods; Targets
ID- NTISDODXA
SH- 63F (Detection and Countermeasures--Optical Detection); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

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AZ- 0675064
AA- <NTIS> AD-A048 722/3/XAB
TI- Preliminary Tests of Inflatable Liferafts for Stability in High Winds
TI- <NOTE> Final rept
AU- Daniels, M. R. ; Markle, R. L. ; Maness, S. G.
CS- Coast Guard Washington D C
CS- <CODE> 086450
RN- USCG-M-1-78
PY- 1 Dec 77
PG- 38p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7807
AB- This report presents the results of a preliminary investigation of the stability of various marine-type inflatable liferafts when afloat and exposed to high wind forces. The report describes capsizings resulting from wind forces generated by helicopter downdraft and the slipstream of a fixed-wing aircraft. (Author)
DE- *Life rafts; *Inflatable structures; Test and evaluation; Wind; Wind velocity; Stability; Downwash; Helicopters; Slipstream; Fixed wing aircraft; Ballast
ID- C-130 aircraft; HH-3F aircraft; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0673161
AA- <NTIS> EGG-1183-1687/XAB
TI- Hp 65 Computer Program for Calculating Discrete Source Detectability
AU- Stuart, T. P.
CS- EG and G, Inc., Las Vegas, Nev.
CS- <CODE> 2309000

SP- Energy Research and Development Administration.
CN- EY-76-C-08-1183
PY- 13 Apr 76
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7806; NSA0300
AB- This memo addresses the problem of calculating detectability of discrete gamma -ray sources as a function of gamma -ray energy, detector size, speed of search platform, angular response of detectors, shielding between source and detector, temporal data processing techniques, and background contributions from natural gamma -ray emitters in the environment. The equations are derived and the computer code described. The calculation method can be used with the Surveillance Accident Nuclear Detection System (SANDS), which contains two arrays of 20 each, 5-inch diameter by 2-inch thick NaI crystals, flown in a helicopter. (ERA citation 03:001329)
DE- *Aerial monitoring; *Computer codes; *Gamma sources; *Radiation accidents; Computer calculations; Coordinates; Directional radiation detectors; Hp computers; Radiation monitors
ID- ERDA/440101; NTISERDA
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 0672614
AA- <NTIS> AD-A047 969/1/XAB
TI- Environmental Noise Impact Analysis for Army Military Activities: User Manual
TI- <NOTE> Final rept
AU- Goff, R. J. ; Novak, E. W.
CS- Construction Engineering Research Lab (Army) Champaign Ill
CS- <CODE> 405279
RN- CERL-TR-N-30
CN- 4A162121A896; 01
PY- Nov 77
PG- 120p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7806
AB- This manual presents the most current techniques for evaluating the environmental impact of noise emissions from proposed and ongoing Army activities. It is designed for use in conjunction with the CERL-developed computer systems to produce an integrated approach to environmental impact assessment. The manual provides the methodology for determining and documenting environmental noise levels, procedures for interpreting these levels in terms of impact on the human environment, methods by which these impacts might be mitigated, and finally procedures to prepare comprehensive environmental noise impact assessments or statements in accordance with the Council on Environmental Quality (CEQ) Guidelines and AR 200-1. (Author)
DE- *Noise pollution; Level(Quantity); Assessment; Quantitative analysis; Army operations; Damage; Criteria; Vehicles; Helicopters; Army equipment; Manuals
ID- Guidelines; Environmental impacts; NTISDODXA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0670510
AA- <NTIS> AD-A047 649/9/XAB
TI- A Personal Cooling System for Helicopter Pilots
TI- <NOTE> Phase rept. 1 Oct 76-30 Sep 77
AU- Reeps, S. M.
CS- Naval Air Development Center Warminster Pa Aircraft and Crew Systems Technology Directorate
CS- <CODE> 393532
RN- NADC-77289-60
CN- F51523; F51523000
PY- 21 Nov 77
PG- 12p
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PC- PC A02/MF A01
JA- GRAI7805
AB- The NAVAIRDEVCEN (Naval Air Development Center) is developing a personal cooling system for helicopter pilots to alleviate the heat stress encountered during exposure to high ambient temperatures. The major components of this system are a lightweight, constant-wear, liquid circulating garment (LCG) outfitted with skin temperature

sensors, a cooling generator, and an automatic controller. The liquid circulation garment is designed for wear under a standard flight coverall and is connected, upon aircraft entry, to the generator and automatic controller. During flight, the system automatically maintains the pilot and copilot in thermal comfort thereby enabling more effective performance of flight duties. The system is currently under a development contract. (Author)
DE- *Flight clothing; *Liquid cooling; *Cooling and ventilating equipment; *Protective clothing; Helicopters; Pilots; Cooling; Coolants; Fluid flow; Nylon; Human factors engineering; Fire resistant textiles; Weight ; Heat exchangers; High temperature
ID- Liquid circulating garment; LCG(Liquid Circulating Garment); NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0668318
AA- <NTIS> AD-A047 083/1/XAB
TI- Evaluation of Slimpak Style Parachute in CT4A Airtrainer Aircraft
TI- <NOTE> Flight test rept
CS- Aircraft Research and Development Unit Laverton (Australia)
CS- <CODE> 015600
RN- TI-556
PY- Nov 76
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7804
AB- The Slimpak style parachute was being evaluated, under Technical Investigation 517, for use in place of the standard 'Flexible Back' parachute which had proven unsatisfactory in helicopter operations when worn by large crew members. Some instructors and students of No 1 Flying Training School, of rather large build, were unable to wear the Flexible Back parachute in the CT4A Airtrainer because of restriction to control column deflection. Headquarters Support Command considered that the Slimpak style parachute might be suitable for use in the Airtrainer by the large crew memebers and ARDU was directed to investigate this possibility. Ground and flight trials were conducted using a wide range of aircrew sizes. Dropping trials were carried out under Technical Investigation 517. The 'Slimpak; model parachute as tested was found to be unacceptable for use in the Airtrainer by aircrew with a buttock to heel length of less than about 1.02 m. It was also found to have major deficiencies in design and operation of the the harness and associated buckles that would render it unsuitable in its present form for use by the RAAF in any other aircraft. (Author)
DE- *Parachutes; Parachute packs; Flight testing; Human factors engineering ; Acceptability; Training planes; Sizes(Dimensions); Straps; Ripcords; Deficiencies; Flight crews; Pilots; Australia
ID- *Slimpak parachutes; CT4A aircraft; NTISDODXA
SH- 51D (Aeronautics and Aerodynamics--Parachutes and Decelerators)

AZ- 0666415
AA- <NTIS> AD-A046 477/6/XAB
TI- Inflatable Body and Head Restraint
TI- <NOTE> Phase rept
AU- Schulman, M. ; McElhenney, J.
CS- Naval Air Development Center Warminster Pa Crew Systems Dept
CS- <CODE> 406610
RN- NADC-77176-40
CN- F41451; WF41451403
PY- 30 Sep 77
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7803
AB- This investigation established the feasibility of using an automatically inflatable restraint system as an alternative to the conventional restraint worn by helicopter crewmen. This type restraint provides increased crash protection because it provides automatic pretensioning which forces the occupant back in his seat, thereby reducing dynamic overshoot; reduces strap loading on the wearer when the inflated restraint is compressed during crash loading; reduces the concentration of strap loads on the body because of the increased bearing surface provided when the restraint is inflated; reduces head rotation and whiplash induced trauma. (Author)
DE- *Inflatable structures; *Flight crews; *Safety equipment; *Aviation safety; *Helicopters; Aviation accidents; Survival(General); Pyrotechnics; Neoprene; Nylon; Plastic coatings; Stress(Physiology); Whiplash; Reduction
ID- *Pyrotechnic inflator; *Restraining devices; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D

(Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0664784
AA- <NTIS> AD-A046 261/4/XAB
TI- Three-Cue Helicopter Flight Director Evaluation
CS- Air Force Instrument Flight Center Randolph AFB Tex
CS- <CODE> 407583
RN- USAFIFC-TR-77-3
PY- Jul 77
PG- 89p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7802
AB- This report covers the work accomplished during an inflight investigation concerning the evaluation of the changes in pilot performance, control activity and biochemical changes while flying with various display configurations of a helicopter Three-Cue Flight Director System. Flights were conducted in the TH-1F helicopter. The subject pilots participating in the study consisted of both instructor pilots and pilots attending the Instrument pilot instructor school (IPIS).
DE- *Flight control systems; *Helicopters; Cueing; Flight instruments; Attitude control systems; Pilots; Performance(Human); Flight training; Instrument panels; Data processing
ID- H-1 Helicopters; TH-1F aircraft; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0662374
AA- <NTIS> AD-A045 826/5/XAB
TI- Advanced Signal Analysis and Instrumentation for Barkhausen Stress Measurement in Steels
TI- <NOTE> Final rept. 15 Dec 75-28 Oct 77
AU- Matzkanin, G. A. ; Burkhardt, G. L.
CS- Southwest Research Inst San Antonio Tex
CS- <CODE> 328200
RN- SWRI-15-4437; AMMRC-CTR-77-22
CN- DAAG46-76-C-0028
PY- Sep 77
PG- 47p
NT- Report on the Army Materials Testing Technology Program.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7801
AB- Advanced methods of signal analysis were investigated as a means of improving instrumentation for Barkhausen noise stress measurement. Methods employed included pulse-sorting and pulse-counting, correlation and probability measurements, and spectrum analysis. Specimens of AISI 4340 steel and AISI 4130 steel were studied. It was found that the Barkhausen noise auto-correlation function, amplitude probability distribution, and amplitude probability density correspond closely to the comparable functions obtained from random noise. These statistical functions were found to be independent of magnetization rate and probe liftoff but slightly dependent on stress. Cursory experiments indicated that reducing the detector bandwidth may provide a means of increasing the stress sensitivity of these parameters.
DE- *Steel; *Residual stress; Signal to noise ratio; Nondestructive testing ; Measuring instruments; Signal processing; Ferromagnetic materials; Helicopter rotors; Rotor blades; Spars; Autofrettage; Gun barrels; Antifriction bearings; Magnetization; Rates; Heat treatment; Mechanical properties
ID- *Barkhausen effect; Steel 4340; Steel 4130; Determination of stress; NTISDODXA
SH- 71J (Materials Sciences--Iron and Iron Alloys)

AZ- 0661783
AA- <NTIS> AD-417 836/4/XAB
TI- Development of the U.S. Army VZ 2 (Boeing Vertol-76) Research Aircraft
TI- <NOTE> Final rept., 15 Apr 56-28 Feb 63
CS- Boeing Co Morton PA Vertol Div
CS- <CODE> 365150
RN- TECHNICAL REPT. R219
CN- NONR-2136(00)
PY- Aug 63
PG- 121p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax

at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7801
AB- The six year development program of the U.S. Army VZ-2 research aircraft, Vertol Division gained extensive experience in the VTOL field. The following conclusions are based upon this exper ience: The technical feasibility of the tilt wing concept has been proven, and a sound basis has been established for the development, design, and construction of a tilt wing aircraft for specific missions. Although new problems were exposed, methods of solving them were indicated. The concentration of hovering controls exclu sively within the propeller-wing assembly, by using full span ailerons for yaw control, differ ential collective pitch for roll control, and monocyclic pitch for pitch control, will elim inate the need for yaw and pitch fans in future models. A more complete comparison and correla tion of test results (NASA flight test, Contrac tor flight test, NASA wind tunnel and Priceton University Long Track data) will provide com prehensive technical data for future designs. (Author)
DE- *Convertible airplanes; *Vertical takeoff aircraft; Research; Research program administration; Design; Airframe; Variable-incidence; Tilt wings; Landing gear; Ducted fans; Flight control systems; Instrumentation; Model; Flight testing; Stability; Aerodynamic characteristics; Captive tests; Aerodynamic control surfaces; Boundary layer control; Flaps(Control surfaces); Experimental data; Tables
ID- Vz-2 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0660574
AA- <NTIS> N77-30714/8/XAB
TI- Evaluation of Stress on a Pilot During Agricultural Flights Based on Physiological Studies
AU- Markiewicz, L. ; Koradecka, D. ; Konarska, M.
CS- Kanner (Leo) Associates, Redwood City, Calif.
RN- NASA-TT-F-17445
PY- Jul 77
PG- 12p
NT- Tran-Transl. Into English from Tech. Lotnicza I Astronaut. (Poland), V. 31, No. 1, 1976 p 13-16. Misc-Transl. Was Announced as A76-20616.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A02/MF A01
JA- GRAI7726; STAR1521
AB- An ergonomic analysis of the development of fatigue in a pilot during agricultural work is presented. Selected indicators of physiological activity during flights on PZL-101 Gawron and An-2 airplanes and Mi-2 and SM-2 helicopters are studied under various flight conditions.
DE- *Human factors engineering; *Pilot performance; *Stress (Physiology); Agriculture; Aircraft pilots; Stress (Psychology)
ID- Translations; Poland; Fatigue(Biology); NTISNASAT
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0658698
AA- <NTIS> AD-360 920/3/XAB
TI- Notes on the Problem of Training Operators for the Aqs-10 Sonar
TI- <NOTE> Technical memo
AU- Baker, C. H.
CS- Human Factors Research Inc Los Angeles Calif
CS- <CODE> 172900
RN- TM-206-17
CN- NONR264900; NR153 199
PY- May 62
PG- 17p
NT- Report on Human Factor Problems in Anti-Submarine Warfare (U).
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7726
AB- No abstract available.
DE- *Sonar personnel; Training; Psychophysiology; Sonar targets; Performance (Human); Perception(Psychology); Attention; Behavior; Time studies; Fatigue(Physiology); Sonar equipment; Human factors engineering; Maintenance; Training devices; Detection; Naval training; Military training; Classification; Display systems; Helicopters; Antisubmarine aircraft
ID- An/aqs-10; H-3 aircraft; NTISDODXD
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 63A (Detection and Countermeasures--Acoustic Detection)

AZ- 0657197
AA- <NTIS> AD-A044 847/2/XAB
TI- An Evaluation of the Navy Undersea Weapons Tank for Testing Aircrew Escape, Survival, and Rescue Procedures and Equipment
TI- <NOTE> Final rept
AU- Every, M. G. ; Brody, M. C.
CS- Biotechnology Inc Falls Church VA
CS- <CODE> 058050
CN- N00014-77-C-0253
PY- Sep 77
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7725
AB- This report evaluates the Navy Undersea Weapons Tank, White Oak, Maryland to determine its suitability as a test facility to conduct and document research relating to in-water escape, survival, and rescue following an aircraft or helicopter mishap. After consideration of factors such as safety, suitability for experimentation, data recording, and emergency medical care, this facility was shown to be excellent for this type of testing. Much of the photographic documentation shown in this report was accomplished during tests involving underwater parachute entanglement and rescue of live subjects. (Author)
DE- *Escape systems; *Test facilities; Underwater; Water tanks; Simulators; Aviation accidents; Survival(Personnel); Flight crews; Search and rescue; Rescue equipment; Naval aviation; Helicopters; Parachutes; Abandonment; Naval shore facilities; Maryland
ID- Inwater tests; NTISDODXA
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 47GE (Ocean Technology and Engineering--General)

AZ- 0657192
AA- <NTIS> AD-A044 842/3/XAB
TI- Evaluation of US Air Force Survival/Armor Vest in US Army OH-58 Helicopters
TI- <NOTE> Final rept
AU- Judge, T. H. ; Kulinski, M. B.
CS- Army Natick Research and Development Command Mass Clothing Equipment and Materials Engineering Lab
CS- <CODE> 408902
RN- CEMEL-161; NATICK-TR-7T-3-CEMEL
PY- Feb 76
PG- 59p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7725
AB- The USAF developed a Survival/Armor Vest concept. This was coordinated with the DoD Tri Service Committee in Aircrew Body Armor with a complete exchange of development information between the services. Four evaluations: Static, Flight, Body Load and Pressure, and Sizing were conducted and these revealed a number of minor design deficiencies. The material used in the vest construction does not provide sufficient retention of the armor insert and carrier. Lack of retention caused the armor insert to rest on the pilots legs creating leg discomfort. The USAF Survival/Armor Vest requires redesigning to correct the deficiencies presented here. The sizing criteria were also evaluated. New sizing criteria are recommended to improve the sizing.
DE- *Body armor; *Vests; Test and Evaluation; Human factors engineering; Survival equipment; Flight crews; Helicopters; Aviation safety; Fabrics ; Terminal ballistics; Problem areas; Sizes(Dimensions); Fittings; Anthropometry
ID- H-58 Helicopters; OH-58 Helicopters; NTISDODXA
SH- 79E (Ordnance--Detonations, Explosion Effects, and Ballistics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0656967
AA- <NTIS> AD-A044 616/1/XAB
TI- Transducer Workshop (8th) Held at Wright Patterson AFB, Dayton, Ohio on 22-24 April 1975
TI- <NOTE> Final rept
AU- Fuselier, P. F.
CS- Range Commanders Council White Sands Missile Range NM Telemetry Group
CS- <CODE> 401435
PY- 1975
PG- 508p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A22/MF A01
JA- GRAI7725
AB- Contents Note: Session I - Transducers - Their Construction and Application; Piezoelectric Polymer Instrumentation, Transducer Technology for Deep Borehole Geothermal Environments, Variable Reluctance Displacement Transducer Compensated to 650 F, A Six-Component Strain Gage Balance for Helicopter Rotor Testing, Strain Sensitivity of Pressure Transducers in a Dynamic Environment, Miniature Pressure Gage (for Use in Aerodynamic and Hydrodynamic Research Investigations), Session II - Transducer Measuring Systems and Their Calibration; Fuel-Air Explosive Blast Measurement, Transducer Applications in Airborne Instrumentation, RV Flight Test Pressure Instrumentation Techniques, Collection of Environmental Data for the HARPOON Missile Program in USS PEGASUS (PHM-1), Shock Calibration of Accelerometers, Measurement System Control Through Periodic Correlation, Session III - Transducer Signal Conditioning; Miniature Transducer Amplifiers Developed for Telemetry Application, A System for Measuring Static Strains to 1500 deg., Telemetry Instrumentation for Acceleration Track Test System, An Instrumentation System for Making Measurements in a High Explosive Environment, HSM - A Measurements Engineering Challenge, A Particle Velocity Gage for Ground Motion Studies.
DE- *Transducers; *Meetings; Construction; Applied science; Measuring instruments; Calibration; Signal processing; Panel(Committee); Telemeter systems; Guided missile ranges; Military commanders; Piezoelectric transducers; Polymers; Instrumentation; Geothermy; Strain gages; Blast; Shock tests; Accelerometers
ID- NTISDODXA
SH- 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0655958
AA- <NTIS> N77-28911/4/XAB
TI- Interior Noise Reduction in a Large Civil Helicopter
AU- Howlett, J. T. ; Clevenson, S. A. ; Rypf, J. A. ; Snyder, W. J.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TN-D-8477; L-11349
PY- Jul 77
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7724; STAR1519
AB- The results of an evaluation of the effectiveness of current noise reduction technology in attaining acceptable levels of interior noise in a large (about 20,000 kg) passenger-carrying helicopter are presented. The helicopter studied is a modified CH-53A with a specially designed, acoustically treated passenger cabin. The acoustic treatment reduced the average A-weighted interior noise levels from 115 db to 87 db. The study suggests selected improvements in the acoustic treatment which could result in additional reduction in cabin noise levels. The resulting levels would be only slightly greater than the interior noise levels of current narrow-body jet transports.
DE- *Aircraft compartments; *Helicopters; *Noise reduction; Acoustic properties; Aircraft noise
ID- *Noise pollution; H-53 aircraft; CH-53 aircraft; NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 68B (Environmental Pollution and Control--Noise Pollution and Control); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0651921
AA- <NTIS> AD-A043 367/2/XAB
TI- Computing Internal Cockpit Reflections of External Point Light Sources for the Model YAH-64 Advanced Attack Helicopter (Low Glare Canopy Design)
TI- <NOTE> Final rept
AU- Smyth, C. C.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-24-77
PY- Jul 77
PG- 61p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7723
AB- The US Army Human Engineering Laboratoy (HEL) has developed a computer

program for computing the internal cockpit reflections on the transparent canopy surfaces of external point light sources. Computations have been completed for the Model YAH-64 Advanced Attack Helicopter (low glare canopy design). The results show that primary reflections as seen from the pilot's position are possible on (1) the upper rear corners of the forward side canopy surfaces, (2) the upper edges of the rear sides, and (3) the sides of the top surface. Computations have also been completed for the copilot's position and show possible reflections on the front and side surfaces. A computer graphics output is used to show reflection points on canopy layouts and perspectives of the cockpit. (Author)

DE- *Canopies; *Reflectivity; *Light sources; *Attack helicopters; Cockpits ; Pilots; Human factors engineering; Computations; Computer programs; Light transmission; Internal reflection; Transparent panels; Glare; Solar radiation; Night flight; Safety; Ray tracing

ID- YAH-64 aircraft; AH-1S aircraft; H-64 aircraft; H-1 aircraft; NTISDODXA

SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0649240

AA- <NTIS> AD-A043 120/5/XAB

TI- Computing Internal Cockpit Reflections of External Point-Light Sources for the Model 209 AH-1S Helicopter Flat-Plate Canopy Design

TI- <NOTE> Final rept

AU- Smyth, C.

CS- Human Engineering Lab Aberdeen Proving Ground Md

CS- <CODE> 172850

RN- HEL-TM-20-77

PY- Jun 77

PG- 50p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A03/MF A01

JA- GRAI7722

AB- The US Army Human Engineering Laboratory (HEL) has developed a computer program for computing the internal cockpit reflections of external point light sources. Computations have been completed for the Model 209 AH-1S COBRA helicopter with the flat-plate canopy design. The results indicate that internal reflections are possible for a wide range of external source locations. A computer graphics output is included in the program to show the reflection points on a perspective drawing of the cockpit canopy as seen from the pilot's position. This report contains hard copies of such perspectives and describes the program and routines. (Author)

DE- *Cockpits; *Human factors engineering; *Aircraft canopies; Computer programs; Computer graphics; Helicopters; Light; Reflection; Pilots; Flat plate models

ID- AH-1S aircraft; Huey Cobra; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0649023

AA- <NTIS> AD-A042 903/5/XAB

TI- A Digital-to-Video Converter for Airborne Television Displays

TI- <NOTE> Research and development technical rept

AU- Karcher, E. A.

CS- Army Electronics Command Fort Monmouth N J

CS- <CODE> 037620

RN- ECOM-4506

CN- 1L262202AH85; 13

PY- Jul 77

PG- 16p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A02/MF A01

JA- GRAI7722

AB- This report covers the design and fabrication of a digital to video converter which accepts data from a digital computer and converts it to a standard 525 line television display. The system was developed for low level nap-of-the-earth helicopter flight studies and will be flight tested in the Experimental Vehicle for Avionics Research (EVAR) Which is a CH-53 helicopter instrumented for Avionics R and D programs. Operation of Army aircraft during day and night conditions at or below tree top level requires the pilot to be aware of the upcoming terrain characteristics. At present, low level operations are performed with the pilot dedicated to the task of piloting the vehicle. The copilot verbally informs the pilot of upcoming terrain from hand-held maps. At night, this is extremely difficult. Improving the method of informing the pilot of approaching terrain, thus reducing the hazards of low level night flight, are the desired goals of this project. The design goal was to develop a general purpose computer driven display whose

information content was entirely determined by the computer software. However, contour maps and various aircraft symbology were the two main items to be displayed.
DE- *Flight instruments; *Computer graphics; *Digital to analog converters; Image tubes; Contours; Maps; Video frames; Cathode ray tubes; Rasters; Helicopters; Airborne; Human factors engineering; Pilots; Color television
ID- NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0648836
AA- <NTIS> AD-A042 716/1/XAB
TI- U.S. Army Test and Evaluation Command Development Test II (EP) - Common Test Operations Procedures 'Logistics-over-the-Shore'
TI- <NOTE> Final rept
CS- Army Test and Evaluation Command Aberdeen Proving Ground Md
CS- <CODE> 041750
RN- TOP-1-2-510
PY- 2 Mar 76
PG- 32p
NT- Supersedes Rept. no. MTP-2-2-520 dated 30 Jul 70, AD-876 402.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7722
AB- This document: Provides a method for evaluating the Logistics-Over-The-Shore (LOTS) capabilities of military equipment including cargo and vehicles. Describes subtests for watertightness, vehicle stability, marine transport, maneuverability, beaching capabilities, fording operations, soils trafficability, beach mobility, seashore exposure, performance under adverse conditions (high wind, heavy rain, high waves, beach obstacles), and safety evaluation. Discusses site and facilities selection, safety factors, and other test planning requirements; human factors and maintenance evaluations. Applies to movement of cargo and vehicles, including towed, self-propelled, and by carrier, over the shore between ocean transportation and shoreside facilities, without benefit of port facilities; loading/unloading onto and from landing craft, amphibians, other transporters, helicopters, storage areas, and transfer points.
DE- *Amphibious vehicles; Test methods; Amphibious operations; Landing craft; Towing vehicles; Test and evaluation; Handling; Maneuverability; Mobility; Maintenance; Stability; Adverse conditions; Safety; Beach heads; Watertightness
ID- Logistics support; NTISDODXA
SH- 47GE (Ocean Technology and Engineering--General)

AZ- 0648251
AA- <NTIS> PB-269 643/3/XAB
TI- Evaluation of Emergency Medical Devices and Systems: Volume I. Environmental Studies
TI- <NOTE> Interim rept. for 30 Jun 74-31 Mar 77
CS- Emergency Care Research Inst., Philadelphia, Pa.
SP- National Center for Health Services Research, Hyattsville, Md.
RN- NCHSR-77/131
CN- PHS-HRA-106-74-188
PY- Mar 77
PG- 43p
NT- See also PB-264 596.
NT- Also available in set of 4 reports PC E09, PB-269 783-SET. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7721
AB- Medical devices are exposed to a wide range of transportation, storage, and operating environments. Each environment has specific characteristics. Medical devices should maintain their normal safety and performance characteristics in all environments in which they are intended to operate or can reasonably be expected to be used, regardless of prior storage and transportation environments. The report describes the environmental studies performed. The environments which were examined are defined and so are the environmental factors which were studied. A medical device classification scheme, used to facilitate these studies, is discussed. The environmental requirements of medical devices which resulted from these studies and the rationale used to develop them are also given.
DE- *Emergency medical services; *Health care technology; *Medical equipment; *Environments; Vibration; Requirements; Temperature; Humidity; Shock; Alternating current; Electric potential; Health care facilities; Ambulances; Aircraft; Helicopters
ID- NTISHRAHSR
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical

Instrumentation and Bioengineering); 44H (Health Care--Health Care Technology)

AZ- 0646313
AA- <NTIS> AD-456 363/1/XAB
TI- Tenth Annual Army Human Factors Research and Development Conference, 6-8 October 1964, U. S. Army Aviation Center, Fort Rucker, Alabama
CS- Army Research Office Washington D C
CS- <CODE> 040950
PY- Oct 64
PG- 461p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A20/MF A01
JA- GRAI7721
AB- No abstract available.
DE- *Human factors engineering; *Symposia; Army research; Aviation accidents; Aviation safety; Tactical warfare; Mobile; Maneuverability; Army operations; Helicopters; Military training; Military personnel; Unconventional warfare; Counterinsurgency; Communication systems; Data storage systems; Data transmission systems; Display systems; Weapon systems; Military intelligence; Photointerpretation; Test methods; Skin(Anatomy); Electricity; Stimulation(Physiology); Surface targets; Target recognition; Aerial reconnaissance; Low altitude; Visual inspection; Navigation; Anthropometry; Flight instruments; Medical research; Army aircraft
ID- H-1 aircraft; Nap-of-the-earth; NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0643172
AA- <NTIS> AD-473 862/1/XAB
TI- Summary Technical Report, Rotor/Wing Concept Study. Volume I
AU- Head, R. E.
CS- Hughes Tool CO Culver City Calif Aircraft Div
CS- <CODE> 172660
RN- HTC-AD-65-15-VOL-1
CN- NONR458800; NR212 162 12 8 64
PY- Sep 65
PG- 132p
NT- See also Volume 2, AD-473 864L and Volume 3, AD-473 863L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7720
AB- Research work including wind tunnel and whirl test of the Rotor/Wing is described. The Rotor/Wing is a dual-purpose lifting device that is a rotor with an unusually large hub. It acts as a tip-jet powered helicopter for low-speed flight and stops in flight to become a tapered and sweptback low-aspect ratio wing for cruise. Stopping the rotor in flight removes the speed limitations of the helicopter rotor and permits flight speeds up to 500 knots. Three series of wind tunnel tests demonstrated that the powered-rotor and autorotating-rotor characteristics are similar to those of a high-performance helicopter; and that the stopped-rotor characteristics are similar to a conventional low-aspect ratio wing with sweep and taper, and maximum lift/drag ratios of 12 or more should be achievable for full-scale aircraft; and that conversion from stopped- to running-rotor and vice versa is a simple and straightforward procedure. (Author)
DE- *Vertical takeoff aircraft; Airplane models; Aerodynamic characteristics; Rotor blades(Rotary wings); Gas generating systems; Turbojet engines; Model tests; Wind tunnel models; Installation; Control panels; Instrumentation; Attitude control systems; Roll; Pitch(Motion); Yaw; Wings; Hovering; Thrust; Lift; Drag; Moments; Helicopter rotors; Autogyros
ID- Rotor/wing aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0643048
AA- <NTIS> AD-462 744/4/XAB
TI- Joint Army-Navy Aircraft Instrumentation Research (Janair) Rotor Blade Radar Antenna - Phase II
TI- <NOTE> Final interim rept
AU- Palmer, J. E. ; Young, D. W.
CS- Bell Helicopter CO Fort Worth Tex
CS- <CODE> 054200
RN- BHC-299-099-275

CN- NONR414800
PY- Feb 65
PG- 64p
NT- Subcontracted to David W. Young and Associates, Inc., Canoga Park, Calif.
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7720
AB- This report covers a research project to investigate the feasibility of using the main rotor blade of a helicopter as a high resolution radar antenna. Fifteen-inch antenna sections were built and tested to study detailed leading and trailing edge array element environments. A full length, 173-in. array was built and tested. A jig was constructed to accept the full length array, and radiation pattern measurements made of beamwidth, focus, sidelobe levels, and front-to-back ratios. Beamwidth and aidelobes were measured under deflections simulating maximum flight loads. Photographs of thin radar sector slices emphasizing elevation and azimuth obstacle sensing capabilities taken from a modified PPI were compared with optical photographs. The array was then installed, covered with an erosion boot and tested in the leading edge of a used UH-1B rotor blade. (Author)
DE- *Radar antennas; *Rotor blades (Rotary wings); *Helicopter rotors; Tests; Jigs; Antenna radiation patterns; Measurement; Focusing; Antenna lobes; Deflection; Aerodynamic loading; Azimuth; Slot antennas; Waveguides; Radiofrequency power; Distribution; Phase shift circuits; Antennas; Plan position indicators; Video amplifiers; Electronic switches; Control systems; Relaxation oscillators; Trigger circuits
ID- NTISDODXD
SH- 49B (Electrotechnology--Circuits)

AZ- 0641134
AA- <NTIS> AD-A041 332/8/XAB
TI- Investigation of Inside Light Reflection Problem on the Flat Plate Canopy (FPC) for Model 209 AH-IS Helicopter
TI- <NOTE> Final rept
AU- Stowell, H. R. ; Smyth, C. C.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-13-77
PY- Apr 77
PG- 46p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7719
AB- Various approaches were examined for a possible solution to the light-reflection problem inside the Model 209 AH-IS helicopter cockpit with the flat-plate canopy (FPC). A computer program was developed to identify primary light reflections inside the FPC at the pilot's eye position. Modifying the side panels on the FPC with curved surfaces may be the only satisfactory solution to the inside light-reflection problem. (Author)
DE- *Helicopters; *Aircraft canopies; Light transmission; Reflection; Human factors engineering; Cockpits; Computer programs; Pilots; Curvature
ID- AH-1S aircraft; H-1 aircraft; Huey Cobra; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0641003
AA- <NTIS> AD-A041 201/5/XAB
TI- Three-Axis Dynamic Simulation of Helicopter Angular Motion for Testing Fire Control Materiel
TI- <NOTE> Final engineering rept
AU- Florence, E.
CS- Frankford Arsenal Philadelphia Pa
CS- <CODE> 142720
RN- FA-TR-77012
PY- Apr 77
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7719
AB- This report describes a program which was conducted to develop improved testing methods for helicopter fire control acceptance testing by providing meaningful simulation of angular motions within the laboratory. Tests were conducted on a Flight Motion Simulator (FMS), which is hydraulically actuated, operable in both manual and tape

modes, and constructed to handle individual test specimens no larger than twenty inches in diameter. Using a pre-recorded tape of angular motion measurements were made in the AH-1G 'Cobra' helicopter. Data was obtained of the machine's operation in both the tape and manual operating modes. The data indicates that it is possible to simulate helicopter motion (of up to 50 Hertz) on the table of the FMS by playing a pre-recorded tape of helicopter motion through the FMS's tape input. It is also possible to reproduce manually the displacement and acceleration curves of motions (limited by frequencies up to 50 Hertz) that are presently specified for helicopter mounted instrumentation.
DE- *Fire control systems; *Aircraft fire control systems; *Attack helicopters; Flight simulators; Angular motion; Angular acceleration; Fire control system components; Acceptance tests; Performance(Engineering); Simulation; Instrumentation; Pitch(Inclination); Roll; Yaw; Flight simulation
ID- AH-1G aircraft; H-1 aircraft; XM-76 fire control sight; Huey Cobra; NTISDODXA
SH- 79E (Ordnance--Detonations, Explosion Effects, and Ballistics); 79F (Ordnance--Fire Control and Bombing Systems); 51C (Aeronautics and Aerodynamics--Aircraft); 51F (Aeronautics and Aerodynamics--Test Facilities and Equipment)

AZ- 0638019
AA- <NTIS> N77-22452/5/XAB
TI- Nondestructive Method for Instrumenting Helicopter Rotor Blades
TI- <NOTE> Patent Application
AU- Long, W. C. ; Williams, M. C.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- PAT-APPL-788 705; NASA-CASE-LAR-11201-1
PY- Filed 19 Apr 77
PG- 17p
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Patent
PC- PC A02/MF A01
JA- GRAI7717; STAR1513
AB- The patent application relates generally to methods of airfoil pressure instrumentation, and more particularly to a nondestructive method of applying and removing external pressure instrumentation to helicopter rotor blades without significantly affecting the aerodynamics of the blade and without damaging or altering the blade structure.
DE- *Aerodynamic coefficients; *Helicopters; *Nondestructive tests; *Rotor blades; *Patent applications; Airfoils; Pressure distribution; Rotary wing aircraft
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94J (Industrial and Mechanical Engineering--Nondestructive Testing); 90G (Government Inventions For Licensing--Instruments)

AZ- 0634610
AA- <NTIS> AD-A039 855/2/XAB
TI- Aeromedical Evaluation of the Army Molecular Sieve Oxygen Generator (AMSOG) Systems
TI- <NOTE> Preliminary rept
AU- Pettyjohn, F. S. ; McNeil, R. J. ; Akers, L. A. ; Rice, G. P. ; Piper, C. F.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-77-10
PY- Mar 77
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7716
AB- Molecular sieve technology has been considered as an alternative source of oxygen for US Army operational fixed and rotary wing aircraft. With the constraints of weight, size, and electrical power, the Army molecular sieve oxygen generator (AMSOG) appeared to meet operational needs. Initial design was predicated on direct replacement of current oxygen equipment for the two man crew OV-1 Mohawk surveillance aircraft. Initial bench and hypobaric chamber testing demonstrates a capability to provide 90-94% oxygen at sea level using engine bleed or compressed air at 40 PSIG, 20 to 22 liters per minute (LPM), normal temperature 70 deg F, pressure 760 Torr, dry (NTPD). Ninety-four percent (94%) oxygen is expected to support both physiologic needs and provide denitrogenation capabilities for US Army aircrew. Argon is concentrated to levels of 6-8% and is considered to be low; however, physiologic effects have not been fully defined. In-flight studies and

toxicology evaluation are continuing. (Author)
DE- *Oxygen generators; *Molecular sieves; Aircraft; Helicopters; Oxygen equipment; Argon; Breathing gases; Physiological effects; Hypobaric chambers; Short takeoff aircraft
ID- *Life support systems; OV-1 aircraft; V-1 aircraft; NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0634204
AA- <NTIS> AD-472 242/7/XAB
TI- The Effects of Pre-Emphasis, Peak Clipping, and de-Emphasis on the Intelligibility of Speech in Noise
TI- <NOTE> Final research rept
AU- Smith, F. L.
CS- Radio Corp of America Camden N J RCA Victor Div
CS- <CODE> 299400
RN- EXPERIMENT-954
CN- DA36 039SC64453
PY- Jun 55
PG- 34p
NT- Prepared in cooperation with Delaware Univ., Newark. Dept. of Psychology.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7716
AB- The experiment reported here was designed to investigate the effects or pre-emphasis, various amounts of peak clipping, and de-emphasis on speech intelligibility under various conditions of noise before processing the speech and in the listening field. Results indicate that all of the variables, operating singly, two at a time, and three at a time produce small but significant differences in articulation scores. These differences may be summarized in answer to the four principal questions of interest for the investigation. (Author)
DE- *Intercommunication systems; *Speech transmission; Intelligibility; In telligibility; Microphones; Noise(Radio); Transistors; Simulation; Helicopter s; Processing; Distortion; Signal-to-noise ratio; Tests; Amplifiers
ID- NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 45C (Communication--Common Carrier and Satellite)

AZ- 0634168
AA- <NTIS> AD-471 437/4/XAB
TI- Endurance Test of an-1 Roller Gear Drive
TI- <NOTE> Engineering rept
CS- Trw Inc Cleveland Ohio TRW Accessories Div
CS- <CODE> 354540
RN- TRW-ER-6371; USAAVLABS-TR-65-31
CN- DA44 177AMC30T; DA-1M1-21401-D-144; 1M1-21401-D-144-04
PY- Aug 65
PG- 50p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7716
AB- This report presents a review of the 1,000-hour endurance test of the roller gear power transmission. The primary purpose of this program was to determine the feasibility of roller gear drive arrangements for power reductions in helicopter transmissions and to determine critical design parameters for the drive. An endurance run was made for 1,000 hours on two roller gear drives mounted in a back-to-back test rig with a 200-horsepower load applied continuously with the high-speed shaft at 28,000 RPM and the low-speed shaft at 600 RPM in each box. An instrumentation system was provided to measure loads, speeds, oil flows, and temperatures, and to measure vibration levels. The test has confirmed that the roller gear drive is feasible for helicopter power reductions and has the ability to accept high input speeds and to accomplish high ratio reductions in one plane with very high efficiency, 98.5% or better with a high degree of mechanical reliability. (Author)
DE- *Transmission gears; Helicopters; Transmissions(Mechanics); Instrumentation; Design; Calibration; Stresses; Life expectancy
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0631310
AA- <NTIS> AD-A039 234/0/XAB
TI- A Program for Increased Flight Fidelity in Helicopter Simulation

TI- <NOTE> Technical memo
AU- Woomer, C. ; Carico, D.
CS- Naval Air Test Center Patuxent River Md
CS- <CODE> 246750
RN- NATC-TM-77-1-RW
PY- 27 Apr 77
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7715
AB- Increased emphasis has been placed on the need for and usefulness of major aviation training devices - flight simulators. A description of a modern trainer and the status of current simulation is provided. High fidelity is necessary to achieve high training transfer to the aircraft. The authors describe the need for and a proposed basic approach to technical simulator flight testing designed to achieve high fidelity. Ideas were formulated as a result of the authors' participation in the development and validation of the SH-2F Weapons System Trainer, Device 2F106. NAVAIRTESTCEN participates in the program as a technical advisor on flight fidelity. Major contributions are aircraft testing for the establishment of criteria data followed by simulator evaluation, both performed by engineering test pilots and flight test engineers. These evaluations used established and disciplined flight test techniques and should be commonplace in the development and validation of flight trainers. An extensive table of criteria data tests is provided for reference. Typical instrumentation tables for both the aircraft and trainer are included. Specific comments are made concerning trainer testing problems and the priorities of tests. A discussion is included on simulator data-gathering techniques, appropriate parameters, and equipment needed. Finally, the scope of a visual system evaluation is presented, along with a description of its usefulness in additional testing of the basic trainer. (Author)
DE- *Helicopters; *Flight simulation; Flight training; Naval aviation; Flight testing; Visual perception; Validation
ID- SH-2F aircraft; H-2 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0630039
AA- <NTIS> AD-474 925/5/XAB
TI- Experimental Airborne Microwave Supported Platform
TI- <NOTE> Final rept. Jun 64-Apr 65
AU- Brown, W. C.
CS- Raytheon CO Burlington Mass Microwave and Power Tube Div
CS- <CODE> 297670
RN- RADC-TR-65-188
CN- AF30(602)-3481
PY- Dec 65
PG- 75p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7715
AB- Microwave power transmission and helicopter technologies have been successfully combined to produce a hovering vehicle which is held aloft solely by power derived from a microwave beam. New efficient, and lightweight antenna and rectifier technologies allow the helicopter to support its energy-capture system and a substantial payload in addition to its own weight. In more detail, a microwave-powered helicopter with a six-foot rotor has been flown at an altitude of fifty feet for ten continuous hours. The helicopter was kept over the microwave beam by means of a suitable tethering system. (Author)
DE- *Microwave equipment; *Radiofrequency power; *Helicopters; Airborne; Hovering; Beams(Electromagnetic); Payload; Helicopter rotors; Electric motors; Lift; Rectifiers; Semiconductor diodes; Performance(Engineering); Instrumentation; Antennas
ID- NTISDODXD
SH- 49B (Electrotechnology--Circuits); 51A (Aeronautics and Aerodynamics--Aerodynamics); 46GE (Physics--General)

AZ- 0628972
AA- <NTIS> N77-18117/0/XAB
TI- Helicopter Sling Load Accident/Incident Survey: 1968 - 1974
AU- Shaughnessy, J. D. ; Pardue, M. D.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TM-X-74007
PY- Mar 77
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7714; STAR1509
AB- During the period considered a mean of eleven accidents per year occurred and a mean of eleven persons were killed or seriously injured per year. Forty-one percent of the accidents occurred during hover, and 63 percent of the accidents had pilot error listed as a cause/factor. Many accidents involved pilots losing control of the helicopter or allowing a collision with obstructions to occur. There was a mean of 58 incidents each year and 51 percent of these occurred during cruise.
DE- *Aircraft accident investigation; *Helicopter control; *Midair collisions; Collisions; Helicopter performance; Human factors engineering; Pilot error
ID- NTISNASA
SH- 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety)

AZ- 0626920
AA- <NTIS> AD-480 932/3/XAB
TI- A Method for Evaluating Sar Requirements for the Twelfth Coast Guard District
TI- <NOTE> Master's thesis
AU- DuPeza, J. B. ; Eustis, R. W. ; Guthrie, J. C. ; Zook, J. E.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- 1964
PG- 90p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A05/MF A01
JA- GRAI7714
AB- The general background and the authority for Coast Guard search and rescue activities is discussed and a brief introduction to the operation of Coast Guard search and rescue is presented. An introduction to model building and Monte Carlo Analysis follows. Scientific and industrial applications of these techniques and suggestions for Coast Guard usage are given. The paper develops a methodology for the application of these methods to Coast Guard problems. A model of the Twelfth Coast Guard District search and rescue operations and facilities is constructed. The potential use of this model is demonstrated. (Author)
DE- *Sea rescues; Mathematical models; Coast guard research; Monte carlo method; Helicopters; Crash rescue boats; Ships; California; Pacific ocean; Disasters; Transport aircraft
ID- C-130 aircraft; H-16 aircraft; H-52 aircraft; Sar(Search and rescue); NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0626527
AA- <NTIS> AD-479 612/4/XAB
TI- Predictors of Performance - Behavioral and Physiological Measures
TI- <NOTE> Annual progress rept. 1 Feb 65-21 Mar 66
AU- Stern, J. A.
CS- Washington Univ St Louis Mo Dept of Psychiatry
CS- <CODE> 370035
CN- DA-49-193-MD-2715
PY- 21 Mar 66
PG- 8p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7714
AB- This report reviews our work on instrumenting a helicopter to record the output of the pilot 'manipulanda' (stick, forward-backward, left-right, throttle, collective pitch, and tail rotor control). Data is recorded on magnetic tape. Data was collected on 4 pilots, and is presently being processed in our computer center. Data reduction system at present includes a Pace analog computer and a PDP-5 digital computer. (Author)
DE- *Pilots; Performance(Human); Helicopters; Instrumentation; Control; Data; Magnetic tape; Data processing; Measurement; Behavior; Physiology

ID- NTISDODXD
SH- 92B (Behavior and Society--Psychology)

AZ- 0624233
AA- <NTIS> AD-A037 992/5/XAB
TI- Human Factors Considerations in New Generation Army Aircraft Systems
TI- <NOTE> Study project rept
AU- Weaver, C. A.
CS- Defense Systems Management Coll Fort Belvoir Va
CS- <CODE> 410036
PY- Nov 76
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7713
AB- This study is useful to project mangers, decision makers and users alike, particularly those interested in rotary-wing system acquisition. It is also useful to behavioral scientists and human factors engineers as an aid to becoming sensitive to user requirements and changes in the operational environment. Purpose, scope and limitations are established. The issues are placed in perspective through a discussion of projected man-machine relationships with respect to the anticipated future operational environment of helicopters. Basic Army aviation systems of the future are described in relation to aviation missions. Projected human factors problems are examined as a function of system performance and operational trends. Human factors are related to life cycle costing by suggesting a relationship between the manager's decision flexibility and a commitment to a final system configuration. It is concluded that a departure from traditional cockpit design is necessary. Recommendations are made concerning decision criteria and human factors-acquisition cycle interface. (Author)
DE- *Helicopters; *Army aircraft; *Human factors engineering; *Man machine systems; Army procurement; Weapon systems; Management planning and control; Flight crews; Behavior
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0623954
AA- <NTIS> AD-489 467/1/XAB
TI- Strength Tests of Helicopter Rescue Basket
TI- <NOTE> Test rept
AU- Cuthrell, C.
CS- Coast Guard Baltimore MD Field Testing and Development Center
CS- <CODE> 086410
RN- 444
CN- 3954/02/01
PY- 16 Sep 66
PG- 23p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7713
AB- An attempt is made to determine if a reported operational failure of the helicopter rescue basket now in use was a design defect which could affect the safety of future rescue operations. The tests revealed some design weaknesses which caused premature failure of the basket bail. The report includes recommended design modifications necessary to provide a 'fix' for existing rescue baskets and a proposed modification for future production of the baskets.
DE- *Helicopters; *Rescue equipment; *Aerial pickup systems; Failure(Mechanics); Mechanical properties; Structural properties; Helicopter hoists; Safety; Design; Test methods
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0623792
AA- <NTIS> AD-488 791/5/XAB
TI- Engineering Flight Test of UH-1B Helicopter Equipped with XM-16 Armament Subsystem and Engineering Flight Test of UH-1B Helicopter Equipped with XM-21 Armament Subsystem
TI- <NOTE> Final test rept. 19 Jul-2 Sep 65
AU- Yamakawa, G. M. ; Foster, J. K.
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAAVNTA-63-81; USAAVNTA-65-1
CN- RDT/E-1X141806D13304; USATECOM-4-4-1532-03
PY- Jun 66
PG- 129p

NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7713
AB- Engineering flight tests of the UH-1B helicopter equipped with the XM-16 and XM-21 armament subsystems were conducted. The overall objective was to determine the effect of the installation of the subsystems on the UH-1B. Specific objectives were to determine the existence of any safety-of-flight conditions by evaluation of equantitative stability and control and vibration data and to determine any performance losses.
DE- *Helicopters; *Aircraft guns; Armor; Aircraft equipment; Air-to-surface ; Firing tests(Ordnance); Machine guns; Rockets; Aircraft ammunition; Folding fins(Rockets); Velocity; Momentum; Altitude; Aviation safety; Weight; Climbing; Level flight; Airspeed; Autorotation; Calibration; Descent trajectories; Pitch(Motion); Attitude control systems; Vibration; Instrumentation; Hovering; Drag; Takeoff
ID- H-1 aircraft; M-16 armament systems; M-60 guns(7.62-mm); NTISDODXD
SH- 79G (Ordnance--Guns); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0620837
AA- <NTIS> AD-A037 359/7/XAB
TI- Comparative Analysis of Part-Task Trainers for U. S. Army Helicopter Maintenance Training
TI- <NOTE> Final rept
AU- Reilly, R. E.
CS- Allen Corp of America Alexandria Va
CS- <CODE> 392997
RN- AC-77-0143; PM TRADE-76-C-0098-1
CN- N61339-76-C-0098
PY- 15 Jan 77
PG- 52p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7712
AB- A series of 28 actual equipment trainers, systems trainers and panel devices currently used in U. S. Army helicopter maintenance training were analyzed to develop recommendations for device improvement through modification, augmentation or substitution. The analysis included on-site interviews of helicopter maintenance instructors, examination of helicopter mishap data related to maintenance error and a review of the state of the art in training technology. To synthesize the information obtained, a generic classification scheme for training devices was developed and individual profiles of devices were prepared using 21 operationally defined criteria. It was concluded that substantial cost-training benefits could be achieved through propitious use of programmable simulation systems that employ microprocessor technology, modular construction and flexibility in display capability. Specific recommendations were made accordingly. (Author)
DE- *Training devices; *Helicopters; *Maintenance personnel; Aircraft maintenance; Errors; Programmed instruction; Microprocessors; Cathode ray tubes; Modular construction; Display systems; Cost benefits; Interviewing; Army personnel
ID- AH-1G aircraft; H-1 Aircraft; UH-1D aircraft; OH-58A aircraft; H-58 aircraft; OH-6A aircraft; H-6 aircraft; CH-47 aircraft; H-47 aircraft; NTISDODXA
SH- 92A (Behavior and Society--Job Training and Career Development); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0619969
AA- <NTIS> AD-800 973/0/XAB
TI- Engineering Flight Research Evaluation of the XV-5A Lift-Fan Aircraft. Part 1 - Stability and Control
TI- <NOTE> Final test rept. 28 Jan-30 Jun 65
AU- Finnestead, R. L. ; Welter, W. L. ; Ferrell, K. R. ; Anderson, W. A.
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAAVNTA-62-72-PT-1
CN- RDT/E-F1F131201D161; USATECOM-4-5-1220-01
PY- Aug 66
PG- 327p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A15/MF A01
JA- GRAI7712
AB- An engineering flight research evaluation was conducted to investigate

the flying qualities and stability and control characteristics of the research model XV-5A lift-fan vertical and short takeoff and landing (V/STOL) aircraft. Testing consisted of 24.2 productive flight hours and was conducted from 28 January through 30 June 1965. The flying qualities of the XV-5A observed during this evaluation were suitable for accomplishment of its primary mission as a research aircraft. Test results indicated an excellent stability augmentation system and good compatibility between fan-mode and jet-mode control systems.

DE- *Vertical takeoff aircraft; *Ducted fans; *Short takeoff aircraft; *Flight control systems; Flight testing; Stability; Control; Turbojet engines; Lift; Gas flow; Pitch(Motion); Aircraft engine ducts; Systems engineering; Research planes; Compatibility; Hovering; Stalling; Handling; Takeoff; Landing; Climbing; Instrumentation; Cockpits; Stall warning indicators; Warning systems; Yaw; Trailing control surfaces; Subsonic characteristics; Aerodynamic configurations

ID- J-85 engines; Stability augmentation; V-5 aircraft; NTISDODXD

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 97J (Energy--Heating and Cooling Systems); 46B (Physics--Fluid Mechanics); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 0617647

AA- <NTIS> AD-A036 910/8/XAB

TI- AH-1G Helicopter Aerodynamic and Structural Loads Survey

TI- <NOTE> Final rept. Jun 74-Apr 76

AU- Shockey, G. A. ; Williamson, J. W. ; Cox, C. R.

CS- Bell Helicopter Textron Fort Worth Tex

CS- <CODE> 054200

RN- 699-099-017; USAAMRDL-TR-76-39

CN- DAAJ02-73-C-0105; 1F262209AH76; 00

PY- Feb 77

PG- 365p

NT- Errata sheet inserted.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A16/MF A01

JA- GRAI7711

AB- Accurate prediction of helicopter system loadings required detailed knowledge of rotor aerodynamic environments and structural dynamic responses. This report describes a flight test program of an AH-1G helicopter where airfoil surface pressure, leading edge stagnation point, local flow magnitude and direction, blade accelerations, bending moments, and the attendant responses in the control system and airframe were measured simultaneously. The hardware development, instrumentation techniques, test conditions, and initial data analyses are discussed. The development of a rotating frequency-division multiplex, capable of regulating and conditioning over 300 transducer signals, and the component testing and calibration of those transducers are described. Samples are presented of pressure distributions, leading edge stagnation point versus azimuth, and surface flow magnitude and direction. Aerodynamic forces and responses in the rotor and control systems are presented and compared with predicted analytical values. Acoustic signals and airload fluctuations are used to locate and define the origin of rotor noise during high-speed flight and in operating regimes of strong wake interaction.

DE- *Helicopter rotors; *Rotor blades; *Aerodynamic loading; Helicopters; Loads(Forces); Flight testing; Structural response; Vibration; Acoustics; Fuselages; Airfoils; Leading edges; Aerodynamic configurations; Hubs; Control systems; Instrumentation

ID- AH-1G helicopters; H-1 helicopters; Huey Cobra; NTISDODXA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0617512

AA- <NTIS> AD-A036 774/8/XAB

TI- Pilotage Navigation Utilizing a Night-Vision System

TI- <NOTE> Final rept

AU- Johnson, N. A. ; Foster, M.

CS- Human Engineering Lab Aberdeen Proving Ground Md

CS- <CODE> 172850

RN- HEL-TM-6-77

PY- Feb 77

PG- 20p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A02/MF A01

JA- GRAI7711

AB- A field test was conducted to evaluate pilotage-navigation performance using a forward-looking infrared (FLIR) night-vision system. Two types of displays (helmet-mounted and panel-mounted) were used, each with three fields of view (FOV) (narrow, 15 deg vertical x 20 deg horizontal; medium, 30 deg vertical x 40 deg horizontal; wide, 45 deg vertical x 60 deg horizontal). The results indicate that the wide FOV

is more effective than either of the narrower FOV's. The future TADS system is proposed to have a horizontal FOV on the order of 40 deg; the authors believe this will present serious problems in conducting pilotage navigation. The implications of these results are discussed. (Author)
DE- *Night vision devices; *Navigation; Helicopters; Target acquisition; Display systems; Flight paths; Human factors engineering
ID- Nap of earth navigation; NTISDODXA
SH- 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection) ; 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 0617017
AA- <NTIS> AD-807 591/3/XAB
TI- Research and Development of a Control-Display Subsystem for a Tactical V/STOL Weapon System
TI- <NOTE> Final rept. May 65-May 66
AU- Fellinger, J. G. ; Hardwicke, R. M.
CS- Lear Siegler Inc Grand Rapids Mich Instrument Div
CS- <CODE> 204620
RN- GRR-66-1221; AFFDL-TR-66-118
CN- AF 33(615)-2540; AF-6190; 619011
PY- Dec 66
PG- 92p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7711
AB- This report describes a 12-month study effort to investigate the requirements of V/STOL control-display systems. During the evaluation phase a fixed-base, dynamic simulator was used to represent a V/STOL aircraft with four lift engines and two cruise engines. The low speed flight regimes, particularly the landing transition, received primary emphasis. Controlled experiments were conducted to evaluate four separate hover indicator concepts including horizontal situation indicator, cathode ray tube, attitude director indicator, and electroluminescent cross-grid displays. These experiments indicated that IFR approaches with V/STOL aircraft can be made safely and efficiently and that the control-display system has a significant effect of fuel consumption, landing site requirements, and pilot performance in making landing approaches. Results of Integrated Flight Control System requirements analysis are discussed and preliminary designs of flight director and autopilot systems are described. (Author)
DE- *Vertical takeoff aircraft; *Short takeoff aircraft; Flight instruments ; Feasibility studies; Flight simulators; Display systems; Instrument panels; Computer programming; Computer logic; Attitude indicators; Course indicators; Hovering; Cathode ray tubes; Tactical weapons; Flight control systems; Instrument landings; Flight speed indicators
ID- Cruise engines; Engines; Lift; NTISDODXD
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0614661
AA- <NTIS> AD-D003 432/2/XAB
TI- Armored Headrest
TI- <NOTE> Patent
AU- Eggert, W. S.
CS- Department of the Navy Washington D C
CS- <CODE> 110050
RN- PAT-APPL-566 465; PATENT-3 922 034
PY- Filed 9 Apr 75 patented 25 Nov 75
PG- 6p
NT- Supersedes PAT-APPL-566 465.
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7710
AB- The patent concerns a headrest for airplane seats, and more particularly for helicopters which provide crash protection to the pilot by the use of a resilient pivotal coupling between a headrest supporting member and the headrest assembly itself. An integrally attached, rapidly movable visor is provided which is movable from a first position wherein it does not restrain the pilot's head a second position where it does restrain the pilot's head, at the same time the headrest provides visibility and armored protection completely around the pilot's head.
DE- *Patents; *Headrests; *Aircraft seats; *Helicopters; Protection; Crashes; Pilots; Couplings; Assembly; Visors; Maneuverability; Visibility; Military applications
ID- PAT-CL-297-216; NTISGPN
SH- 90GE (Government Inventions For Licensing--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering);

51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0614488
AA- <NTIS> AD-A036 600/5/XAB
TI- Preliminary Evaluation of Oxygen Use Rates in US Army Aircraft. Part I. RU-21H
TI- <NOTE> Final rept
AU- Pettyjohn, F. S. ; Meier, M. J.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-77-6
CN- 3A062110A819
PY- Nov 76
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7710
AB- Accurate inspiratory minute volume (IMV) is required for us Army fixed and rotary wing aircraft oxygen system design. This initial study evaluated oxygen usage rates of US Army aircrew conducting operational missions at altitudes of 19,000 to 25,000 feet flying RU-21H twin turbopropeller driven unpressurized aircraft. Inspiratory minute volume (IMV) was calculated from the crew dilutor demand oxygen regulator pressure gauge and timed mission profiles. The IMV results were consistent with consideration of the limited accuracy of the pressure gauge through 56 flights with 112 pilot and copilot crewmembers. The average IMV was 8.09 + or - 2.14 Standard Deviation (SD), liters per minute (LPM) at normal temperature (70 F), pressure (760 mmHg) and dry NTPD). The range of IMV was 4.47 to 13.25 LPM NTPD per crewman.
DE- *Life support systems; *Oxygen consumption; Helicopters; Oxygen generators; Standards; Work; Pilots; Respiration
ID- NTISDODXA
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 0614094
AA- <NTIS> AD-A036 204/6/XAB
TI- Helicopter Integrated Control (GAT-2H)
TI- <NOTE> Final rept
AU- Waugh, J. D. ; Stephens, J. A.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-39-76
PY- Dec 76
PG- 31p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7710
AB- Two experimental three-axis helicopter controls combining collective and cyclic functions into an optional one-handed controller were simulator flight tested and their performance, measured in energy-expended terms, was compared to conventional helicopter controls. The nature of the results indicate further development through flight testing should be undertaken. (Author)
DE- *Flight control systems; *Helicopters; *Human factors engineering; Integrated systems; Flight simulators; Flight simulation; Pilots; Motion; Hands; Sensitivity; Performance tests; Control sticks; Steering

ID- OH-58 aircraft; H-58 aircraft; GAT-2H flight simulators; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0613891
AA- <NTIS> AD-818 788/2/XAB
TI- Arctic Kit for Use with Aircraft Wire Dispenser Set AN/ATE-1 Development Phase
TI- <NOTE> Interim rept. no. 1 on Phase 1
AU- Snow, F. E. ; Fischer, R. L. ; Anderson, R. C.
CS- Aircraft Technical Services Inc van Nuys Calif
CS- <CODE> 388110
RN- ECOM-02532-1
CN- DA-28-043-AMC-02532(E); DA-1E6-40306-D-488; 1E6-40306-D-488-17
PY- Jul 67
PG- 119p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A06/MF A01
JA- GRAI7710
AB- Various modifications of the Arctic Door Closure Kit for use with Aircraft Wire Dispenser AN/ATE-1 were considered for the purposes of: (1) Overcoming the deficiencies noted during rain test and vibration test of the prototype. (2) Incorporating suggestions for improvement noted in Report No. 2 and Report No. 4 of prototype contract, and in Technical Report ECOM-6008. (3) Eliminating requirements for installation on CH-21, CH-34, and UH-1A helicopters, and adding requirements for installation UH-1D helicopter. (4) Complying with human factors engineering requirements as they affect installation, operation, maintenance, repair, and stowage of the Arctic Kit. (5) Achieving an economical design which can be manufactured in production quantities with maximum ease and minimum cost consistent with performance requirements. Sketches are shown of the different possible methods of accomplishing the above objectives. The advantages and disadvantages of alternate methods are listed. A new survey of available materials for the curtain and seals was made, since the temperature range for instllation and operation of the Arctic Kit has been changed from -80F thru +160F for the prototype, to -65F thru +125F for the advanced development model, and also to determine if more suitable materials have become available since the survey was made for the prototype. From the different possible methods and materials investigated the most suitable are selected and recommended for the advanced development model Arctic Kit. (Author)
DE- *Aircraft doors; *Helicopters; Modification kits; Wind; Rain; Vibration ; Cold weather tests; Arctic regions; Installation; Design; Field wire; Release mechanisms; Aircraft equipment; Telephone equipment; Telephone lines; Human factors engineering; Protection; Performance(Human)
ID- An/ate-1; Dispensers; H-34 aircraft; H-21 aircraft; H-1 aircraft; Wire dispensers; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0613278
AA- <NTIS> AD-815 210/0/XAB
TI- Investigation of Crew Escape Concepts for VTOL and Low-Altitude DASH Vehicles
TI- <NOTE> Final technical rept. Feb 65-Aug 66
AU- Bull, J. O. ; Serocki, E. L. ; Schor, J. ; Nolan, L. J. ; Mackey, B. C.

CS- Boeing CO Renton Wash
CS- <CODE> 059550
RN- D6-60001-2; AFFDL-TR-66-149
CN- AF 33(615)-2378; AF-1362; 136203
PY- Feb 67
PG- 341p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A15/MF A01
JA- GRAI7710
AB- This report covers the results of a study to define crew escape requirements and criteria for selection, evaluation, and design of crew escape systems for VTOL and low-altitude dash vehicles. Escape concept performance, survival, pressurization, restraint, crew comfort and efficiency, and development and qualification testing requirements are defined. Representative open ejection seat, encapsulated ejection seat, cockpit pod, and separable nose capsule escape concepts and vehicle configurations are defined. Escape concept performance capabilities with respect to altitude, speed, and descent angle are presented and results of analyses of escape concept effectiveness for VTOL hover and transition, conventional takeoff and landing, low-altitude dash, and high-speed and high-altitude flight regimes are presented. Also, the results of an investigation of automatic emergency detection and escape initiation are presented. Escape concept trade data relative to escape and survival potential, reliability, cost, weight, volumetric penalty, availability, crew comfort and efficiency, and crew safety were developed and are presented in a form useful as a guide in the selection, evaluation and design of escape concepts for advanced VTOL and low-altitude dash vehicles. (Author)
DE- *Vertical takeoff aircraft; *Aerospace systems; *Jet bombers; Short takeoff aircraft; Supersonic aircraft; Low altitude; Hovering; Level flight; Wind tunnel models; Takeoff; Aerodynamic characteristics; Aircraft landings; Nonpowered flight; Survival kits; Ejectors(Ordnance) ; Jettisonable cockpits; Ejection seats; Controlled atmospheres; Solid propellant rocket engines; Pressurization; Stabilization systems; Safety belts; Booms(Equipment); Human factors engineering; Drogue parachutes; Warning systems; Shock resistance; Data processing; Flotation; Computers; Configuration; Explosive actuators; Performance(Engineering); Costs; Remote control; Weight; Explosives initiators; Volume; Shaped charges; Safety; Base detonating fuzes
ID- Flexible linear shaped charges; Mild detonating fuze; Transition flight ; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0613112
AA- <NTIS> AD-814 465/1/XAB
TI- Proposed Aircrew Member Head Protection (Uh-1 Armor Seat Headguard)
TI- <NOTE> Final rept. 1 Oct-15 Nov 66
AU- Bowers, F. J.
CS- Army Concept Team in Vietnam San Francisco Calif 96243
CS- <CODE> 037350
CN- ACTIV-ACA-10/67I
PY- 12 May 67
PG- 6p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7710
AB- The UH-1 helicopter armor seat headguard was evaluated in Vietnam to determine its effectiveness and desirability. Insufficient engineering and operational test data were available to assess the capability of the armor seat headguard to deflect or absorb bullets of various caliber, or to predict effects of various caliber hits from different angles, or to evaluate crashworthiness of the armor seats with the headguard installed. Available quantitative data, reinforced by qualitative operational and tactical data obtained during the evaluation, indicate a strong requirement for protection of the head area. It was recommended that an engineering test program be undertaken in CONUS to determine seat crashworthiness. Pilot/copilot protection in conjunction with the ballistic helmet and the associated bullet splash and ricochet caused by the headguards. Efforts should be continued to develop protective headguard that is light in weight and affords adequate visibility for the pilot. (Author)
DE- *Aircraft seats; *Helicopters; Armor; Armor plate; Effectiveness; Flight crews; Design; Aircraft equipment; Head(Anatomy); Vietnam; Counterinsurgency; Vulnerability
ID- H-1 aircraft; South vietnam; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0612909
AA- <NTIS> AD-813 376/1/XAB
TI- Arctic Service Test of Universal Helicopter Cargo Hook, 6,000-Pound Capacity under Arctic Winter Conditions
TI- <NOTE> Final test rept. 24 Oct 66-24 Feb 67
AU- Grieg, J. M.
CS- Army Arctic Test Center Fort Greely Alaska
CS- <CODE> 036000
CN- RDT/E-1M141812D184; USATECOM-4-3-7380-02
PY- 21 Mar 67
PG- 40p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7710
AB- It is concluded that the Universal Helicopter Cargo Hook, 6,000- Pound Capacity, is suitable for U. S. Army use in the UH-1D helicopter under arctic winter conditions with loads ranging from 12 to 4,000 pounds. The test hook is superior to the standard hook with respect to number and location of release controls, pilot warning light and static line attachment ring location. The test hook was not satisfactory with respect to weight and opening under 'no load' condition. (Author)
DE- *Hooks; Cargo; Helicopters; Arctic regions; Feasibility studies; Safety ; Air drop operations; Reliability; Human factors engineering; Maintenance; Cold weather tests; Flight testing
ID- H-1 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0612714
AA- <NTIS> AD-811 781/4/XAB
TI- Engineering Flight Test of UH-1B/540 Rotor Helicopter Equipped with XM-16/M-5, XM-21/M-5 or XM-3/M-5 Armament Subsystem
TI- <NOTE> Final test rept. 13 Nov 65-5 May 66
AU- Nagata, J. I. ; Hall, G. C. ; Chubboy, R. A. ; Wray, D. P.
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAAVNTA-65-12
CN- USATECOM-4-5-1591-01
PY- Dec 66
PG- 135p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other

countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7710
AB- This report presents the results of an engineering flight test of the UH-1B/540 rotor helicopter equipped with the XM-16, XM-21, or XM-3 armament subsystem in conjunction with the M-5 armament subsystem. The test was conducted by the U. S. Army Aviation Test Activity (USAAVNTA). Overall test objectives were to verify safety of flight, develope data for the operator's manual, and assure that aircraft modifications did not degrade the handling qualities or limit the operational characteristics of the subsystems. Specific objectives were to determine quantitatively the effect of the armament subsystems on stability, control and performance of the aircraft, to determine the rocket launcher jettison characteristics, and to define the usable limits of the flight envelope for safe jettison of the launchers. Testing was conducted at Edwards Air Force Base, California, and at sites in Fort Irwin and Bakersfield, California. A total of 152 flights for a productive flight time of 116.4 hours was flown on aircraft S/N 64-14105 between 13 November 1965 and 5 May 1966. This included 30 jettison flights and 35 firing flights.
DE- *Helicopters; *Weapons; Firing tests(Ordnance); Gas turbine rotors; Aviation safety; Instruction manuals; Performance(Engineering); Stability; Rocket launchers; Jettisonable equipment; Range(Distance); Drag; Vibration; Airspeed; Flight testing; Control; Flight control systems; Hovering; Level flight; Instrumentation
ID- H-1 aircraft; M-134 guns(7.62-mm); M-21 armament subsystems; M-3 launchers; M-5 armament subsystems; M-60 guns(7.62-mm); M-75 grenade launchers(40-mm); Transition flight; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74I (Military Sciences--Passive Defense Systems); 79G (Ordnance--Guns)

AZ- 0611878
AA- <NTIS> NTIS/PS-77/0145/1/XAB
TI- Flight Simulator Training. Volume 1. 1964-1973 (A Bibliography with Abstracts)
TI- <NOTE> Rept. for 1964-Dec 73
AU- Adams, G. H.
CS- National Technical Information Service, Springfield, Va.
CS- <CODE> 391812
PY- Mar 77
PG- 122p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI7709
AB- Volume One of a two-volume bibliography begins a documentation of the flight training of Air Force, Navy, and Army airmen by the use of simulators and simulation systems. Takeoff, flight, maneuvering, approach, and landing are covered, along with visual fields, perception, flight control, guidance, physiological characteristics, and psychological aspects. Applications include jet aircraft, helicopters, space shuttles, training planes, and VTOL and STOL craft. Discussions are presented of pilot performance, training concepts, cost effectiveness, television and display equipment, instrument flight, computer applications, human factors, adaptive methods, weaponry, and aircraft dynamics. A separate bibliography covers the design and development of the simulators. (This updated bibliography contains 117 abstracts, 9 of which are new entries to the previous edition.)
DE- *Bibliographies; *Flight simulators; *Military training; Flight simulation; Training devices; Education; Specialized training; Computer programming; Pilots; Army training; Navy training; Air Force training; Adaptive systems; Television equipment; Display devices; Aircraft; Performance
ID- Pilot training; NTISNTIS
SH- 92A* (Behavior and Society--Job Training and Career Development); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0611057
AA- <NTIS> AD-A035 966/1/XAB
TI- A Study Using Infra Red Thermography of Clothing Assemblies for Use by Personnel Working Beneath Operating Helicopters
AU- Clark, R. P. ; Mullan, B. J. ; Goff, M. R.
CS- Royal Naval Personnel Research Committee London (England)
CS- <CODE> 311350
RN- ES-4/76; DRIC-BR-54506
PY- May 76
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A02/MF A01
JA- GRAI7709
AB- With exposure to the down-draught of a hovering helicopter the surface temperatures of various garment assemblies has been compared, using infra red thermography and the Interim Assembly has been shown to have lowest surface temperature indicating its suitability at heat retention by the body. The surface temperatures observed are seen to be much more uniform in the down-draught than in 'still air' conditions. Thermography reveals the local hot spots over garment assemblies worn in 'still air' conditions. These are the areas where the heat loss will be greatest both in the 'still air' and also when the subjects are exposed to high velocity winds. The very warm areas over the face have been demonstrated in all of the garment assemblies. With the high heat loss coefficients previously measured beneath hovering helicopters, these areas could account for up to 40% of the total body heat loss. Underneath a hovering helicopter an excess temperature of 1 C over any garment assembly can increase heat loss from a subject by upwards of 80 W/m2. This indicates the sensitivity of heat loss to excess temperature in these environments and emphasises the importance of adequate and uniform insulating properties of the garment assembly.
DE- *Protective clothing; *Maintenance personnel; Cold weather operations; Adverse conditions; Helicopters; Flight decks; Hovering; Wind velocity; Body temperature; Thermographs; Thermography; Great Britain
ID- Comfort; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0610877
AA- <NTIS> AD-A035 785/5/XAB
TI- Air Velocity and Convective Cooling Coefficient Measurements Beneath a Sea King Helicopter
AU- Clark, R. P. ; Mullan, B. J. ; Goff, M. R.
CS- Royal Naval Personnel Research Committee London (England)
CS- <CODE> 311350
RN- ES-1/76; DRIC-BR-54565
PY- Jan 76
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7709
AB- The Environment Subcommittee of the Royal Naval Personnel Research Committee is reviewing and rationalising requirements for extreme-cold-weather clothing in ships. It is generally thought that flight-deck personnel concerned with helicopter operations in ships at sea are those most adversely affected by cold. The protection required by these crews is likely to be one of the base factors in deciding the overall extent of the clothing protection that is needed. Flight-deck personnel can be subjected to temperatures in the range -15 C to +10 C for periods of up to 6 hours. They may be exposed to wind speeds of up to 50 knots in addition to the down-draught and outwash created by the helicopter itself. As a preliminary to land and sea trials designed to assess particular garment assemblies suitable for use in these environments, a study has been made to measure the wind strengths and convective cooling coefficients found beneath a helicopter operating on land in a temperate climate. This paper reports the results of these experiments which were performed beneath a Sea King helicopter at A and AEE Boscombe Down on 18 September 1975. (Author)
DE- *Convection(Heat Transfer); *Protective clothing; *Helicopters; Downwash; Cooling; Wind chill; Flight decks; Naval personnel; Anemometers; Exposure(Physiology); Wind; Test methods; Aircraft landings; Cold weather operations; Great Britain
ID- *Convective cooling coefficient; *Sea king helicopters; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0610360
AA- <NTIS> AD-823 682/0/XAB
TI- Formation Flight Displays
TI- <NOTE> Interim progress rept. 27 Jun 66-31 Jan 67
AU- Clifford, R. R. ; Nicholson, R. M. ; Ekstrom, J. L. ; Baker, C. A.
CS- Honeywell Inc Minneapolis Minn Systems and Research Center
CS- <CODE> 402349
RN- 12543-IR1
CN- N00014-66-C-0362; NR-213-054
PY- 1 Feb 67
PG- 126p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7709

AB- The objective of the program is to define and demonstrate an appropriate display system for helicopter IFR formation flight. This report presents the results of the work that has been performed to date in the areas of human factors analysis, display design and real-time man-in-the-loop simulation. The human factors analysis was concerned primarily with the identification of the pilot's information and control requirements when flying the formation flight problem under IFR conditions. The display design task was directed toward incorporating the analytically derived information requirements into alternative display formats. During the simulation phase of the study these alternative display formats are being 'optimized' and will be ultimately compared for both normal and degraded modes of system operation. (Author)
DE- *Display systems; *Formation flight; *Instrument flight; *Helicopters; Flight instruments; Human factors engineering; Control systems; Man machine systems; Simulation; Flight; Mission profiles; Military training
ID- NTISDODXD
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0610277
AA- <NTIS> AD-823 022/9/XAB
TI- One-Man Insulated Life Raft
TI- <NOTE> Final rept. 1 Jul-14 Aug 67
AU- Stahl, K. K.
CS- Tactical Airlift Center Pope AFB N C
CS- <CODE> 402290
RN- TAC-TEST-67-211
PY- Sep 67
PG- 25p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7709
AB- This test determined in a salt-water environment the manufacturing quality, suitability, performance, compatibility, and durability of the one-man insulated life raft. The raft endured well during a series of inspections and repacks. Inflation tests showed canopy and floor welds separate easily. When packed in a survival kit, the raft does not inflate uncontrollably at altitude. The deployment of the raft during all phases of bailout and descent were normal. The durability test concluded the raft was durable. The raft produces a sailing effect when subjected to helicopter's downwash and is less stable than current life rafts. The raft is compatible with TAC survival kits. It is recommended that the One-Man Insulated Life Raft be procured as a replacement for the LRU-4/P and -5/P rafts when existing deficiencies have been corrected. (Author)
DE- *Life rafts; Environmental tests; Safety devices; Stability; Compatibility; Jet fighters; Handling; Survival kits; Wear resistance; Inflatable structures; Deployment; Failure; Visual inspection; Reliability; Acceptability; Arctic regions; Performance(Engineering); Thermal insulation
ID- F-104 aircraft; F-105 aircraft; F-4 aircraft; Temperature regions; NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0610075
AA- <NTIS> AD-822 178/0/XAB
TI- The Princeton Pennsylvania Army Avionics Research Program
TI- <NOTE> Annual rept. no. 1, 1 Jun 66-30 May 67
AU- Dukes, T. A. ; Durbin, E. J. ; Graham, F. D. ; Schmitz, F. H. ; Sharkoff, E. G.
CS- Princeton Univ N J
CS- <CODE> 288450
RN- ECOM-02412-1
CN- DA-28-043-AMC-02412(E); DA-1H1-20601-A219; 1H1-20601-A219-07
PY- Oct 67
PG- 47p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7709
AB- The Effect of Helicopter Dynamics and Control Characteristics on Formation Flight is a theoretical study of the trajectory laws which are used to define a follower's nominal point and the control laws which determine the follower's required action. Effect of maneuvers is included in this effort to provide fundamental information on which to base the development of IFR Formation Flight equipment for the Army.

Landing Control Theory for Decelerating VTOL Aircraft is an attempt to obtain optimal trajectories for decelerating landing and accelerating take-off maneuvers. The effect of acceleration, aerodynamic constraints, and terminal constraints are included in the problem formulation. Simplified equations of motion are developed and possible schemes for their solution are investigated in this start toward providing information on which development of guidance equipment can be based. A System Study of Low Visibility Approach and Landing is an effort to combine the control characteristics of Helicopters with the performance characteristics of the Pilot to determine guidance parameters needed for low visibility approaches. The models for the control characteristics, disturbances, and pilot have been chosen, and work has started on setting up a combined model. An Examination of Instrumentation Requirements to Permit Control of Helicopter and Future VTOL Flight Performance explores possible methods for improving the high gross weight take-off performance of helicopters by giving accurate aerodynamic information to the pilot in some appropriate way. (Author)

DE- *Helicopters; *Formation flight; *Vertical takeoff aircraft; *Aerodynamics; *Instrument landings; *Aeronautics; Control; Theory; Dynamics; Deceleration; Takeoff; Equations of motion; Visibility; Flight paths

ID- *Avionics; NTISDODXD

SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0608001

AA- <NTIS> N77-12027/7/XAB

TI- Full-Scale Crash Test of a CH-47C Helicopter

AU- Castle, C. B.

CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

RN- NASA-TM-X-3412; L10854

PY- Dec 76

PG- 38p

NT- Misc-Film Supplement L-1211 to This Report Is Available on Request.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A03/MF A01

JA- GRAI7708; STAR1503

AB- A full-scale crash test of a large troop/cargo carrying CH-47C helicopter was conducted at the Langley impact dynamics research facility. The crash test of this large helicopter was performed as part of a joint U.S. Army-NASA helicopter test program to provide dynamic structural and seat response data. The test, the procedures employed, the instrumentation, a general assessment of the resulting damage, and typical levels of accelerations experienced during the crash are reported. Various energy-absorbing seating systems for crew and troops were installed and instrumented to provide data for use in the development of design criteria for future aircraft. The crash conditions were selected to simulate known crash conditions and are representative of the 95th percentile accident environment for an autorotating helicopter. Visual examination of the crashed test specimen indicated irreparable damage to many of the structural components. The highest accelerations were recorded by the accelerometers located on the cabin floor in the aft section of the helicopter, directly above the primary impact location and on the floor of the cockpit above the secondary impact location(s). (Author)

DE- *Aircraft accidents; *Ch-47 helicopter; *Crashes; *Seats; Dynamic response; Dynamic tests; Energy absorption; Flight simulation

ID- NTISNASA

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety)

AZ- 0607288

AA- <NTIS> AD-A035 334/2/XAB

TI- Army Aviation RDT and E Plan

TI- <NOTE> Edition No. 5

CS- Army Aviation Systems Command St Louis Mo

CS- <CODE> 404318

PY- Oct 76

PG- 262p

NT- See also AD-A035 351.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A12/MF A01

JA- GRAI7708

AB- Contents: Airmobile Systems Introduction -- Army Aviation Systems Requirements, Threat, Land Combat Functions, Major Thrusts, and IOC Dates; Airmobile Systems -- Mobility, Intelligence, Firepower, Combat Service Support, and Command, Control and Communications; Technology Introduction -- Analysis of Aircraft Concepts, Technological

Requirements, Analysis of R and D Tasks, Analysis of Required Resources, Laboratory Project Selection Process, and Responsiveness to Science and Technical Objectives; Aerodynamics; Structures; Propulsion; Reliability Maintainability; Safety and Survivability; Mission Support; Aircraft Subsystems; Aircraft Weaponization; Human Factors, Remotely Piloted Vehicles; Aviation Electronics; Manufacturing Technology; Advanced Technology Demonstration; Tilt Rotor Air Vehicle, Rotor System Research Aircraft, Advancing and Blade Concept, and Advanced Structures Technology Demonstrator; Mathematical Science; Aircraft Systems Synthesis; Fundamental Sciences; and Resources Required. (Author)
DE- *Army aviation; *Army planning; *Helicopters; Research management; Military requirements; Airmobile operations; Avionics; Advanced systems ; Mission profiles; Aerodynamics; State of the art; Predictions; Remotely piloted vehicles; Test and Evaluation
ID- NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74GE (Military Sciences--General)

AZ- 0607264
AA- <NTIS> AD-A035 310/2/XAB
TI- The Shock and Vibration Digest. Volume 9. Number 1
CS- Naval Research Lab Washington D C Shock and Vibration Information Center
CS- <CODE> 389004
PY- Jan 77
PG- 100p
NT- See also Volume 8, Number 12, AD-A035 311.
NT- Naval Research Lab., Shock and Vibration Information Center, Attn: Code 6020. Washington, D. C. 20375. Annual subscription $40.00. No copies furnished by DDC/NTIS.
PC- Not available NTIS
JA- GRAI7708
AB- Partial contents: Vibration of Helicopters; Shock and Vibration Instrumentation--Accelerometers; Computer Programs--Shock and vibration isolation; and Abstracts from the Current Literature.
DE- *Vibration; *Shock(Mechanics); Periodicals; Technical information centers; Helicopters; Accelerometers; Computer programs; Vibration isolators; Structural response; Abstracts
ID- NTISDODXA
SH- 46E (Physics--Structural Mechanics)

AZ- 0607020
AA- <NTIS> AD-A035 064/5/XAB
TI- Integrated Controller Evaluation
TI- <NOTE> Final rept
AU- Thomas, C. L. ; Mathews, M. S. ; Arnold, J. R.
CS- Army Aviation Engineering Flight Activity Edwards AFB Calif
CS- <CODE> 409025
RN- USAAEFA-75-24
PY- Sep 76
PG- 62p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7708
AB- The United States Army Aviation Engineering Flight Activity, in conjunction with the United States Army Human Engineering Laboratory (USAHEL), conducted a limited flight evaluation of an integrated control system installed in a JOH-58A helicopter. Flight tests were conducted at Aberdeen Proving Ground, Maryland, from 23 January through 19 February 1976. A total of 27 flights were conducted, consisting of 14 productive flight hours. Testing was performed to provide a safety-of-flight envelope for future USAHEL tests, to determine the feasibility of the integrated controller concept, and to verify satisfactory operation of standard flight controls (right side) with the integrated flight control system installed. A safety-of-flight envelope was established for future USAHEL testing. The integrated controller concept could not be adequately evaluated because of the large number of shortcomings and deficiencies found with the initial design. Eight shortcomings and five deficiencies were noted during this evaluation. The most significant were the high control sensitivity in all controls and the poor control harmony between control axes. The standard control operated satisfactorily in conjunction with the integrated controller. (Author)
DE- *Flight control systems; *Integrated systems; *Helicopters; *Army aircraft; Human factors engineering; Flight testing; Instrumentation
ID- H-58 aircraft; JOH-58A aircraft; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0606984
AA- <NTIS> AD-A035 028/0/XAB

TI- Test Planning Information and Procedures for Testing Aircraft Navigation Systems
AU- King, A. B. ; Sandlin, L. F.
CS- Armament Development and Test Center Eglin AFB Fla
CS- <CODE> 404038
RN- ADTC-TR-75-70
PY- Oct 75
PG- 115p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7708
AB- The designation of the Central Inertial Guidance Test Facility (CIGTF) as the DoD focal point for aircraft inertial navigator test and evaluation required that a generalized test plan be written to govern all future tests. This document outlines such a Standarized Test, including test philosophy and objectives, the test approach and an outline of the test procedure. It provides the reader with an understanding of the 6585th Test Group's aircraft navigator test capabilities, the types of test programs currently available, and the requirements necessary for an agency to enter systems in these programs. Ten appendices which cover areas such as analysis methods, laboratory testing, and instrumentation, are included to provide the customer with additional detailed information. (Author)
DE- *Inertial navigation; Navigators; Airborne; Test methods; Data reduction; Helicopters; Jet fighters; Circular error probable; Pallets; Mission profiles; Planning; Test facilities
ID- UH-1H Aircraft; RF-4C Aircraft; NTISDODXA
SH- 76GE (Navigation, Guidance, and Control--General)

AZ- 0605533
AA- <NTIS> AD-483 730/8/XAB
TI- Full-Scale Dynamic Crash Test of a Small Observation Type Helicopter
TI- <NOTE> Technical rept
AU- Turnbow, J. W. ; Robertson, S. H. ; Carroll, D. F. ; McWilliam, R. D.
CS- Aviation Safety Engineering and Research Phoenix Ariz
CS- <CODE> 049050
RN- AVSER-65-10; USAAVLABS-TR-66-32
CN- DA-44-177-AMC-254(T); DA-1P125901A142; 1P125901A14230
PY- May 66
PG- 75p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7708
AB- This report discusses the results of experimental crash tests of two fully instrumented OH-4A helicopters. The first of these tests, conducted as a crane drop, illustrated the energy absorption capability of the tapered-wall landing gear strut. It further showed that high accelerations may be induced in occupants under level impact conditions of the aircraft in which the design sinking speed for the gear is exceeded. The latter of these tests, conducted from droned flight, indicated that rotor blade impacts with obstacles induced loads into the mast-transmission system which were sufficient to fail the structure at the transmission supports. The crashworthiness of the OH-4A showed an improvement over previous aircraft tested; however, further improvements are definitely possible. This report recommends the means of such improvements and proposes their implementation through appropriate study and test programs. (Author)
DE- *Helicopters; Drop tests; Instrumentation; Landing gear; Rotor blades(Rotary wings); Failure(Mechanics); Acceleration; Performance(Engineering); Airframes; Crash injuries; Impact shock; Aviation accidents; Safety belts; Aviation safety
ID- H-4 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0604262
AA- <NTIS> N77-11030/2/XAB
TI- Display/Control Requirements for VTOL Aircraft
TI- <NOTE> Interim Technical Report
AU- Hoffman, W. C. ; Curry, R. E. ; Kleinman, D. L. ; Hollister, W. M. ; Young, L. R.
CS- Aerospace Systems, Inc., Burlington, Mass.
RN- NASA-CR-145026; ASI-TR-75-26
CN- NAS1-13653
PY- Aug 75
PG- 273p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
PC- PC A12/MF A01
JA- GRAI7707; STAR1502
AB- Quantative metrics were determined for system control performance, workload for control, monitoring performance, and workload for monitoring. Pilot tasks were allocated for navigation and guidance of automated commercial V/STOL aircraft in all weather conditions using an optimal control model of the human operator to determine display elements and design.
DE- *Automatic control; *Display devices; *Pilot performance; *Vertical takeoff aircraft; Avionics; Ch-47 helicopter; Commercial aircraft
ID- NTISNASA
SH- 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0603595
AA- <NTIS> AD-A034 898/7/XAB
TI- Aviator Performance During Day and Night Terrain Flight
TI- <NOTE> Final rept
AU- Lees, M. A. ; Kimball, K. A. ; Hofmann, M. A. ; Stone, L. W.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-77-3
PY- Nov 76
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7707
AB- Terrain flying, both day and night, is now an Army aviation tactical requirement. The present investigation compared terrain flight during Low Level (LL) and Nap-of-the-Earth (NOE) profiles for: (1) day flight with the unaided eye; (2) night flight with the unaided eye; and (3) night flight using night vision goggles. Data were acquired through use of the Helicopter In-Flight Monitoring System(HIMS). The total sets of inflight measures were analyzed separately for both LL and NOE with further analysis on the subsets of pilot control variables and aircraft status variables. Multiple discriminant analysis techniques were used to determine which measures best discriminated between visual conditions. For the LL flight profiles, the results indicate that performance factors describing air speed and the frequency of small control inputs best discriminated between visual conditions. For NOE flight profiles, it was determined that performance factors measuring severity of roll angles, and the frequency and magnitude of control input, best discriminated between the three visual conditions. (Author)

DE- *Terrain following; *Flight paths; *Pilots; Helicopters; Inflight; Low level; Day; Night flight; Eye movements; Night vision devices; Goggles; Airspeed; Roll; Performance(Human); Comparison
ID- AN/PVS-5; Nap of the earth flight; NTISDODXA
SH- 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0603431
AA- <NTIS> AD-A034 732/8/XAB
TI- Specialized Training versus Experience in Helicopter Navigation at Extremely Low Altitudes
TI- <NOTE> Technical paper
AU- Farrell, J. P. ; Fineberg, M. L.
CS- Army Research Inst for the Behavioral and Social Sciences Arlington Va
CS- <CODE> 408010
RN- ARI-TECHNICAL PAPER-277
CN- DA-2-Q-763743-A-772
PY- Nov 76
PG- 11p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7707
AB- An experiment was performed to determine if navigation skills acquired in general flight would transfer to flight at extremely low levels and if the transfer could be matched by specialized training. Since the effects of extensive experience were matched by only 15 hours of special training, transfer may not be as extensive as previously assumed.
DE- *Helicopters; *Flight maneuvers; *Performance(Human); *Transfer of training; Low altitude; Comparison; Navigation; Flight training; Army aviation; Human factors engineering; Terrain following
ID- Experience; Specialized training; NTISDODA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 76GE (Navigation, Guidance, and Control--General); 92A (Behavior and Society--Job

Training and Career Development)

AZ- 0602767
AA- <NTIS> AD-834 597/7/XAB
TI- Engineering Flight Test of the CH-47B (Chinook) Helicopter. Phase D
TI- <NOTE> Interim rept
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAAVNTA-66-23
CN- RDT/E-IR-179-191-D-685; USATECOM-4-6-0200-03
PY- Mar 68
PG- 37p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7707
AB- The performance of the CH-47B helicopter was evaluated to determine compliance with the performance guarantees of the detail specification, and to provide data for the flight handbook. A summary of the performance guarantees and comparison of test results are included.
DE- *Helicopters; Flight testing; Performance(Engineering); Specifications; Military requirements; Instrumentation; Aerodynamic characteristics; Airspeed; Hovering; Position finding; Level flight; Climbing
ID- H-47 aircraft; NTISDODXD
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0602735
AA- <NTIS> AD-834 379/0/XAB
TI- Engineering Flight Test of the AH-1G (Hueycobra) Helicopter Equipped with the XM-28 Chin Turret with Twin XM-134 Miniguns. Phase B. Part 3
TI- <NOTE> Final rept. 20 Oct-28 Dec 67
AU- Melton, J. R. ; Hall, G. C.
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
CN- RDT/E-1X141807D174; USAAVCOM-67-26
PY- Mar 68
PG- 49p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7707
AB- Firing tests were conducted to determine the effects on the stability and control characteristics of the AH-1G helicopter caused by firing the twin XM-134 minigun 7.62 machine guns in the XM-28 chin turret. Firing the two XM-134 miniguns in the XM-28 turret does not cause any objectionable aircraft reactions which would restrict the flight envelope. The deficiencies and shortcomings detected during this test are discussed.
DE- *Helicopters; *Gun turrets; *Machine guns; Weapons; Human factors engineering; Flight testing; Firing tests(Ordnance); Stabilization systems; Flight control systems; Aerial gunnery; Stability; Aircraft fire control systems; Aerial gunners; Fairings; Fire control system components; Cockpits; Aircraft guns; Ammunition feed mechanisms; Control panels; Firing circuits; Gun components; Configuration
ID- Ah-1g aircraft; H-1 aircraft; M-134 guns(7.62-mm); NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 79G (Ordnance--Guns)

AZ- 0602133
AA- <NTIS> AD-832 419/6/XAB
TI- Engineering Flight Test of the AH-1G Helicopter to Determine the Area of Inadequate Directional Control Power at 8100 Pounds Gross Weight
TI- <NOTE> Final rept
AU- Melton, J. R. ; Hall, G. C.
CS- Army Aviation Test Activity Edwards AFB Calif
CS- <CODE> 036470
CN- RDT/E-IX141807D174; USAAVNTA-66-06
PY- Feb 68
PG- 35p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7707
AB- The test was conducted at Grand Prairie Municipal Airport near Fort Worth, Texas, from 4 August 1967 to 12 August 1967 by the US Army Aviation Test Activity (USAAVNTA). Paced in-ground-effect (IGE) flight, hovering in winds, approaches to a spot, and arrestment of turn rates

at various wind azimuths were investigated.
DE- *Helicopters; *Flight control systems; Flight testing; Helicopter rotors; Yaw; Hovering; Damping; Roll; Gears; Deterioration; Turning flight; Stability; Instrumentation; Weight; Wind; Velocity; Very high frequency; Low frequency; Communication and radio systems; Oscillation; Warning systems
ID- H-1 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0601946
AA- <NTIS> AD-831 636/6/XAB
TI- Progress under the Pennsylvania-Princeton-Army Avionics Research Program
TI- <NOTE> Annual technical rept. no. 1, 1 Jun 66-31 May 67
AU- Berkowitz, R. F. ; Fegley, K. A. ; Haber, F. ; Rubinoff, M. ; Schwartz, R. F.
CS- Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
CS- <CODE> 237000
RN- 68-04; ECOM-02411-1
CN- DA-28-043-AMC-02411(E); DA-1H1-20601-A-219; 1H1-20601-A-219-07
PY- Oct 67
PG- 677p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A99/MF A01
JA- GRAI7707
AB- The report contains a comprehensive technical description of effort carried out on seven tasks directed towards applied research on Avionics Technology. The research involved station keeping problems, navigation, radar systems, communications, computer activated instrumentation displays as applied to U. S. Army aircraft. (Author)
DE- *Aircraft equipment; Army aircraft; Helicopters; Aircraft antennas; Airframes; Inertial navigation; Simulation; Mathematical models; Formation flight; Radar equipment; Display systems; Lasers; Data processing; Air traffic control systems; Computer programs; Voice communications; Intelligibility; Military requirements
ID- *Avionics; Computer activated instrumentation displays; Stationkeeping; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 76GE (Navigation, Guidance, and Control--General); 45C (Communication--Common Carrier and Satellite); 63H (Detection and Countermeasures--Radiofrequency Detection)

AZ- 0599764
AA- <NTIS> AD-A034 075/2/XAB
TI- An Experimental Investigation of Favorable Interference Effects from a Wing and Proprotor
TI- <NOTE> Master's thesis
AU- Griffith, S. L.
CS- North Carolina State Univ Raleigh Dept of Mechanical and Aerospace Engineering
CS- <CODE> 400714
CN- DAHC04-75-C-0023; DAHC04-75-G-0007
PY- 1976
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A04/MF A01
JA- GRAI7706
AB- Although research on V/STOL aircraft has been extensive, there are other covertiplane configurations yet to be studied. Previous investigations of tilting proprotor concepts have considered the overall aerodynamic characteristics of specific designs. It is the purpose of this research to experimentally investigate the lift and drag characteristics of a constant-pitch proprotor and wing interaction system in the North Carolina State University subsonic wind tunnel. The testing system consisted of five basic parts, the proprotor and wing models, the North Carolina State University subsonic wind tunnel, the strain gage balance system, the system instrumentation, and the proprotor alignment, drive and shaft assembly.
DE- *Rotors; *Convertible planes; Wind tunnel tests; Tilt; High lift; Drag; Wings; Reduction; Angle of attack; Interference; Aerodynamic loading; Stalling; Theses
ID- Tilt rotor aircraft; Proprotors; Tilted proprotors; NTISDODXA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 46B (Physics--Fluid Mechanics)

AA- <NTIS> AD-A033 422/7/XAB
TI- The Shock and Vibration Bulletin. Part 4. Measurements and Criteria Development, Isolation and Damping
CS- Naval Research Lab Washington D C Shock and Vibration Information Center
CS- <CODE> 389004
RN- BULL-46-PT-4
PY- Aug 76
PG- 293p
NT- Presented at the Symposium on Shock and Vibration (46th) 20-23 Oct 75, San Diego, Calif. See also Bulletin 46, Part 5, AD-A033 423.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A13/MF A01
JA- GRAI7705
AB- Partial Contents: Boundary Layer Fluctuating Pressure Data Obtained in a High Background Noise Environment; Dynamic Measurement of Low-frequency Components of Track-induced Railcar Wheel Accelerations; Development and Application of a Miniature Recorder/Analyzer for Measurement of the Transportation Environment; Shipping Damage Prevention. Coherence Methods Used to Define Transmission Paths in Airborne Antenna Vibration; Component Random Vibration Requirements and Response Spectra; Statistical Determination of Random Vibration Requirements for Subassembly Tests; Ship Shock Loads Test for Harpoon Missile; Harpoon Missile-Aircraft Launch Ejection Shock Environment; Measurement of Damping and the Detection of Damages in Structures by Random Decrement Technique; Response Analysis of a System with Discrete Dampers; Application of Elastomeric Lead-Lag Dampers to Helicopter Rotors; Evaluation of Isolation Mounts in Reducing Structureborne Noise; Polyurethane Foam Isolators for Shock Isolated Equipment Floors; and Component Testing of Liquid Shock Isolator and Elastomers in Support of Recent Shock Isolation System Designs.
DE- *Shock(Mechanics); *Vibration; Symposia; Damping; Vibration isolators; Test methods; Measurement; Standards; Model tests; Test equipment; Instrumentation; Packaging; Equations of motion; Random vibration; Structural response; Shock tests; Shock absorbers; Floors; Encapsulation; Plastics; Boundary layer; Guided missiles; Antennas; Ground vehicles; Helicopter rotors; Naval vessels; Mathematical models; Computerized simulation
ID- *Meetings; NTISDODXA
SH- 46E (Physics--Structural Mechanics)

AZ- 0597586
AA- <NTIS> AD-A033 205/6/XAB
TI- Military Potential Test of Commercial 'Off the Shelf' Helicopters as Primary Helicopter Trainers
AU- Davis, W. S. ; Smith, H. G.
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
PY- 15 Jan 64
PG- 295p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A13/MF A01
JA- GRAI7705
AB- Six helicopters (PH-1, PH-4, PH-5, PH-6, PH-7 and PH-9) were tested to determine which commercial off-the-shelf FAA-certificated helicopters were suitable for use as primary helicopter trainers. It was concluded that the PH-4, PH-5, PH-6, and PH-7, after correction of the deficiencies and shortcomings listed in this report, will be suitable for Army use as primary helicopter trainers.
DE- *Training planes; *Helicopters; Flight testing; Observation aircraft; Pilots; Handling; Specifications; Human factors engineering; Army training; Commercial aircraft
ID- PH-1 aircraft; PH-4 aircraft; PH-5 aircraft; PH-6 aircraft; PH-7 aircraft; PH-9 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0597239
AA- <NTIS> AD-A032 857/5/XAB
TI- Aviation Visual Performance in the UH-1H. Study I
TI- <NOTE> Technical rept
AU- Frezell, T. L. ; Hofmann, M. A. ; Oliver, R. E.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-74-7
CN- 3A061101A91C
PY- Oct 73
PG- 130p

NT- See also Study 2, AD-A007 812.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7705
AB- This study monitored, via the corneal reflection technique, visual performance of Army aviators while flying a number of maneuvers in a UH-1H. Visual performance, to include time and transition information, was gathered over 13 cockpit areas. In addition to the objective recordings, subjective assessments by the aviators with regard to their visual performance was also attained. Results acquired by both techniques are provided. (Author)
DE- *Visual perception; *Pilots; *Flight maneuvers; Man machine systems; Helicopters; Windshields; Cockpits; Eye movements; Performance(Human); Army personnel; Flight testing; Experimental data; Takeoff; Hovering; Turning flight; Approach; Aircraft landings; Video tape recording; Flight recorders; Army aircraft
ID- Corneal reflection; Field of view; H-1 aircraft; UH-1H aircraft; NTISDODXA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 57S (Medicine and Biology--Physiology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92D (Behavior and Society--Education, Law, and Humanities)

AZ- 0594905
AA- <NTIS> AD-811 251/8/XAB
TI- Integrated Engineering and Service Tests of Pilot'S Clipboard
TI- <NOTE> Final rept. 27 Oct 66-10 Feb 67
AU- Traver, D. G. ; Followill, R. J.
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
CN- USATECOM-4-6-5008-01
PY- 28 Feb 67
PG- 42p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7705
AB- The US Army Aviation Test Board conducted the integrated engineering and service tests of the pilot's clipboard to determine the extent to which the clipboard performs its intended purpose and whether it is suitable for use by Army aviators. The clipboard was tested in both fixed- and rotary-wing aircraft under visual and instrument flight conditions during daylight and darkness at Fort Rucker, Alabama, from 27 October 1966 to 10 February 1967. Aviators from the US Army Aviation School also participated in the test. The clipboard was compared point by point with the applicable criteria of the Small Development Requirement.
DE- *Navigational aids; Display systems; Pilots; Human factors engineering; Military requirements; Performance(Engineering); Army aircraft; Acceptability; Aviation safety
ID- NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 76GE (Navigation, Guidance, and Control--General)

AZ- 0593282
AA- <NTIS> AD-844 579/3/XAB
TI- The Princeton Pennsylvania Army Avionics Research Program
TI- <NOTE> Annual rept. no. 2, 1 Jun 67-30 Jun 68
AU- Born, G. J. ; Dukes, T. A. ; Durbin, E. J. ; Graham, F. D. ; Schmitz, F. H.
CS- Princeton Univ N J
CS- <CODE> 288450
RN- ECOM-02412-2
CN- DA-28-043-AMC-02412(E); DA-1-H-162202-A-219; 1-H-162202-A-21907
PY- Nov 68
PG- 114p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7704
AB- This Second Annual Report of work done under Contract DA 28-043 AMC-02412(E) in support of the USAECOM Avionics Laboratory program covers five tasks: (1) Simple modeling and fundamental considerations of the station keeping control loop are presented. (2) In this report, a problem of considerable interest to people involved with improving existing steady-state STOL take-off techniques is discussed theoretically: minimum distance to clear an obstacle of a given fixed

height. (3) A System Study of Low Visibility Approach and Landing is a simulation of the control characteristics of helicopters combined with modeled characteristics of the pilot to determine guidance parameters needed for low visibility approaches. (4) An examination of instrumentation requirements to permit control of helicopter and VTOL flight performance. (5) Results of a preliminary survey of the phenomenon of triboelectricity as it applies to the problem of helicopter electrical charging are reported. (Author)
DE- *Helicopters; *Vertical takeoff aircraft; *Short takeoff aircraft; Formation flight; Turning flight; Equations of motion; Approach; Aircraft landings; Flight paths; Mathematical models; Transformations(Mathematics); Glide path systems; Takeoff; Instrumentation; Electrostatic fields
ID- *Management information systems; Station keeping; NTISDODXD
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0592537
AA- <NTIS> AD-840 903/9/XAB
TI- Instrument Formation Flight System for Helicopters (Iffsh). Simulation Evaluation. Volume I, Summary
TI- <NOTE> Research and development technical rept
AU- Campagna, R. W. ; Chambers, H. R. ; Rakowski, J. S.
CS- Army Electronics Command Fort Monmouth N J Avionics Lab
CS- <CODE> 387890
RN- ECOM-3010
PY- Sep 68
PG- 72p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7704
AB- A quantitative, simulation-based system evaluation of the Instrument Formation Flight System for Helicopters (IFFSH) was conducted at the Tactical Avionics System Simulator (TASS) Facility, Fort Monmouth. This program was directed to the task of measuring the capabilities of the IFFSH and used a manned real-time simulation of the UH-1C aircraft and the IFFSH display and controls to determine the significant variables of formation flight that pertain to the system. This volume of the report contains the TASS experiment design plan for the evaluation and a summary of the entire program from its initiation. The second volume of the report is Technical Report ECOM C-0387-F3, Development of Hybrid Computer Programs for Simulation of an Instrument Formation Flight System for Helicopters (U), June 1968, prepared under contract DAAB07-68-C-0387.
DE- *Formation flight; *Instrument flight; *Flight instruments; Helicopters ; Flight simulators; Human factors engineering; Control panels; Flight control systems; Range(Distance); Separation; Gusts; Proximity devices; Warning systems; Plan position indicators; Mathematical models; Digital computers; Simulation; Display systems; Computer programs; Effectiveness
ID- H-1 aircraft; NTISDODXD
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0590760
AA- <NTIS> AD-275 184/0/XAB
TI- United States Army Aviation Crash Injury Research
CS- Aviation Safety Engineering and Research Phoenix Ariz
CS- <CODE> 049050
RN- 61 20TR62 13; TRECOM-TR-62-13
CN- DA44 177TC707
PY- Sep 61
PG- 92p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7703
AB- No abstract available.
DE- *Aviation accidents; *Helicopters; *Impact shock; *Jet fighters; *Simulation; Aircraft seats; Airframes; Aviation injuries; Aviation safety; Commercial planes; Design; Effectiveness; Helmets; Human factors engineering; Military requirements; Pilot seats; Safety belts; Statistical analysis; Test methods; Tests
ID- Dc-8 aircraft; H-21 aircraft; G-91 aircraft; H-13 aircraft; H-25 aircraft; H-1 aircraft; H-23 aircraft; NTISDODXD
SH- 57W (Medicine and Biology--Stress Physiology); 51B (Aeronautics and Aerodynamics--Aeronautics); 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering)

AZ- 0588820
AA- <NTIS> AD-A032 028/3/XAB
TI- Noise Certification Considerations for Helicopters Based on Laboratory Investigations
TI- <NOTE> Final rept
CS- Man-Acoustics and Noise Inc Seattle Wash
CS- <CODE> 408220
RN- MAN-1014; FAA-RD-76-116
CN- DOT-FA74WAI-490
PY- Jul 76
PG- 108p
NT- See also report dated Nov 75, AD-A018 036.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7702
AB- This is the second part of a program concerning noise certification for V/STOL and helicopter aircraft. Aspects considered were: an engineering calculation procedure which validly and reliably reflects annoyance to helicopter operations; estimates of noise exposure levels which could be compatible with human activities in areas surrounding heliports; noise exposure modeling for helicopter noise; certification measurement approaches for helicopter noise certification. The basics of the program involved human response evaluations of conventional takeoff and landing (CTOL) aircraft noise, simulations of helicopter noise emphasizing 'slap' or pulsating noise effects, and recordings of a wide variety of helicopter operations.
DE- *Noise pollution; *Helicopters; *Short takeoff aircraft; *Psychophysics ; Aircraft noise; Acoustic measurement; Human factors engineering; Intensity; Exposure(General); Statistical processes; Simulation; Models ; Analysis of variance; Environmental protection; Experimental data; Community relations; Laboratory tests
ID- Annoyance; Noise levels; Certification; NTISDODFAA; NTISDOTFAA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0588512
AA- <NTIS> AD-850 180/1/XAB
TI- Engineering Test of Clothing System (Summer Uniform) for Army Aviation Crew Members
TI- <NOTE> Final rept
AU- Mercer, D. G.
CS- Army General Equipment Test Activity Fort Lee VA
CS- <CODE> 038370
CN- RDT/E-1-M-643303-D-547; USATECOM-46530004
PY- Dec 68
PG- 69p
NT- Original contains color plates: All DDC reproductions will be in black and white. Original may be seen in DDC Headquarters.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7702
AB- An Engineering Test of Clothing System (Summer Uniform) for Army Aviation Crew Members was conducted during the period 10 June - 15 November 1968 to determine the technical performance and safety characteristics as described in the SDR, the Technical Characteristics, and as indicated by the particular design, and to determine the technical and maintenance suitability of the uniform for service test. It was concluded that: the summer uniform, as described in the report, meets the operational requirements to a degree sufficient to warrant service testing. It was recommended that: the sleeve fastener be altered to allow a snug fit; the patch-type sleeve pocket zipper be replaced with a velcro fastener alleviating the accessibility problem; serious consideration be given to failure of material to exhibit a high degree of light fastness not only to the resultant color change, but also to the extreme loss of strength before the uniform is approved for issue. (Author)
DE- *Flight clothing; *Clothing; Environmental tests; Acceptability; Flight crews; Static electricity; Colors; Fastenings; Textiles; Tensile properties; Polyamide plastics; Laundry operations; Nylon; Humidity; Atmospheric temperature; Heat tolerance; Skin(Anatomy); Aviation safety ; Fire safety; Weight; Infrared radiation; Gloves; Shoes; Ventilation; Observation aircraft; Helicopters
ID- Summer uniforms; Uniforms; NTISDODXD
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0587407

AA- <NTIS> AD-812 953/8/XAB
TI- Evaluation of the E75R4 CBR Helicopter Mask
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
CN- AVN-2961.2/62
PY- 30 Mar 62
PG- 6p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7702
AB- No abstract available.
DE- *Protective masks; Flight crews; Acceptability; Compatibility; Helmets; Helicopters; Design; Maintenance; Configuration; Eyeglasses; Military requirements
ID- E-75 protective masks; NTISDODXD
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0587372
AA- <NTIS> AD-294 903/0/XAB
TI- Military Troop Seat Design Criteria
AU- TURNBOW, J. W. ; ROTHE, V. E.
CS- Aviation Safety Engineering and Research Phoenix Ariz
CS- <CODE> 049050
RN- 62 9TR62 79; TRECOM-TR6279
CN- DA44 177TC802
PY- Nov 62
PG- 73p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7702
AB- Strength requirements set forth in military specifications governing the design and fabrication of troop seats currently utilized in Army aircraft were analyzed. The analysis was made in light of accident experience with this seat, human tolerance as presently known, and accelerations and forces which may be anticipated in potentially survivable accidents. The analysis revealed that the strength requirements quoted in current military specifications are considerably lower than those which would be dictated by the upper limit of accelerations which can be tolerated by the occupants of the seats. It is recommended that the troop seat specifications be revised and that dynamic load factors of 25G for 0.20 second plus 45G for 0.10 second be adopted for troop seat design in the longitudinal and lateral directions and 25G for 0.10 second for the vertical direction. (Author)

DE- *Aircraft seats; Acceleration; Army aircraft; Aviation accidents; Design; Energy; Helicopters; Human factors engineering; Impact shock; Load distribution; Safety belts; Stresses; Tests
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0587344
AA- <NTIS> AD-101 555/1/XAB
TI- Evaluation of Gas Mask for Helicopter Pilots
CS- Army Aviation School Fort Rucker Ala
CS- <CODE> 036450
RN- AVN 1155
PY- 3 Feb 56
PG- 14p
NT- Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7702
AB- No abstract available.
DE- *Pilots; Helicopters; Tests
ID- NTISDODXD
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0585688
AA- <NTIS> AD-A031 710/7/XAB
TI- Army Scientific Advisory Panel Summer Study '76, 19 - 30 July 1976. Volume 2. Aviation Systems Subgroup Report
TI- <NOTE> Final rept

CS- Army Scientific Advisory Panel Washington D C
CS- <CODE> 403222
PY- Sep 76
PG- 43p
NT- See also Volume 3, AD-C007 906L.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7701
AB- The Army Scientific Advisory Panel (ASAP) conducted Summer Study '76 at the Armed Forces Staff College, Norfolk, VA, during the period 19-30 July 1976. The Panel examined the compatibility of the Science and Technology Objectives Guide (STOG), which delineates desired operational capabilities, and the system development plans of the various Army Laboratories to determine if the laboratory programs include the appropriate technology efforts to achieve the desired systems capabilities. The Panel made the examination through the efforts of the six Subgroups of Armament, Aviation, Electronics, Missiles, Mobility, and Soldier Support Systems, a separate report being published for each. (Author)
DE- *Research management; *Army planning; *Airmobile operations; *Helicopters; Remotely piloted vehicles; Human factors engineering; Weapon systems; Airborne; Systems engineering; Flight simulators; Integrated systems
ID- STOG(Science and technology objectives guide); Science and technology objectives guide; Aquila project; NTISDODXA
SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 74G (Military Sciences--Military Operations, Strategy, and Tactics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0585257
AA- <NTIS> AD-A031 277/7/XAB
TI- A Comparison of Red and White Cockpit Lighting under Quasi-Operational Conditions
TI- <NOTE> Technical memo
AU- Johnson, N. A. ; Poston, A. M.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-6-76
PY- Jan 76
PG- 34p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7701
AB- In an effort to compare data from basic research on the color of cockpit lighting to an applied environment, an experiment was conducted in a quasi-operational environment. Two OH-58 helicopters were configured with red and white lighting systems respectively, each with individually rheostatically controlled wedge-lighted instruments so that the instrument panel could be balanced for equal brightness between instruments. Five experiments were conducted on legibility, visual acuity, detectability of scale model military targets, peripheral visual performance, and external visual acuity for Landolt rings and full scale military targets in a real-world situation.
DE- *Cockpits; *Helicopters; *Illumination; *Visual acuity; *Colors; White light; Red; Human factors engineering; Performance tests; Instrument panels; Test methods; Thresholds(Physiology); Night vision; Target detection; Simulation
ID- Legibility; OH-58 aircraft; H-58 aircraft; NTISDODA
SH- 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0584180
AA- <NTIS> AD-851 862/3/XAB
TI- A Preliminary Design Study for a Ground Effect Machine
TI- <NOTE> Master's thesis
AU- Merrick, M. P.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- Mar 68
PG- 65p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A04/MF A01
JA- GRAI7701
AB- This paper provides the results of a preliminary design study of a

ground effect machine to be built at the Naval Postgraduate School, Monterey, California. The design covers such factors as lift versus weight, thrust versus drag, balance, stability, control, and instrumentation. The final design chosen was a peripheral jet type ground effect machine with a cushion area of 25.7 square feet, driven by a 4 foot diameter shrouded propeller. Total engine power of 203 horesepower is sufficient to provide 1017 pounds of lift at a hover height of 5.95 inches and 446 pounds of thrust at 30 knots. (Author)
DE- *Ground effect machines; *Gas turbines; Design; Feasibility studies; Jets; Lift; Weight; Thrust; Drag; Stability; Control; Shrouded propellers; Hovering; Theses
ID- NTISDODXD
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines) ; 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0583160
AA- <NTIS> N76-30816/2/XAB
TI- The Evaluation of Human Exposure to Helicopter Vibration
AU- Griffin, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
RN- ISVR-TR-78
CN- MIN-DEF-AT/2040/0165/AE
PY- Sep 75
PG- 46p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7626; STAR1421
AB- The form of a new procedure for evaluating helicopter vibration is described. Guidance to aircraft designers is offered for three categories of vibration exposure: whole-body vibration of aircrew, the legibility of vibrating instruments, and local vibration of aircrew heads, hands, and feet. The derivation of the evaluation procedure is presented and areas where more research is required are defined. Examples of how the procedure may be used to evaluate helicopter vibration are given and the vibration conditions reported in some helicopters are compared with the recommended vibration limits. (Author)
DE- *Vibration effects; *Helicopter performance; Helicopter control; Helicopter design; Exposure; Human factors engineering; Human performance; Manual control; Stress (Physiology); Vibration measurement ; Vibration perception
ID- Great Britain; NTISNASAE
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology)

AZ- 0582973
AA- <NTIS> N76-30223/1/XAB
TI- Analytical Display Design for Flight Tasks Conducted under Instrument Meteorological Conditions
AU- Hess, R. A.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RN- NASA-TM-X-73146; A-6636
PY- Aug 76
PG- 51p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7626; STAR1421
AB- Paramount to proper utilization of electronic displays is a method for determining pilot-centered display requirements. Display design should be viewed fundamentally as a guidance and control problem which has interactions with the designer's knowledge of human psychomotor activity. From this standpoint, reliable analytical models of human pilots as information processors and controllers can provide valuable insight into the display design process. A relatively straightforward, nearly algorithmic procedure for deriving model-based, pilot-centered display requirements was developed and is presented. The optimal or control theoretic pilot model serves as the backbone of the design methodology, which is specifically directed toward the synthesis of head-down, electronic, cockpit display formats. Some novel applications of the optimal pilot model are discussed. An analytical design example is offered which defines a format for the electronic display to be used in a UH-1H helicopter in a landing approach task involving longitudinal and lateral degrees of freedom. (Author)
DE- *Instrument landing systems; *Pilot performance; Design analysis; Display devices; Human factors engineering; Algorithms; Cockpits; Control theory; Degrees of freedom; Electronic equipment; Flight control; Flight simulation; Mathematical models; Psychomotor performance
ID- NTISNASA

SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

AZ- 0581636
AA- <NTIS> AD-A030 734/8/XAB
TI- Evaluation of the Improved Passenger Seat Arrangements for HU-1A and HU-1B Helicopters
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
RN- ATBG-DT-AVN-2860
PY- 23 Sep 60
PG- 3p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7626
AB- An evaluation is reported of the seven-passenger seat kit to determine the optimum seating arrangement for the maximum number of combat troops that could be transported in the HU-1A and HU-1B Helicopters.
DE- *Helicopters; *Aircraft seats; Passengers; Human factors engineering; Test and evaluation; Floor coverings; Medical personnel; Flight testing ; Army operations; Rescue equipment
ID- HU-1A aircraft; HU-1B aircraft; H-1 aircraft; U-1 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0581547
AA- <NTIS> AD-863 818/1/XAB
TI- VTOL Handling Qualities Criteria Study Through Moving-Base Simulation
TI- <NOTE> Final technical rept. Feb 68-Apr 69
AU- McCormick, R. L.
CS- Cornell Aeronautical Lab Inc Buffalo N Y
CS- <CODE> 098300
RN- AFFDL-TR-69-27
CN- AF 33(615)-3736; AF698DC
PY- Oct 69
PG- 617p
NT- Prepared in cooperation with Northrop Corp., Hawthorne, Calif. Norair Div., Rept. no. NOR-69-7.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A99/MF A01
JA- GRAI7626
AB- An investigation of VTOL longitudinal and lateral handling qualities in hovering and low-speed maneuvering flight was conducted on a moving-base simulator. The simulator included an external display, and the task performed by the participating pilots was a visual rather than an instrument task. Pertinent longitudinal and lateral stability derivatives were varied in a wide range of test configurations. Most of the cases investigated included the effects of steady winds and turbulence. For part of the program, stick force gradients existed on the simulator control stick; for part of the program, they did not. For most of the cases, the pilot selected optimum control sensitivities. In all cases a pilot rating and pilot comments were given. Other data resulting from the simulations include probability density and power spectral density analyses. Pilot performance for part of the task also was calculated. (Author)
DE- *Vertical takeoff aircraft; Performance(Engineering); Handling; Maneuverability; Flight simulators; Standards; Hovering; Visual perception; Pilots; Roll; Pitch(Motion); Flight control systems; Drag; Wind
ID- NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0581304
AA- <NTIS> AD-862 106/2/XAB
TI- Evaluation of the XM8 Grenade Launcher for OH-6A Helicopter
TI- <NOTE> Final rept
AU- Hickerson, C. M.
CS- Army Concept Team in Vietnam APO San Francisco 96384
CS- <CODE> 037350
CN- ACTIV-ACA-10/69I
PY- 12 Nov 69
PG- 25p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A02/MF A01
JA- GRAI7626
AB- The Army concept team in Vietnam evaluated the XM8 40mm grenade launcher armament sub-system mounted on the OH-6A to determine its suitability for tactical use by US Army units in Vietnam. The XM8 was designed to give increased firepower to the OH-6A over the currently authorized XM27E1 minigun. (Author)
DE- *Grenades; *Helicopters; Launching; Army operations; Vietnam; Reconnaissance aircraft; Military training; Performance(Engineering); Test methods; Safety; Human factors engineering; Electrical equipment; Mission profiles
ID- Evaluation; H-6 aircraft; M-27 guns(7.62-mm); M-8 grenade launchers; Oh-6a aircraft; South vietnam; NTISDODXD
SH- 79A (Ordnance--Ammunition, Explosives, and Pyrotechnics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0580692
AA- <NTIS> AD-858 780/0/XAB
TI- Rocket Escape System with Cruise Using Electric Rotors (Rescuer)
TI- <NOTE> Technical memo
AU- Rabenhorst, D. W.
CS- Johns Hopkins Univ Silver Spring MD Applied Physics Lab
CS- <CODE> 031650
RN- APL-TG-1063; IDEP-347.00.00.00-S6-26
CN- NOW-62-0604
PY- Apr 69
PG- 34p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7626
AB- This report concerns a practical solution to the problem of rescuing stranded personnel on the ground in situations that would prohibit the use of rescue helicopters. For this situation, the Navy would like to have an air-droppable package weighing no more than about 250 pounds that will enable the stranded person to take off vertically, climb rapidly to about 2500 feet altitude, cruise about 50 miles, and land in friendly territory for subsequent rescue by more conventional means. No system is currently available that will satisfy these requirements. However, we have recently studied system concepts aimed at satisfying some closely related problems. It is believed that a combination of the basic concepts described in these studies and the tractor rocket escape system studied previously offers a most practical solution to the present ground-to-air rescue problem. (Author)
DE- *Pilots; *Rescues; Launching; Helicopter rotors; Rocket engines; Electric motors; Parachutes; Feasibility studies
ID- NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0577899
AA- <NTIS> AD-A030 545/8/XAB
TI- Evaluation of the Sperry ASE Installed in the H-37 Helicopter
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
RN- ATBG-DT AVN-1059/1
PY- 23 Dec 59
PG- 8p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7625
AB- The United States Army has established a requirement for the operation of helicopters under instrument flight conditions, and it has been proved that helicopter instrument flights are both practical and feasible. In order to exploit fully the helicopter's capability under instrument conditions, it is necessary to alleviate one of the major deterrents to helicopter instrument flight, that of pilot fatigue. This fatigue is a direct result of the inherent instability of the helicopter. The pilot must devote most of his time and attention to flying the helicopter and is unable to divert sufficient attention to instrument flight procedures.
DE- *Helicopters; *Instrument flight; *Stabilization systems; Fatigue(Physiology); Pilots; Flight testing; Visual flight rules; Army aircraft; Pitch(Motion); Roll; Yaw
ID- H-37 aircraft; IFR(Instrument Flight Rules); Instrument Flight Rules; NTISDODXA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0577573
AA- <NTIS> AD-871 350/5/XAB
TI- Aircraft Mounted Personnel Detector - Chemical
TI- <NOTE> Final rept. on Phase 4
CS- General Electric CO Pittsfield Mass Ordnance Systems
CS- <CODE> 149175
RN- LWL-CR-06C66A
CN- DA-18-001-AMC-983(X)
PY- May 70
PG- 392p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A17/MF A01
JA- GRAI7625
AB- Two aircraft mounted personnel detector systems were designed, fabricated, checked out, installed on military aircraft and field tested. The systems were demonstrated to be capable of meeting the design criteria of detecting airborne effluents and predicting their locations. Ground support equipment, spare and repair parts, and operational and maintenance manuals necessary for field and operational support were developed and supplied.
DE- *Personnel; *Gas detectors; Detection; Enemy personnel; Chemical reactions; Display systems; Cyanides; Nitrogen compounds; Organic nitrogen compounds; Wind; Human factors engineering; Sensitivity; Computers; Circuits; Aerial reconnaissance; External stores; Reconnaissance aircraft; Helicopters; Airborne; Flight testing; Maintenance; Doppler navigation; Design
ID- An/asn-64; Effluvia; H-1 aircraft; Jov-1b aircraft; People sniffers; Personnel detectors; Pods; Uh-1d aircraft; V-1 aircraft; NTISDODXD
SH- 74I (Military Sciences--Passive Defense Systems); 74D (Military Sciences--Chemical, Biological, and Radiological Warfare)

AZ- 0577280
AA- <NTIS> AD-869 251/9/XAB
TI- Evaluation of the Night Hawk System
TI- <NOTE> Final rept. 1-30 Oct 69
AU- Hickerson, C. M.
CS- Army Concept Team in Vietnam APO San Francisco 96384
CS- <CODE> 037350
CN- ACTIV-ACA-2/70I
PY- 30 Jan 70
PG- 37p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7625
AB- The purpose of the evaluation was to determine the suitability of the Night Hawk system for combat operations in the Republic of Vietnam (RVN) and, if acceptable, to recommend a basis of issue (BOI). The Night Hawk system was evaluated during night operations by three units located in the III Corps Tactical Zone. Analysis of evaluation data resulted in the following recommendations: that the Night Hawk system, consisting of three basic components (a AN/VSS-3 Searchlight, a Night Observation device, AN/TVS-4 or a Big Screen Night Observation device, and a pintal mounted 7.62 minigun) be adopted as an interim system for use by units throughout RVN; that the Night Hawk system be distributed to meet unit requirements based upon area of operations, unit mission, and availability of aircraft and system components as recommended in the proposed BOI; that the development of a standardized Night Hawk mounting kit be initiated under the VLAPA program; that a foot-operated microphone switch for the gunner's and observer's stations be installed; and that the Big Screen Night Observation device be incorporated in the Night Hawk system to replace the AN/TVS-4.
DE- *Night warfare; Instrumentation; Image intensifiers(Electronics); Counterinsurgency; Feasibility studies; Vietnam; Aircraft searchlights; Xenon; Display systems; Small arms; Night vision; Microphones; Aircraft ammunition; Acceptability; Performance(Engineering); Helicopters
ID- *Wh-1d aircraft; *Wh-1h aircraft; 7.62-mm miniguns; An/tvs-4; An/vss-3; H-1 aircraft; Infrared searchlights; Miniguns; Night hawk systems; South vietnam; NTISDODXD
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0577153
AA- <NTIS> AD-868 310/4/XAB
TI- OCS In-Flight Acquisition Study
AU- Enderwick, T. P. ; Huntoon, R. B. ; Leslie, J. P.
CS- North American Rockwell Corp Columbus Ohio Columbus Div
CS- <CODE> 403209

RN- NR70H-55
CN- DAAH01-69-C-1978
PY- 26 Apr 70
PG- 84p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7625
AB- The objective of this study is to quantitatively define the capability of human operators to detect and identify tank-type targets from the air by direct vision and then to lock a tracking gate in a video display onto the target in preparation for missile launch. The study approach included using a Bell UH-1M helicopter equipped with a helmet mounted display system. The equipment simulated an externally mounted, air-to-ground, optical contrast seeker (OCS), guided missile. The seeker in this missile would be directed by the head movement of the gunner/pilot and once locked onto the target, the missile could be launched without requiring any further commands from the helicopter or gunner (fire-and-forget). (Author)
DE- *Air to surface missiles; *Television display systems; Television guidance; Target recognition; Antitank ammunition; Optical equipment; Target acquisition; Probability; Visual perception; Mission profiles; Analysis of variance; Human factors engineering; Performance(Human)
ID- *Head up display systems; NTISDODXD
SH- 63F (Detection and Countermeasures--Optical Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 75GE (Missile Technology--General)

AZ- 0576977
AA- <NTIS> AD-866 919/4/XAB
TI- Helicopter Escape and Personnel Survival System Exhaust Plume Impingement Study
TI- <NOTE> Technical publication Jun-Sep 69
AU- McCarten, R. M.
CS- Naval Weapons Center China Lake Calif
CS- <CODE> 403019
RN- NWC-TP-4874; GIDEP-347.97.00.00-X7-05
CN- A34-531/202/69W45-59
PY- Feb 70
PG- 54p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7625
AB- Design of the Helicopter Escape and Personnel Survival System for large helicopters requires that rocket exhaust plumes pass in close proximity to the helicopter body. In this report, an engineering analysis is performed to determine the severity of the problem, with emphasis on taking worst-case examples. Two computer plume prediction techniques were used and three subscale tests using live rocket motors and a helicopter model were performed. A complete study of the problem should include developing equations describing the flow field of the plume about the helicopter body and the heat transfer to the fuselage based on this flow field, but was not performed in this study due to funding shortages. Results indicated that the helicopter body should be able to survive the environment. In the future, it is recommended that an instrumented helicopter cross-section be placed in the exhaust plume of a heavyweight retro motor to verify the safety of the system. (Author)
DE- *Helicopters; *Jettisonable cockpits; *Retro rockets; Aerospace systems ; Parachute descents; Hazards; Cargo parachutes; Solid propellant rocket engines; Rocket nozzles; Turbulence; Predictions; Temperature; Flow fields
ID- Helicopter escape and personnel survival systems; Heps(Helicopter escape and personnel survival system); Rocket exhaust; NTISDODXD
SH- 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0576949
AA- <NTIS> AD-866 760/2/XAB
TI- The Experimental and Electronics Laboratories of the British Hovercraft Corporation
AU- Mandel, P.
CS- Office of Naval Research London (England)
CS- <CODE> 265000
RN- ONRL-R-16-70
PY- 19 Feb 70
PG- 11p

NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7625
AB- The facilities and kind of work undertaken by the Experimental and Electronics Laboratories of the British Hovercraft Corporation are described. In addition to hydrodynamic, aerodynamic and structural work, EEL also manufactures electronic instrumentation for British and overseas industry. Their rotor torquemeter is standard equipment in most British helicopters. (Author)
DE- *Ground effect machines; *Electronics laboratories; Test facilities; Water tunnels; Hydrodynamics; Aerodynamics; Structural members; Electronic equipment; Great britain
ID- British hovercraft corporation; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0575298
AA- <NTIS> AD-A029 811/7/XAB
TI- Evaluation of the Improved Litter Supports for the H-13H Helicopter (ECP BEL-H13-462)
AU- Marinelli, J. L.
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
RN- ATBG-DT-AVN-5358
PY- 6 Feb 59
PG- 3p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7624
AB- No abstract available.
DE- *Helicopters; *Stretchers; Reinforcement(Structures); Experimental design
ID- Litter supports; H-13 aircraft; H-13H aircraft; NTISDODXA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0575295
AA- <NTIS> AD-A029 808/3/XAB
TI- Draft Military Characteristics, Army Aircraft Crewman's Helmet
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
RN- USAATB-AVN-2858
PY- 1958
PG- 7p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7624
AB- Specifications are given for a protective helmet for Army aircraft crewmen which will afford crash and ballistic protection, be suitable for wear while performing duties on the ground and in flight in either fixed- or rotary-wing aircraft, and be compatible with ejection seats, oxygen, and other allied equipment provided in these aircraft.
DE- *Flight helmets; Specifications; Army equipment; Army personnel; Flight crews; Human factors engineering
ID- NTISDODXA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0575092
AA- <NTIS> AD-880 558/2/XAB
TI- Engineering Flight Test AH-1G Helicopter (Hueycobra). Phase D. Part 1. Handling Qualities
TI- <NOTE> Final rept. 13 Jun 68-29 Jul 69
AU- Finnestead, R. L. ; Wray, D. P. ; Pelikan, R. J. ; Buss, M. W.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-66-06-PHASE-D-PT-1
CN- RDT/E-1-X-141807-D-174; USATECOM-46050001
PY- Dec 70
PG- 427p
NT- See also Part 2, AD-874 210L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A19/MF A01
JA- GRAI7624
AB- The AH-1G helicopter manufactured by Bell Helicopter Company (BHC) was designed specifically to meet the US Army requirements for an armed helicopter. Tandem seating is provided for a two-man crew. The main rotor system is a two-bladed, semi-rigid, 'door hinge' type with the stabilizer bar removed. The engine is derated to 1100 shp due to the maximum torque limit of the main transmission. Distinctive features of the AH-1G are: the narrow fuselage (36 inches), the stub midwing with four external store stations, the integral chin turret. The flight control system is of the mechanical, hydraulically boosted, irreversible type with conventional helicopter controls in the aft cockpit (pilot station). The controls in the forward cockpit (copilot/gunner station) consist of conventional antitorque pedals and sidearm collective and cyclic controls. An electrically operated force trim system is connected to the cyclic and directional controls to induce artificial feel and to provide positive control centering.
DE- *Helicopters; Flight testing; Aerodynamic characteristics; Stability; Flight control systems; Attitude control systems; Takeoff; Aircraft landings; Autorotation; Handling; Performance(Engineering); Pitch(Motion); Airspeed; Altitude; Sideslip; Payload; External stores; Human factors engineering; Instrument panels
ID- *Ah-1g aircraft; Gunships; H-1 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0575026
AA- <NTIS> AD-879 656/7/XAB
TI- Engineering Flight Test, YUH-1H Helicopter, Phase D (Limited)
TI- <NOTE> Final rept. Feb 66-Aug 67
AU- Dominick, F. ; Nelson, E. E.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-66-04
CN- USAAVSCOM-66-04
PY- Nov 70
PG- 258p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A12/MF A01
JA- GRAI7624
AB- This report presents the results of a limited Phase D Engineering Flight Test of the YUH-1H helicopter equipped with the Lycoming T53-L-13 engine. The objectives of the test were to define the increased performance, to evaluate the engine characteristics and to investigate the flying qualities resulting from the expanded flight envelope. One hundred and fifteen data flights were conducted from December 1966 to August 1967 accounting for 98 productive flight hours. Testing was conducted in California at Edwards Air Force Base and at auxiliary test sites at Bakersfield and Bishop. Helicopter performance was quantitatively defined for hover, takeoff, climb and level flights. Engine characteristics and helicopter flying qualities were determined quantitatively at specific flight conditions and were qualitatively investigated throughout the operating flight envelope. The performance of the UH-1D was significantly improved by the installation of the higher powered T53-L-13 engine which resulted in an increased weight, temperature and altitude flight envelope. The T53-L-13 engine demonstrated good dynamic characteristics except for instability at topping power and poor static characteristics. In general, the helicopter flying qualities were acceptable in forward flight. During low-speed flight and hover, the left directional control margin was inadequate. At a forward center of gravity, the helicopter has insufficient aft longitudinal control. To safely use the increased flight envelope, the control deficiencies must be corrected. (Author)
DE- *Helicopters; *Helicopter engines; Gas turbines; Flight testing; Deceleration; Performance(Engineering); Acceptability; Flight control systems; Hovering; Takeoff; Climbing; Stability; Aircraft landings; Airspeed; Range(Distance); Maintenance; Control; Approach; Wind; Fuel consumption; Vibration; Weight; Temperature; Failure(Mechanics); Turboprop engines; Instrumentation
ID- Flight; H-1 aircraft; Shafts(Machine elements); Turbojet engines; T-53 engines; Uh-1d aircraft; T53-l-13 engines; Yuh-1h aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0575025
AA- <NTIS> AD-879 623/7/XAB
TI- Design Criteria for an Inspection and Diagnostic System for the UH-1D Helicopter
TI- <NOTE> Final rept
AU- Leifer, J. C. ; Peacock, H. G.
CS- Melpar Falls Church VA
CS- <CODE> 225450
RN- 7558-FR; USAAVLABS-TR-70-46
CN- DAAJ02-68-C-0004; DA-1-F-162203-A-434; 1-F-162203-A-43405

PY- Nov 70
PG- 190p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7624
AB- The objective of the program is to accumulate sufficient vibration and temperature data to establish base-line operating levels and to determine maximum limits for use in the development of an automatic diagnostic and inspection system for the UH-1 series helicopter. Samples of data were taken from 12 instrumented helicopters at controlled times by three automatic self-calibrating data collection systems which were moved between the aircraft twice each day. The relevant data were processed by a high-speed digital computer through a number of passes to produce edited calibrated printouts and magnetic tape records of each acceptable data sample. Maintenance records on the instrumented helicopters were reviewed, summarized, and correlated with measured changes in temperature and acceleration level during the same period. (Author)
DE- *Helicopters; Performance(Engineering); Vibration; Temperature; Design; Standards; Recording systems; Instrumentation; Data processing; Accelerometers; Temperature sensitive elements
ID- *Aircraft diagnostic equipment; Design criteria; H-1 aircraft; Uh-1d aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0574955
AA- <NTIS> AD-878 569/3/XAB
TI- Airworthiness and Flight Characteristics Test, Production OH-58A Helicopter Unarmed and Armed with XM27E1 Armament Subsystem, Stability and Control
TI- <NOTE> Final rept. Aug 68-Jun 70
AU- Graham, W. A. ; Laing, E. J. ; Stringer, P. G.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-68-30
CN- USAAVSCOM-68-30
PY- Oct 70
PG- 154p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- GRAI7624
AB- Stability and control tests were conducted on a production model OH-58A helicopter to evaluate its flying qualities in the unarmed configuration and in an armed configuration with the XM27E1 weapon system. Limited testing was also performed to evaluate the helicopter slope landing capabilities and flying qualities with skis installed. Human factors and maintainability characteristics were noted throughout the evaluation. The testing consisted of 89 flights which totaled 85.3 hours of productive flight testing. Maintainability of the helicopter was excellent throughout the test program.
DE- *Helicopters; *Gun mounts; Flight testing; Pitch(Motion); Attitude control systems; Performance(Engineering); Flight speeds; Level flight; Roll; Maneuverability; Stability; Sideslip; Aircraft landings; Skis; Landing gear; Flight control systems; Aircraft guns; Firing tests(Ordnance); Hovering; Vibration; Human factors engineering; Maintainability; Ammunition feed mechanisms; Small arms ammunition; Containers; Sights
ID- *H-58 aircraft; *Oh-58a aircraft; Gau-2b/a guns; M-134 guns(7.62-mm); M-27 armament subsystems; M-70 sights; Xm-134 guns(7.62-mm); Xm-27e1 armament subsystems; Xm-70e1 sights; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 79G (Ordnance--Guns)

AZ- 0574426
AA- <NTIS> AD-874 211/6/XAB
TI- Airworthiness and Flight Characteristics Test, AH-1G Helicopter with Stabilized Night Sight (SNS), Phase II
TI- <NOTE> Final rept. Mar 69-Jan 70
AU- Bender, G. L. ; Buss, M. W.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-69-01-PHASE-2
CN- USAAVSCOM-69-01
PY- Aug 70
PG- 96p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road,

Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7624
AB- The Phase II tests were conducted to evaluate the flight envelope of the AH-1G with the SNS installed for significant changes in the structural loads, handling qualities and performance due to this modification. The effects of weapons firing on the SNS system were also evaluated. The structural loads, handling qualities and performance of the AH-1G were not significantly changed by the SNS installation. The published AH-1G flight envelope is satisfactory for the SNS modified aircraft with one exception: due to the aircraft's reactions following sudden engine failure, the engine torque should be limited to less than 35 pounds per square inch, indicated, for all dives to airspeeds greater than 150 KCAS. Four deficiencies require correction before further testing in instrument flight conditions or in a combat environment.
DE- *Helicopters; *Optical sights; Night warfare; Stabilization; Load distribution; Loads(Forces); Flight testing; Firing tests(Ordnance); Flight control systems; Attitude control systems; Diving; Vibration; Torque; Control panels; Human factors engineering; Cockpits; Aircraft turrets
ID- Ah-1g aircraft; H-1 aircraft; M-28 turrets; Sns(Stabilized night sights); Stabilized night sights; Xm-28 turrets; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0573081
AA- <NTIS> AD-A029 628/5/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 61. HH-3E In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-61
CN- AF-7231; 723104
PY- Nov 75
PG- 15p
NT- See also VOlume 62, AD-029 629.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- The HH-3E is a USAF amphibious transport helicopter used for search and rescue, and combat aircrew recovery. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for seven locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference levels, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Helicopters; Flight crews; Handbooks; Noise(Sound); Amphibious aircraft; Search and rescue; Inflight; Interference; Sound pressure; Speech; Exposure(Physiology)
ID- *Bioenvironmental noise; HH-3E aircraft; H-3 aircraft; Speech interference; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573080
AA- <NTIS> AD-A029 627/7/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 60. UH-1N In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-60
CN- AF-7231; 723104
PY- Nov 75
PG- 15p
NT- See also Volume 61, AD-A029 628.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- The UH-1N is a USAF Utility Helicopter configured as a gunship. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for one location in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Helicopters; Flight crews; Handbooks; Noise(Sound); Gunships; Inflight; Ear protectors; Interference; Sound pressure; Speech; Exposure(Physiology)
ID- *Bioenvironmental noise; UH-1N aircraft; H-1 aircraft; Speech interference; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573078
AA- <NTIS> AD-A029 625/1/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 56. HC-130N In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-56
CN- AF-7231; 723104
PY- Nov 75
PG- 21p
NT- See also Volume 57, AD-A029 626.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- The HC-130N is a USAF aircraft used to search for, locate and recover personnel and/or retrieve material in global air and space operations; it also serves as an air refueling tanker for helicopters. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this aircraft during normal flight operations. Data are reported for 14 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors.
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Tanker planes; Inflight; Flight crews; Noise(Sound); Sound pressure; Interference; Exposure(Physiology); Ear protectors; Speech transmission; Rescue vehicles; Transport aircraft
ID- *Bioenvironmental noise; HC-130 aircraft; HC-130N aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573075
AA- <NTIS> AD-A029 622/8/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 53. AC-119G In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-53
CN- AF-7231; 723104
PY- Nov 75
PG- 13p
NT- See also Volume 54, AD-A029 623.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01

JA- GRAI7623
AB- The AC-119G is a USAF gunship for interdiction and suppression of enemy ground attack. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this aircraft during normal flight operations. Data are reported for 6 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, 'USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Applications', AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Gunships; Flight crews; Passengers; Sound pressure; Intensity; Speech transmission; Interference; Exposure(Physiology); Ear protectors; Inflight; Handbooks

ID- *Bioenvironmental noise; *Helicopters; AC-119G aircraft; C-119 aircraft ; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573073
AA- <NTIS> AD-A029 620/2/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 51. HH-53C In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-51
CN- AF-7231; 723104
PY- Oct 75
PG- 15p
NT- See also Volume 52, AD-A029 621.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- THe HH-53C is a USAF heavy assault transport helicopter used to search, locate, and recover combat aircrew members, personnel, and/or vital aerospace hardware. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for 15 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to VOlume 1 of this handbook, USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. (Author)
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Helicopters; Flight crews; Noise(Sound); Handbooks; Sound pressure; Inflight; Amphibious aircraft; Search and rescue; Speech; Interference
ID- *Bioenvironmental noise; HH-53C aircraft; H-53 aircraft; Speech interference; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573072
AA- <NTIS> AD-A029 619/4/XAB
TI- USAF Bioenvironmental Noise Data Handbook: Volume 50. HH-43B In-flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-50
CN- AF-7231; 723104
PY- Oct 75
PG- 15p
NT- See also Volume 51, AD-A029 620.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- The HH-43B is a USAF local crash rescue helicopter used for fire control and suppression, and aerial/crash-entry pickup of survivors. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for three locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors.
DE- *Noise pollution; *Bioacoustics; *Aircraft noise; *Helicopters; Inflight; Flight crews; Noise(Sound); Sound pressure; Speech transmission; Interference; Ear protectors; Exposure(Physiology); Rescue vehicles
ID- *Bioenvironmental noise; HH-43 aircraft; HH-43B aircraft; Rescue aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0573065
AA- <NTIS> AD-A029 612/9/XAB
TI- USAF Bioenvironmental Noise Data Handbook. Volume 39. UH-1F In-Flight Crew Noise
TI- <NOTE> Technical rept
AU- Rose, J. F. ; Farinacci, N. A. ; Cole, J. N. ; Mohlman, H. ; Eilerman, D.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-75-50-VOL-39
CN- AF-7231; 723104
PY- Sep 75
PG- 12p
NT- See also Volume 42, AD-A029 613.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- The UH-1F is a USAF general-purpose utility helicopter providing transportation to and from remote missile installations. This report provides measured data defining the bioacoustic environments at flight crew locations inside this helicopter during normal flight operations. Data are reported for 1 location in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors.
DE- *Noise pollution; *Bioacoustics; *Helicopters; Flight crews; Inflight; Utility aircraft; Noise(Sound); Voice communications; Sound pressure; Interference; Exposure(Physiology); Ear protectors
ID- *Bioenvironmental noise; *Aircraft noise; UH-1 aircraft; UH-1F aircraft ; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 57W (Medicine and Biology--Stress Physiology); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0572995
AA- <NTIS> AD-A029 542/8/XAB
TI- Depth Perception with the AN/PVS-5 Night Vision Goggle
TI- <NOTE> Final rept
AU- Wiley, R. W. ; Glick, D. D. ; Bucha, C. T. ; Park, C. K.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-76-25
CN- DA-1498; DA-3-A-062110-A-819
PY- Jul 76
PG- 22p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- Laboratory measures of stereopsis and field measures of relative depth discrimination while using the AN/PVS-5 Night Vision Goggle were determined and compared with data of unaided eye performance. Using a modified Howard-Dolman apparatus, the stereoscopic threshold was found to be considerably degraded with the man-goggle system when compared to

photopic unaided eye performance. Field measurements of relative depth discrimination using all available visual cues showed that performance of the man-goggle system was statistically equivalent only at intermediate distances of 500 feet or less.
DE- *AN/PVS-5; *Night vision devices; *Goggles; Visual perception; Helicopters; Discrimination
ID- *Depth perception; Stereopsis; Human factors engineering; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AA- <NTIS> AD-A029 212/8/XAB
TI- An Investigation of Cockpit Lighting for Compatibility with Use of Night-Vision Goggles, AN/PVS-5
TI- <NOTE> Final rept
AU- Stowell, H. R.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-26-76
PY- Jul 76
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7623
AB- Cockpit lighting in U. S. Army helicopters was investigated for compatibility with use of night-vision goggles, AN/PVS-5. Instrument-lighting systems in existing Army helicopters, e.g., eyebrow lighting, post lighting, are not suitable for use with night-vision goggles. A comparatively simple flood-lighting system can provide suitable lighting in the cockpit of existing helicopters for reading instruments with night-vision goggles. The most suitable instrument-lighting system for use with the goggles is integral instrument lighting; however, indicator lights need to be modified so they are compatible with the goggles. Methods were investigated for instantaneously refocussing the goggles inside the cockpit. Luminance levels compatible for use with night-vision goggles are stated in photometric terms. (Author)
DE- *Lighting equipment; *Cockpits; *Electromagnetic compatibility; *Night vision devices; Airborne; Helicopters; Human factors engineering; Goggles; Floodlights; Instrument landings; Indicator lights
ID- AN/PVS-5; Cockpit lighting; UH-1D aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0570771
AA- <NTIS> AD-B004 561/7/XAB
TI- HITVAL System Scoring Test Report. Volume I. Test Results and Analysis
TI- <NOTE> Final rept. Oct 73-Nov 74,
CS- Air Force Special Weapons Center Kirtland AFB N Mex
CS- <CODE> 012950
RN- AFSWC-TR-74-29-VOL-1
CN- AF-921H
PY- May 75
PG- 138p
NT- See also Volume 2, AD-B004 151L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7622
AB- HITVAL is a joint Army/Air Force test program to acquire an empirical data base to determine hit probability of selected Soviet antiaircraft guns against US fixed and rotary wing aircraft. The data base will be used to determine the degree of validity of three DOD aircraft attrition models. A preliminary system scoring test was conducted to determine the accuracy of the gun instrumentation mounted on an S-60 gun, the 23-mm twin-barrel gun, and the XM-42A weapon system. The gun instrumentation system measured the azimuth and elevation of the gun breech relative to the gun base, the tilt of the gun base and tracking errors of the gun crew. The target position was measured by cinetheodolites. A comparison of the cinetheodolite and gun instrumentation position information was performed to quantify the errors in gun instrumentation systems and thus determine the accuracy of the hit scoring system. (Author)
DE- *Antiaircraft defense systems; *Antiaircraft guns; USSR; Scoring; Military forces(Foreign); Attrition; Hit probabilities; Accuracy; Mathematical models; Computer programs; Instrumentation; Theodolites; Jet fighters; Jet bombers; Attack bombers; Data bases; Joint military activities
ID- F-4 aircraft; A-37 aircraft; Hitval project; S-60 guns; 23-mm guns; VM-42A weapon system; M-42 weapon system; Cinetheodolites; NTISDODXD
SH- 74A (Military Sciences--Antiaircraft Defense Systems); 79G

(Ordnance--Guns)

AZ- 0570727
AA- <NTIS> AD-B001 041/3/XAB
TI- Design of a Field Test for Probability of Hit by Antiaircraft Guns. Third Addendum. HITVAL II Test Design
AU- Transue, J. R. ; Ross, J. A. ; Ireland, C. T.
CS- Institute for Defense Analyses Arlington VA Systems Evaluation Div
CS- <CODE> 403307
RN- P-921-ADD-3; WSEG-197-ADD-3; IDA/HQ-74-16415
CN- DAHC15-73-C-0200
PY- Jul 74
PG- 12p
NT- Addendum 3 to report dated Feb 73, AD-B001 040L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7622
AB- The basic paper (AD-B001 040L) presents a design for a test of probability of hit by antiaircraft guns (HITVAL). This test is currently being conducted at White Sands Missile Range, N.M., using four antiaircraft gun systems. It has since been decided to conduct a similar test (HITVAL II) on a fifth gun system later this year. The purpose of this addendum, then, is to present a test design for HITVAL II.
DE- *Antiaircraft guns; *Antiaircraft fire control systems; Field tests; Interception probabilities; Experimental design; Manpower; Instrumentation; Test methods; Accuracy; Assessment; Jet fighters; Helicopters; Aircraft interception; Radar tracking; Optical tracking; Attrition; Mathematical prediction; Mathematical models; Validation
ID- Hit probabilities; NTISDODXD
SH- 74A (Military Sciences--Antiaircraft Defense Systems); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0570726
AA- <NTIS> AD-B001 040/5/XAB
TI- Design of a Field Test for Probability of Hit by Antiaircraft Guns
AU- Transue, J. R. ; Brown, G. L. ; Dingman, R. G. ; Ireland, C. T. ; McPadden, D. F. X.
CS- Institute for Defense Analyses Arlington VA Systems Evaluation Div
CS- <CODE> 403307
RN- P-921; WSEG-197; IDA/HQ-72-14680
CN- DAHC15-73-C-0200
PY- Feb 73
PG- 79p
NT- See also Addendum 2, AD-B001 032L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7622
AB- The test design presented in this report provides the basis for a detailed test plan to be developed by the Test Director. The design describes what data and major instrumentation will be required, the test conditions, aircraft support, antiaircraft gun systems and range requirements for the field test. In addition, the report describes a preliminary plan for analysis and evaluation. The field test described is one element in a program to validate and improve mathematical models of an antiaircraft gun firing at an aircraft.
DE- *Antiaircraft guns; *Antiaircraft fire control systems; Field tests; Interception probabilities; Experimental design; Manpower; Instrumentation; Test methods; Accuracy; Assessment; Gunners; Range safety; Aircraft interception; Antiaircraft ammunition; Helicopters; Jet fighters; Flight paths; Flight maneuvers; Tactical air support; Attrition; Mathematical prediction; Mathematical models; Validation
ID- Hit probabilities; NTISDODXD
SH- 79G (Ordnance--Guns); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0570723
AA- <NTIS> AD-B001 032/2/XAB
TI- Design of a Field Test for Probability of Hit by Antiaircraft Guns. Second Addendum
AU- Transue, J. R. ; Brown, G. L. ; Ireland, C. T.
CS- Institute for Defense Analyses Arlington VA Systems Evaluation Div
CS- <CODE> 403307
RN- P-921-ADD-2; WSEG-197-ADD-2; IDA/HQ-73-15642
CN- DAHC15-73-C-0200
PY- Nov 73

PG- 24p
NT- Addendum 2 to report dated Feb 73, AD-B001 040L. See also Addendum 3, AD-B001 041L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7622
AB- This is the second addendum to the test design for HITVAL. The present addendum results from the elimination of crew fatigue from the test design, and from a desire to structure the test so that analysis will still be possible if only half (the first half or the second half) of the first two experimental designs are conducted.
DE- *Antiaircraft guns; *Antiaircraft fire control systems; Field tests; Interception probabilities; Experimental design; Manpower; Instrumentation; Test methods; Accuracy; Assessment; Gunners; Flight paths; Flight maneuvers; Experimental data; Analysis of variance; Helicopters; Jet fighters; Attrition; Mathematical prediction; Mathematical models; Validation
ID- High probabilities; NTISDODXD
SH- 79G (Ordnance--Guns); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0570496
AA- <NTIS> AD-A028 924/9/XAB
TI- Vibration Measurements on the Rotor Shaft of the UH-1M Helicopter
TI- <NOTE> Test rept
AU- Goldman, H. I.
CS- Frankford Arsenal Philadelphia Pa
CS- <CODE> 142720
RN- FA-TR-76009
CN- DA-1-F-263206-D-043; 1-F-263206-D-04303
PY- Feb 76
PG- 18p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7622
AB- This report describes a program of in-flight vibration measurements carried out on a platform mounted atop the rotor mast on the UH-1M helicopter. Results of a real time analysis of the data are presented which reveal that a low level of vibration exists at that site making it a good location for the future placement of fire control instrumentation. A mechanical impedance study is also presented which shows that much of the high frequency present in the acceleration-time histories is a result of resonances in the tested platform. (Author)
DE- *Helicopter rotors; *Shafts(Machine elements); *Vibration; *Measurement ; *Fire control systems; Flight testing; Mechanical impedance; Inflight ; Real time
ID- *helicopter rotor shafts; UH-1M aircraft; H-1 aircraft; NTISDODXA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0570312
AA- <NTIS> AD-A028 738/3/XAB
TI- The Geneva Conventions and Legal Protection of Medical Transport by Helicopter in Armed Conflicts
AU- Evrard, E.
CS- Army Medical Intelligence and Information Agency Washington D C
CS- <CODE> 409112
RN- USAMIIA-K-5433
PY- 7 Mar 75
PG- 26p
NT- Trans. of AGARD Conference Proceedings (France) n24 p63-84 24 May 67.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding; Translation
PC- PC A03/MF A01
JA- GRAI7622
AB- No abstract available.
DE- *Aeromedical evacuation; *International law; Marker lights; Protection; Casualties; Air transportation; Helicopters; Tactical warfare; Treaties ; NATO
ID- *Meetings; Geneva conventions; Translations; NTISDODXA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 92D (Behavior and Society--Education, Law, and Humanities)

AZ- 0569991
AA- <NTIS> AD-923 214/1/XAB
TI- Personnel Retriever -- Helicopter
AU- Williams, R. E.
CS- Coast Guard Washington D C Testing and Development Div
CS- <CODE> 086480
PY- 20 Mar 57
PG- 24p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7622
AB- Three helicopter personnel retrieving devices consisting of the Air Force XMA-2 Personnel Retriever, the folding version of the Sproule Net, and the folding version of the Coast Guard (Erickson) Basket were tested for retrieving conscious or unconscious survivors from calm and rough waters by HO4S helicopter with no external assistance offered to the survivors. The Coast Guard Basket was not deemed suitable for use in making unassisted pickups of conscious or unconscious survivors from water. Both the XMA-2 Retriever and the Sproule Net were successful instruments for performing operations of this nature. Because the XMA-2 Retriever exhibited the best overall characteristics in live pickups and was favored by the test pilots, it is recommended for adoption for Coast Guard use. (Author)
DE- *Air sea rescues; *Rescue equipment; Helicopters; Coast Guard; Aerial pickup systems; Water exit; Survival(Personnel); Recovery; Surface roughness; Helicopter hoists; Nets; Stretchers; Latches; Malfunctions; Weight; Tow bars; Performance(Engineering); Pilots; Acceptability
ID- XMA-2 personnel retrievers; Sproule nets; NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0569887
AA- <NTIS> AD-919 756/7/XAB
TI- Drone Control and Data Retrieval System (DCDRS). Preliminary Design Study Final Report. Volume III. Trade Studies and Analyses. Part XVIII. Human Operator Environment Trade Study
TI- <NOTE> Technical rept. 5 Mar-5 Oct 73
CS- Sperry UNIVAC St Paul Minn Defense Systems Div
CS- <CODE> 408125
RN- ASD-TR-74-5-VOL-3-PT-18
CN- F33657-73-C-0665
PY- Apr 74
PG- 36p
NT- See also Volume 3, Part 19, AD-919 757L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7622
AB- Table of Contents: Human Operator Environment Analysis; Technical Characteristics; Specific Areas of Investigation; and Conclusions and Recommendations.
DE- *Remotely piloted vehicles; *Operators(Personnel); Trade off analyses; Shelters; Aircraft cabins; Anthropometry; Work; Sizes(Dimensions); Air conditioning equipment; Noise; Vibration; Lighting equipment; Maintenance; Repair; Consoles; Modular construction; Illumination; Temperature; Humidity; Life support; Airborne; Hooks; Helicopters; Costs
ID- Work areas; DCDRS(Drone Control and Data Retrieval System); Drone control and data retrieval system; Drone control facilities; Rigid shelters; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0569870
AA- <NTIS> AD-918 976/2/XAB
TI- Helicopter Operational Test, Target Acquisition
TI- <NOTE> Technical publication Oct 72-Jun 73
AU- Amundson, P. H. ; Shlanta, A. ; Sorensen, R.
CS- Naval Weapons Center China Lake Calif
CS- <CODE> 403019
RN- NWC-TP-5591; GIDEP-347.50.00.00-X7-03
PY- Jan 74
PG- 120p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at

orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7622
AB- This report presents the results of the target acquisition phase of the Helicopter Operational Test conducted at the Naval Weapons Center. This test was designed to test the effects of seat position, experience, and target illumination upon target acquisition capability. The results of an initial effort to use personal difference tests to predict target acquisition capability are also included. (Author)
DE- *Target acquisition; *Helicopters; *Pilots; Performance(Human); Proficiency; Surface targets; Detection; Weapon delivery; Rockets; Aircraft guns; Accuracy; Range(Distance); Aircraft seats; X band; Radar beacons; Luminosity; Voice communications; Regression analysis; Psychological tests; Gunships; Observation aircraft; Low altitude; Flight speeds; Flight paths
ID- AH-1G aircraft; OH-58 aircraft; H-1 aircraft; H-58 aircraft; NTISDODXD
SH- 63F (Detection and Countermeasures--Optical Detection); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0569431
AA- <NTIS> AD-910 495/1/XAB
TI- Vibration and Temperature Survey CH-54B Helicopter
TI- <NOTE> Final rept. 22 Aug-29 Sep 72
AU- Laing, E. J. ; Merrill, R. K. ; Reid, J. S.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-70-15-3
CN- USAAVSCOM-70-15-3
PY- Mar 73
PG- 231p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- GRAI7622
AB- Vibration and temperature measurement tests were conducted on a CH-54B helicopter to define the vibration and temperature environment for instruments, avionics, pilot station, and other component parts for representative flight conditions. The testing consisted of 16 flights totaling 18.5 productive test hours. Vibration data were recorded from 70 accelerometer locations for 55 flight conditions, and narrow band spectral analyses were performed on the vibration data. The results of the spectral analyses were summarized by use of statistical methods. Forward fuselage vibrations were primarily low frequency and were caused by the main rotor. Aft fuselage vibrations were primarily high frequency and were caused by gearbox and other rotating component vibration sources. The highest vibration levels were recorded at the auxiliary power plant at main transmission gear mesh frequencies. There were two shortcomings: amplification of main rotor-induced vibrations by avionics vibration isolation mounts, and excessively high Wet Bulb Globe Temperature index at the pilot station under certain environmental conditions.
DE- *Helicopters; *Vibration; Measurement; Human factors engineering; Atmospheric temperature; Flight testing; Environmental tests; Level flight; Turning flight; Helicopter rotors; Vibration isolators; Magnetic recording systems; Magnetic tape; Data transmission systems; Accelerometers; Spectrum analyzers; Wave propagation; Attenuation; Flight instruments; Shock(Mechanics); Electronic equipment; Transmission gears; Aircraft cabins; Temperature; Helicopter engines; Auxiliary power plants
ID- *Ch-54b aircraft; Avionics; H-54 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46E (Physics--Structural Mechanics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0569393
AA- <NTIS> AD-910 006/6/XAB
TI- Expanded Service Test of Antilaser Goggles
TI- <NOTE> Final rept. 1 Apr-12 Sep 72
AU- Burkhalter, E. L. ; Magathan, W. C.
CS- Army Aviation Test Board Fort Rucker Ala
CS- <CODE> 036500
CN- RDT/E-1-J-664717-DL-40; USATECOM-8-EI-825-000-017; 1-J-664717-DL-4044
PY- Dec 72
PG- 63p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7622

AB- The expanded service test of the antilaser goggles was conducted by the US Army Aviation Test Board at Fort Rucker, Alabama, from 1 April through 12 September 1972. The purpose of the test was to determine qualitatively the suitability, exclusive of protective capabilities, of the antilaser goggles for use by Army aviators who pilot AH-1G helicopters in intermediate climatic conditions. Fifteen type 1 and five type 2 goggles were received for testing. (Type 2 goggles are to be worn only by individuals wearing corrective lenses.) Testing was conducted, using simulated tactical missions, during daylight hours with the exception of two missions which were flown in darkness.
DE- *Eyeglasses; Lasers; Pilots; Helicopters; Compatibility; Helmets; Protective masks; Color vision; Visibility; Fog; Optical sights; Range finding; Radiation injuries; Infrared radiation; Light transmission; Environmental tests; Visual acuity; Films; Lenses; Acceptability; Design; Aviation safety; Army personnel; Eye; Protection
ID- *Antilaser goggles; Ah-1g aircraft; Coverall goggles; Goggles; H-1 aircraft; Sizes(Dimensions); NTISDODXD
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0569356
AA- <NTIS> AD-909 536/5/XAB
TI- Handling Qualities Evaluation of the OH-58A Helicopter Incorporating the Model 570B Three-Axis Stability and Control Augumentation System
TI- <NOTE> Final rept. 29 Aug-15 Nov 72
AU- Smith, R. B. ; Benson, T. P.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-72-20
CN- AVSCOM-72-20
PY- Feb 73
PG- 90p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7622
AB- A limited handling qualities evaluation of the OH-58A helicopter with a Bell Helicopter Model 570B three-axis stability and control augmentation system installed was conducted to determine its capability to perform instrument flight. Testing was performed by the US Army Aviation Systems Test Activity at Edwards Air Force Base, California. The testing consisted of 25 productive flight hours and was conducted from September through November 1972. The evaluation revealed significant improvements in the aircraft handling qualities with the addition of the augmentation system. The most significant enhancing characteristics provided by the equipment were: (1) increased damping of the lateral-directional oscillation (Dutch roll), (2) improvement of aircraft spiral stability from neutral to convergent, and (3) reduction in pilot effort required to maintain trim flight conditions. This evaluation was of limited scope, and primarily addressed handling qualities. It did not provide a basis to qualify the aircraft for instrument flight.
DE- *Helicopters; *Instrument flight; *Flight control systems; Aerodynamic characteristics; Flight testing; Stability; Control systems; Handling; Human factors engineering; Oscillation; Damping; Roll
ID- H-58 aircraft; Oh-58 aircraft; Oh-58a aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0569337
AA- <NTIS> AD-909 441/8/XAB
TI- Vibration and Temperature Survey Production UH-1H Helicopter
TI- <NOTE> Final rept. 24 Mar-16 Jun 72
AU- Laing, E. J. ; Hepler, L. J. ; Merrill, R. K.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-70-15-2
CN- AVSCOM-70-15-2
PY- Jan 73
PG- 235p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- GRAI7622
AB- Vibration and temperature measurement tests were conducted on a production UH-1H helicopter to define the vibration and temperature environment for instruments, avionics, pilot station, and other component parts during firing and nonfiring flight. Testing was performed by the United States Army Aviation Systems Test Activity, Edwards Air Force Base, California, between 24 March and 16 June 1972. The testing consisted of 19 flights totaling 20 productive testing

hours. Vibration data were recorded from 49 accelerometer locations for 55 flight conditions, and narrow-band spectral analyses were performed on the vibration data. The results of the spectral analyses were summarized by use of statistical methods. The primary source of low-frequency vibrations was the main rotor. Gunfire-induced vibrations were less than main rotor-induced vibrations. The highest vibration levels were recorded at the 42-degree gearbox at gear mesh frequencies. There were three shortcomings: amplification of main rotor-induced vibrations by avionics vibration isolation mounts, pilot station vibrations in excess of the military specification limits, and excessively high Wet Bulb Globe Temperature index at the pilot station under certain environmental conditions. (Author)
DE- *Helicopters; *Vibration; *Temperature; Instrument panels; Aerial gunnery; Flight testing; Helicopter rotors; Gas turbines; Standards; Gears; Bearings; Pumps; Failure(Mechanics); Pilots; Performance(Human); Accelerometers; Specifications; Turning flight; Aircraft guns; Machine guns; Maneuverability; Weapons; Magnetic tape; Environmental tests; Data processing; Takeoff; Landing; Climbing; Hovering; Level flight; Instrumentation
ID- Comparison; H-1 aircraft; H-58 aircraft; M-59 cartridges(7.62-mm); M-60 guns(7.62-mm); Uh-1h aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 46E (Physics--Structural Mechanics); 46GE (Physics--General)

AZ- 0569260
AA- <NTIS> AD-908 656/2/XAB
TI- Instrument-Flight-Rules Capability Evaluation CH-54B (TARHE) Helicopter
TI- <NOTE> Final rept. 16 Aug 71-19 May 72
AU- Bailes, E. E. ; Diekmann, V. L. ; Watts, J. C. ; Henderson, J. C.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-71-01
CN- USAAVSCOM-71-01
PY- Dec 72
PG- 140p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7622
AB- Airworthiness and flying qualities tests were conducted on the Sikorsky CH-54B Skycrane helicopter to determine its instrument-flight-rules capability and compliance with MIL-H-8501A. The flying qualities of the CH-54B in the Army pod configuration are acceptable for flight under instrument-flight-rules conditions with both automatic flight control systems operating. The CH-54B should be equipped with dual visual omnirange receivers and a marker beacon receiver. Additional testing should be accomplished to quantitatively determine the instrument-flight-rules capability of the CH-54B with external single-point sling loads.
DE- *Helicopters; *Instrument flight; Flight testing; Performance(Engineering); Automatic pilots; Flight instruments; Flight control systems; Hydraulic equipment; Helicopter engines; Instrument panels; Data processing; Stability; Yaw; Specifications; Radio beacons; Instrumentation; Magnetic recording systems
ID- *H-54 aircraft; Ch-54b aircraft; Instrument flight rules; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568757
AA- <NTIS> AD-901 652/8/XAB
TI- Category II Performance Test of the UH-1N Helicopter. Volume II
TI- <NOTE> Final rept. 17 Nov 70-16 Feb 72
AU- Springer, R. H. ; Berger, D.
CS- Air Force Flight Test Center Edwards AFB Calif
CS- <CODE> 012100
RN- AFFTC-TR-72-17-VOL-2
CN- AFFTC-69-49B
PY- May 72
PG- 210p
NT- See also Volume 1, AD-901 651L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A10/MF A01
JA- GRAI7622
AB- This volume presents the test techniques, data analysis methods, test data, and general aircraft information for the Category II performance evaluation of the UH-1N helicopter. (Author)
DE- *Helicopters; *Cold weather tests; Hovering; Helicopter engines; Performance(Engineering); Vibration; Velocity; Gas turbines; Autorotation; Torque; Tables(Data); Takeoff; Climbing; Flight testing; Aircraft landings; Instrumentation; Pitot tubes; Helicopter rotors;

Calibration
ID- *Uh-1n aircraft; Category 2 tests; H-1 aircraft; Slope landings; T-400-cp-400 engines; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568754
AA- <NTIS> AD-901 649/4/XAB
TI- UH-1N Category II Arctic Tests. Appendix IV. Volume I
TI- <NOTE> Final rept. 3 Dec 71-26 Jan 72
AU- Ladegard, P. E.
CS- Air Force Flight Test Center Edwards AFB Calif
CS- <CODE> 012100
RN- AFFTC-TR-72-10-VOL-1
CN- AFFTC-69-49A
PY- Jun 72
PG- 305p
NT- Appendix 4, Volume 1 to Rept. no. AFFTC-TR-72-10 dated Mar 72, AD-894 512L. See also Volume 2, AD-901 650L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A14/MF A01
JA- GRAI7622
AB- The UH-1N Category II Arctic Test (AT) conducted at Eielson AFB, Alaska, consisted of 17 flights for a total flight test time of 28.5 hours. Flight test data from eight selected flights are presented in this document. These test data are best representative of UH-1N system operation in a cold weather environment.
DE- *Helicopters; *Cold weather tests; Flight testing; Instrumentation; Digital recording systems; Thermocouples; Transducers; Pressure; Helicopter hoists; Helicopter engines; Aircraft heaters; Helicopter rotors; Atmospheric temperature; Barometric pressure; Cargo; Takeoff; Aircraft landings; Performance(Engineering); Tables(Data); Graphics; Alaska
ID- *Uh-1n aircraft; Category 2 tests; H-1 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568668
AA- <NTIS> AD-900 263/5/XAB
TI- Technical Evaluation, Boeing-Vertol Model 347 Advanced Technology Helicopter
TI- <NOTE> Final rept. 28 May-12 Aug 71, on Phase 1
AU- Yamakawa, G. M. ; Steinmetz, A. G. ; Greenland, R. L. ; Hendrickson, D. E.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-70-38
CN- USAAVSCOM-70-38
PY- Jan 72
PG- 186p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7622
AB- The Model 347, a derivative of the CH-47 transport helicopter, was tested. Performance, handling qualities, vibration and noise characteristics were evaluated to determine the improvements provided by incorporation of advanced technology systems in a large tandem-rotor transport helicopter. Compliance with the provisions of the contract statement of work and with military specifications, MIL-H-8501A and MIL-A-8806A, was determined. Several shortcomings identified during the testing were corrected by the contractor after the testing was completed. The effects of these corrections were evaluated during additional testing conducted on 11 and 12 August 1971. Level flight performance and out-of-ground-effect hover performance were significantly improved over that of the CH-47C helicopter. The excellent static longitudinal stability characteristics enhanced the mission capability of the aircraft. The steering and glide-path modes of the automatic flight path control system worked satisfactorily and reduced the pilot workload in instrument flight conditions. Cockpit noise and vibration characteristics were noticeably improved over those of the CH-47C.
DE- *Helicopters; Performance(Engineering); Army aircraft; Military requirements; Vibration; Instrument flight; Hovering; Stability; Flight testing; Cockpits; Flight instruments; Flight control systems; Human factors engineering; Effectiveness; Steering; Glide path systems
ID- Ch-47 aircraft; H-47 aircraft; Vertol model-347 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568551

AA- <NTIS> AD-894 547/9/XAB
TI- Category II Performance and Flying Qualities Tests of the HH-53C Helicopter
TI- <NOTE> Final rept. 26 Aug 69-27 Feb 70
AU- Barbini, W. J. ; Balfe, P. J. ; Lovrien, C. E.
CS- Air Force Flight Test Center Edwards AFB Calif
CS- <CODE> 012100
RN- AFFTC-TR-70-8
CN- AFFTC-69-2
PY- Apr 70
PG- 23p
NT- Includes ASD Addendum.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7622
AB- HH-53C Category II evaluation to obtain data for the Flight Manual. The Flight Manual power required to hover was 2 to 7% higher than test data. Flight Manual specific range data were accurate at recommended cruise, but were up to 10% higher than test data at the higher airspeeds. Rotor blade compressibility effects resulted in up to a 5% increase in power required. Rotor blade compressibility was most significant during level flight when advancing blade-tip Mach numbers as high as 0.95 were obtained. Power required increased as much as 38% as advancing blade-tip Mach number was varied from 0.76 to 0.94. During level flight (below 38,000 pounds and 5,000 feet density altitude), maximum airspeed was limited by either the up collective pitch stop or by the advancing blade-tip Mach number, rather than the aircraft airspeed redline, engine power, or any engine/torque limitations. The HH-53C exhibited positive static stability for all flight conditions except for a neutral or slightly negative longitudinal stability at approximately 35 KCAS for level flight and partial power descent. With the automatic flight control system (AFCS) on, it was stable about all axes.
DE- *Helicopters; Performance(Engineering); Flight testing; Instruction manuals; Hovering; Low altitude; Level flight; Yaw; Pitch(Motion); Roll ; Flight control systems; Stability; Control sticks; Airspeed; Rotor blades(Rotary wings); Payload; Aircraft landings; Turning flight; Gas turbines; Temperature; Human factors engineering
ID- *Hh-53c aircraft; Category 2 tests; H-53 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568467
AA- <NTIS> AD-893 743/5/XAB
TI- UH-1N Category II Climatic Laboratory Tests (Appendix III). Volume I
TI- <NOTE> Technical rept
AU- Montefusco, M. T.
CS- Air Force Flight Test Center Edwards AFB Calif
CS- <CODE> 012100
RN- AFFTC-TR-71-36-APP-3-VOL-1
PY- Nov 71
PG- 396p
NT- Appendix 3 to report dated Aug 71, AD-891 288L. See also Volume 2, AD-893 744L.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A17/MF A01
JA- GRAI7622
AB- During the climatic laboratory phase of the UH-1N Category II All-Weather Test Program, 21.1 hours test time were accumulated during 30 test runs. Eleven test runs were selected from this phase as being the most representative of UH-1N operation in regions with ambient temperatures varying from 125 to -65 degrees F. All available temperatures and pressures obtained on these test runs from digital, oscillograph, and photopanel recording equipment are presented in this document.
DE- *Helicopters; *Helicopter engines; Environmental tests; Captive tests; Instrumentation; Experimental data; Thermal properties; Temperature; Pressure; Performance(Engineering)
ID- *Uh-1n aircraft; Category 2 tests; H-1 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 0568356
AA- <NTIS> AD-892 509/1/XAB
TI- Evaluation of Operations and Marginal Costs of MAST Alternatives
TI- <NOTE> Final rept
AU- Greyson, M. ; Delang, J. J. ; Haymond, P. M. ; Reed, D. ; Robertson, M. A.
CS- Stanford Research Inst Menlo Park Calif

CS- <CODE> 332500
CN- DAHC19-71-C-0021; SRI-1223
PY- Oct 71
PG- 224p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A10/MF A01
JA- GRAI7622
AB- To provide a data base to assist the Department of Defense in establishing a position on the provision of military-helicopter support to civilian-ambulance and rescue services, the potential capabilities of the U.S. Army to provide such support were analyzed and costed. Experiences gained during five pilot projects of the program, Military Assistance to Safety and Traffic (Project MAST), were examined and related to the accidental-injury and emergency medical-system characteristics of 18 communities around selected U.S. Army installations. Based on these relationships, the helicopter-ambulance needs of the communities were estimated. Types of military helicopters feasible for the ambulance mission and types of U.S. Army units capable of providing the support were identified. The TO and E, training syllabi, and peacetime function of these units were then examined to determine the support that could be provided within the normal peacetime activities of the unit and those that would have to be provided by resources above normal peactime allocations. Civilian aircraft capable of serving in the ambulance role were also identified. Feasible units were then related to civilian community needs to estimate the type of unit that would be required in each of the civilian areas.
DE- *Rescues; *Cost effectiveness; *Helicopters; Data processing; Ambulances; Operations research; Military medicine; Military facilities ; Civil aviation; Accidents; Wounds and injuries; Medical supplies; Traffic; Evacuation; Civilian personnel; Medical personnel; Army aircraft; Safety; Vietnam; Costs; Mortality rates; Survival(Personnel); Management engineering
ID- *Mast project; Data bases; First aid; Good samaritan statutes; H-1 aircraft; Patients; Uh-1h aircraft; NTISDODXD
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 70B (Administration and Management--Management Practice); 62A (Computers, Control, and Information Theory--Computer Hardware); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568341
AA- <NTIS> AD-892 400/3/XAB
TI- Airworthiness and Flight Characteristics Test CH-47C Helicopter (Chinook) Performance
TI- <NOTE> Final rept. 29 Apr 69-21 Aug 70
AU- Forsyth, R. F. ; Nagata, J. I. ; Marr, G. A. ; Burden, J. R.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-66-29
CN- RDT/E-1-R-179191-D-685; USATECOM-4-6-0201-03
PY- Sep 71
PG- 144p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7622
AB- The CH-47C was flight tested to obtain detailed performance data and to verify compliance of the aircraft with the manufacturer's detail specification and applicable military specifications. The test results show that the helicopter exceeded all performance guarantees and complied with almost all specifications against which it was tested. The performance characteristics of the helicopter are satisfactory for operational use.
DE- *Helicopters; Performance(Engineering); Flight testing; Specifications; Acceptability; Gas turbines; Helicopter engines; Cockpits; Vibration; Torque; Aerodynamic characteristics; Aircraft noise; Hovering; Climbing ; Airspeed; Cargo; Payload; Load distribution; Human factors engineering; Pilots; Handling; Flight control systems; Aerodynamic loading; Flight instruments; Display systems
ID- Ch-47c aircraft; H-47 aircraft; Shafts(Machine elements); Turbojet engines; T-55-l-11 engines; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0568268
AA- <NTIS> AD-891 263/6/XAB
TI- Category II Arctic Tests of the HH-53C Helicopter
TI- <NOTE> Final rept. 5 Jan-26 Feb 71

AU- Etzel, G. A. M. ; Gurley, S. E. ; Barbagallo, J. L. ; Lovrien, C. E.
CS- Air Force Flight Test Center Edwards AFB Calif
CS- <CODE> 012100
RN- AFFTC-TR-71-12
CN- AFFTC-71-24
PY- Apr 71
PG- 84p
NT- Includes attached Addendum.
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7622
AB- The purpose of the arctic test was to determine the adequacy of the HH-53C, systems and components during operation after extended soaks in an arctic environment. Specific test objectives were to: (1) Determine the adequacy of the HH-53C systems components and ground equipment for operation in accordance with AFR 80-31 and as specified in the aircraft model specification; (2) Determine human requirements, i.e., the requirements for men to maintain and fly the aircraft in an arctic environment; (3) Verify and amplify the results of the Climatic Laboratory tests as well as to determine additional deficiencies revealed by the increased operational capability over that available in the Climatic Laboratory; (4) Test modifications, fixes, procedures, etc., determined from the Climatic Laboratory tests; (5) Determine the cold weather operating procedures to be included in the Flight Manual; and (6) Compile environmental data for future fixes, modifications, and design purposes.
DE- *Helicopters; Cold weather tests; Arctic regions; Flight testing; Maintainability; Auxiliary power plants; Airplane engine oils; Fire extinguishers; Seals; Oil seals; Failure; Operation; Performance(Engineering); Reliability; Performance(Human); Human factors engineering; Ground support equipment; Aircraft heaters; Instrument panels; Refueling in flight; Aircraft guns
ID- *Hh-53c aircraft; Category 2 tests; H-53 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0567869
AA- <NTIS> AD-885 839/1/XAB
TI- Vibration and Elevator Loads Survey Tests of the UH-1M Helicopter with the Forward-Looking Infrared (FLIR) System Installed
TI- <NOTE> Final rept. 9 Sep 70-25 May 71
AU- Finnestead, R. L. ; Hendrickson, D. E.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-70-29
CN- USAAVSCOM-70-29
PY- Jun 71
PG- 194p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7622
AB- Main rotor vibration characteristics and elevator loads were determined both with and without the FLIR system installed. Nine parameters of vibration and six channels of elevator loads were evaluated to determine military specification compliance, and to provide mission suitability information for inclusion in technical manuals and other publications. The elevator loads and vibration characteristics were generally unaltered by the installation of the FLIR system, except for the vertical vibration magnitudes at a frequency of 4/rev. The magnitude of the 1/rev vertical vibration was irritating to the flight crew and exceeded the limit as specified in the military specification, MIL-H-8501A, when operating at or near the forward cg limit at low airspeed (less than 65 knots calibrated airspeed). The 4/rev vertical vibration levels exceeded the specification limit and were generally greater with the FLIR system installed. The amplitude of the 8/rev vertical vibration was higher than the limit specified in paragraph 3.7.1(b) of MIL-H-8501A during diving flight. Analysis of the elevator beam bending loads data without the FLIR system installed indicated that there was some increase when compared to contractor test results of the standard UH-1C/M21 helicopter. (Author)
DE- *Aerodynamic control surfaces; *Infrared equipment; *Night warfare; Vibration; Installation; Helicopters; Helicopter rotors; Elevators; Aerodynamic loading; Flight testing; Resonant frequency; Flight paths; Statistical data
ID- Flir(Forward looking infrared); Forward looking infrared; H-1 aircraft; T-53 engines; T53-l-13 engines; Uh-1m aircraft; NTISDODXD
SH- 46B (Physics--Fluid Mechanics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0567498
AA- <NTIS> AD-881 186/1/XAB
TI- Adverse Weather Tests of the HH-53C Helicopter
TI- <NOTE> Final technical rept. 19 Dec 69-30 Jan 70
AU- Reilly, D. A.
CS- Aeronautical Systems Div Wright-Patterson AFB Ohio
CS- <CODE> 008800
RN- ASD-TR-70-51
CN- AF-482A
PY- Dec 70
PG- 44p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7622
AB- Instrumentation and thermocouples were installed to record basic flight parameters and to pick up temperature variations in HH-53C helicopter for evaluation during all phases of operation in actual and simulated adverse weather. Eighteen missions were flown for a total flight time of 31 hours and 15 minutes. The HH-53C gave a safe performance in both running takeoff and hovering takeoff; and cruising flight in instrument conditions presented no undue hardships. This helicopter provides a large amount of IFR instrumentation and several approach airspeeds for instrument landing, and characteristically displayed satisfactory handling and control in instrument flight, with reasonable safety and recovery capability in case of subsystem failure. Tentative procedures and comments by pilots were used in accomplishing instrument and missed approaches. Practice touchdowns up to 60 knots were made. Takeoffs and landings in snow helped in establishing procedures for meeting 'whiteouts' experienced in powdery snow. Landing sequences were designed to assist pilots in poor visibility. Uncleared runways and extreme weather conditions during the winter provided ideal testing conditions of ground handling and taxing on snow and ice. Detailed summaries of highly successful flights in natural icing conditions are described. (Author)
DE- *Helicopters; *All weather aviation; Flight testing; Snow; Ice; Takeoff ; Hovering; Level flight; Instrument flight; Performance(Engineering)
ID- Hh-53c aircraft; H-53 aircraft; NTISDODXD
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0566407
AA- <NTIS> AD-D002 697/1/XAB
TI- Rotatable Head Up Display with Coordinate Reversal Correctives
TI- <NOTE> Patent
AU- Kinder, F. A.
CS- Department of the Navy Washington D C
CS- <CODE> 110050
RN- PAT-APPL-534 617; PATENT-3 945 716
PY- Filed 20 Dec 74 patented 23 Mar 76
PG- 4p
NT- Supersedes AD-D000 572.
NT- This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7621
AB- The patent describes a rotatable head up display system to furnish target coordinate information to the pilot of an aircraft, for example. The head up display may be slaved to a FLIR or TV tracker to display the scene viewed thereby as well as the azimuth with respect to the aircraft. A small cathode ray tube is used for the display and the scene is viewed through a holographic lens so that the display appears at infinity focus. The pilot is also provided with means for controlling the aiming of the sensor (FLIR, TV, or the like). The invention relates to improved weapon sighting devices for use by helicopter aircraft pilots.
DE- *Head up displays; *Patents; *Fire control system components; Holography; Lenses; Helicopters
ID- PAT-CL-350-174; NTISGPN
SH- 90F (Government Inventions For Licensing--Electrotechnology); 49E (Electrotechnology--Optoelectronic Devices and Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0566281
AA- <NTIS> AD-A028 339/0/XAB
TI- Advanced Operational Aviation Medicine Course, (4th), held at Royal Air Force Institute of Aviation Medicine, Farnborough, Hampshire 17-26 June 1975
AU- Nicholson, A. N.
CS- Advisory Group for Aerospace Research and Development Paris (France)
CS- <CODE> 400043

RN- AGARD-R-642
PY- May 76
PG- 115p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7621
AB- During June 1975 the Fourth Advanced Operational Aviation Medicine Course was held at the Royal Air Force Institute of Aviation Medicine, Farnborough. The course covered in depth some aspects of aviation medicine which are of current concern to the effectiveness of NATO air forces. The topics included the training of aircrew in aviation medicine, medical aspects of naval helicopter operations on the northern flank of NATO, developments in personal equipment with special reference to helmet developments, high speed escape and thermal problems, and the use of hypnotics in air operations.
DE- *Aviation medicine; Human factors engineering; Warning systems; Flight crews; Helicopters; Training; Helmets; Hypnotics and sedatives; Escape systems; Thermal insulation; Protective clothing; Display systems; Breathing masks; NATO
ID- NTISDODXA
SH- 57E (Medicine and Biology--Clinical Medicine); 57W (Medicine and Biology--Stress Physiology)

AZ- 0560200
AA- <NTIS> AD-913 469/3/XAB
TI- Integrated Pilot Assist System
TI- <NOTE> Interim rept. Jun 70-Apr 73
AU- Young, W. L. ; Welch, A. J.
CS- Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
CS- <CODE> 012070
RN- AFFDL-TR-73-66
CN- AF-8226; 822605
PY- Jul 73
PG- 86p
NT- Distribution limitation now removed. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7618
AB- This program was originated for the purpose of developing a flight control system for helicopters and V/STOL vehicles. The design utilizes force stick steering and parallel servo installation with full, mechanical back-up. The system stabilizes the vehicle in all four axes with additional features such as altitude hold velocity hold, turn coordination, and attitude hold. (Author)
DE- *Automatic pilots; *Attitude control systems; *Speed regulators; Man machine systems; Integrated systems; Helicopters; Stabilization systems ; Flight speeds; Vertical takeoff aircraft; Short takeoff aircraft; Observation aircraft; Servomechanisms; Feedback; Control sticks; Force(Mechanics); Pitch(Motion); Roll; Yaw; Simulation; Pilots; Rescues ; Flight paths; Tactical warfare; Turning flight; Hovering
ID- *Altitude control systems; Fail safe design; H-6 aircraft; Strouhal number; NTISDODXD
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0558742
AA- <NTIS> AD-A026 062/0/XAB
TI- Laboratory Testing Techniques for High-Noise Environment Communications Systems
AU- Lindberg, A. W. ; Mayer, M. S.
CS- Army Electronics Command Fort Monmouth N J Avionics Lab
CS- <CODE> 387890
PY- 1976
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7617
AB- The Army is looking to improve the performance of the communications systems so as to effectively eliminate the transmission and penetration of the undesired noise environment to the aviator's ear. The authors have developed new laboratory testing techniques for communication systems that must operate in high-noise environments.
DE- *Communication and radio systems; *Avionics; *Noise reduction; Aviation personnel; Simulation; Hearing; Laboratory tests; Test methods; Speech recognition; AN/ARC-114; AN/ARC-115; Noise(Sound); Helicopters; Costs
ID- CH-47 aircraft; NTISDODXA; NTISDODA

SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0557029
AA- <NTIS> AD-A025 680/0/XAB
TI- An Analysis of the Effect of a Flight Director on Pilot Performance in a Helicopter Hovering Task
TI- <NOTE> Master's thesis
AU- Duffy, T. W.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- Mar 76
PG- 53p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A04/MF A01
JA- GRAI7616
AB- A fixed-base simulator evaluation of a flight director for maintaining longitudinal control of a helicopter in the hover mode of operation was made. Test subjects performed ninety-second precision hovering tasks utilizing two cockpit displays. The second display differed from the first only by the addition of the flight director indicator. The helicopter and each display were simulated on a hybrid computer. The hovering task consisted of minimizing root mean square longitudinal and vertical deviation from an initial equilibrium position. Root mean square performance data and numerical pilot opinion ratings were obtained. These data indicated significant improvement in performance when the flight director was being utilized. (Author)
DE- *Flight instruments; *Hovering; Pilots; Performance(Human); Simulation; Helicopters; Display systems; Theses; Assessment
ID- NTISDODXA; NTISDODN
SH- 92D (Behavior and Society--Education, Law, and Humanities)

AZ- 0556809
AA- <NTIS> AD-A025 455/7/XAB
TI- Development of a Prototype Experimental Plan to Evaluate Stabilized Optical Viewing Devices. II. Inflight Measures of Airsickness Potential
TI- <NOTE> Interim rept
AU- Hixson, W. C. ; Guedry, F. E. ; Norman, J. W. ; Glick, D. D. ; Wiley, R. W.
CS- Naval Aerospace Medical Research Lab Pensacola Fla
CS- <CODE> 406061
RN- NAMRL-1223; USAARL-76-15
CN- M4305; M4305-08
PY- 8 Mar 76
PG- 27p
NT- Joint report prepared in cooperation with Army Aeromedical Research Lab., Fort Rucker Ala. See also AD-A011 244.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7616
AB- Investigators at the Naval Aerospace Medical Research Laboratory and the U. S. Army Aeromedical Research Laboratory conducted a combined field and laboratory study to evaluate observer performance while using an improved XM-76 stabilized viewing device. Air-to-ground observations were made in a UH-1 aircraft, flying maneuvers modeled in part after a scout helicopter scenario. The experimental protocol was such that visual acuity data were collected under three different observation conditions: with the naked eye, with XM-76 operated in its normal stabilized mode, and with the XM-76 operated in a caged or nonstabilized mode. Measures of selected airsickness symptoms were derived from an onboard flight observer and from postflight questionnaires. The resulting data indicate that the level of airsickness symptoms manifested by the subject group while using the device was higher than the baseline level present when the observations were made without the device. In contradistinction to the hypothesis that the stabilization feature of such devices increases the airsickness potential, the general trend of the data showed the opposite effect.
DE- *Motion sickness; *Target acquisition; Stabilization systems; Aerial reconnaissance; Visual perception; Performance(Human); Aviation medicine; Stability; Hand held; Questionnaires; Prototypes; Display systems; Optics; Gyro stabilizers; Human factors engineering; Helicopters; Vestibular apparatus; Vertigo
ID- *XM-76 sights; UH-1 aircraft; NTISDODXA; NTISDODA; NTISDODN
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0555585
AA- <NTIS> N76-19146/9/XAB
TI- Analytical Evaluation of Tilting Proprotor Wind Tunnel Test Requirements
TI- <NOTE> Technical Report, 1 Apr. - 15 Dec. 1975
AU- Hall, W. E. ; Buenz, D.
CS- Systems Control, Inc., Palo Alto, Calif.
RN- NASA-CR-137826
CN- NAS2-8799
PY- Jan 76
PG- 144p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7615; STAR1410
AB- Specific test requirements related to the wind tunnel testing of the XV-15 advanced tilt rotor research aircraft were determined. The following analytical tools were developed: (1) digital simulation of the XV-15, incorporating a simplified tunnel support model, control system loop, measurement lags, gust disturbances, and sensor noise, (2) specialization of existing data analysis programs to the high order XV-15 dynamical model (transfer function program, a time series analysis program, an advanced maximum likelihood parameter identification program), (3) several auxiliary programs to provide estimates of damping from transfer functions as well as calculations of model decomposition of system response. The following results were discussed: (1) modelling of the aircraft, instrumentation, and controls, (2) results of the rotor/cantilever wing model and coupled wing, (3) examples of data prediction with system identification techniques, and (4) detailed conclusions and recommendations.
DE- *Analyzing; *Evaluation; *Specifications; *Tilt rotor research aircraft program; *Wind tunnel tests; Computer programs; Digital simulation; Research aircraft
ID- NTISNASA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0553074
AA- <NTIS> AD-A024 726/2/XAB
TI- Aeromedical Review of Oxygen Requirements of US Army Aviators
TI- <NOTE> Publication rept
AU- Pettyjohn, F. S. ; McNeil, R. J.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-76-19
PY- Apr 76
PG- 23p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7614
AB- Aeromedical review of US Army aircraft oxygen design criteria and military specification indicates physiologic inconsistencies. Oxygen duration charts in use for U-21 aircraft are computed on the basis of military specification using inspiratory minute volume (IMV) of 13.12 liters per minute (LPM), normal temperature (70F), pressure, dry (NTPD). Current oxygen duration charts for the RU-21 aircraft using constant flow regulator have overstated oxygen availability of 62.3% at 10,000 feet and 18.7% at 15,000 feet. Type regulator and dilution schedule are listed for U-21 series aircraft. The current design inspiratory minute volume of 13.12 LPM NTPD is the basic design deficiency. The effects of the activity and stress of flight require an increase of design IMV.
DE- *Oxygen equipment; *Life support systems; Helicopters; Performance tests; Criteria; Aeromedical evacuation; Army; Stress(Physiology); Requirements; Tables(Data); Humans
ID- NTISDODA
SH- 57W (Medicine and Biology--Stress Physiology); 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 0552861
AA- <NTIS> AD-A024 512/6/XAB
TI- Helicopter Yaw Axis Augmentation Investigation
TI- <NOTE> Interim rept
AU- Clark, W. E. ; Intano, G. P.
CS- Instrument Flight Center Randolph AFB Tex
CS- <CODE> 407583
RN- IFC-TR-76-3
PY- Mar 76
PG- 149p
NT- See also Rept. no. IFC-TR-74-2, AD-A009 839.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and

email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7614
AB- This investigation was conducted to document changes in pilot performance and activity resulting from augmentation of the helicopter yaw axis. Subject pilot opinions regarding workload and pilot acceptance of the concept of yaw augmentation were also evaluated. Eight highly qualified instructor pilots were used as data collection pilots. These pilots flew profiles representing typical helicopter instrument maneuvers. Each maneuver, except for the instrument takeoff flown augmented only, was flown first with the yaw-augmentation system engaged and then repeated without yaw-augmentation. Objective and subjective data was obtained through the use of video, audio, oscillograph recording equipment and in-flight and postflight questionnaires and debriefings. Due to the lack of large scale computer facilities for objective data analysis, an interim report is being published. A final report utilizing correlation and regression analysis, documenting cause and effect relationships will be published when computer facilities are available. The present interim report provides limited objective data analysis and project personnel interpretation of the subjective data. (Author)
DE- *Helicopters; *Flight control systems; Aerodynamic characteristics; Yaw ; Augmentation; Pilots; Performance tests; Performance(Human); Instructors; Data acquisition; Instrumentation; Questionnaires; Flight testing; Maneuverability; Recording systems; Debriefing
ID- Yaw axis; Yaw augmentation; Data interpretation; NTISDODXA; NTISDODAF
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0552124
AA- <NTIS> PB-251 723/3/XAB
TI- Mobile Lidar Study of the Los Angeles Mixing Layer
TI- <NOTE> Final rept
AU- Liu, D. T.
CS- System Innovation and Development Co., Rolling Hills Estates, Calif.
CS- <CODE> 390509
SP- Environmental Sciences Research Lab., Research Triangle Park, N.C.
RN- EPA/600/4-76/009
CN- EPA-68-02-1305
PY- Feb 76
PG- 239p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- GRAI7613
AB- A mobile Lidar system, mounted in a van, was used to depict the temporal and spatial variations of the mixing depth over the Los Angeles Basin, during the LARPP field tests in the fall of 1973. Lidar profiles are interpreted and compared to vertical temperature and moisture profiles measured by helicopter and standard meteorological sounding techniques. Lidar echo anomalies are classified into mixing layer height or significant levels based on backscatter slop evaluation. The qualitative aspects of each backscatter signature are used in describing the nature and altitude of inversion bases, moisture layers, stratus and fog layers.
DE- *Air pollution; *Atmospheric composition; *Gas detectors; *Optical radar; Boundary layer transitions; Weather; Temperature; Humidity; Instrumentation; Data processing; Gas sampling; Mobile equipment; Ozone ; Nitrogen oxides; Methane; Hydrocarbons; Carbon monoxide; Trace elements; Tables(Data); Monitors; California
ID- *Air pollution detection; Los Angeles(California); LARPP program; NTISEPAORD
SH- 68A (Environmental Pollution and Control--Air Pollution and Control); 63F (Detection and Countermeasures--Optical Detection)

AZ- 0550309
AA- <NTIS> AD-A023 728/9/XAB
TI- Influence of Pilot Incapacitation on Low Speed and Hovering Flight
TI- <NOTE> Final technical memo
AU- Harvey, D. P. ; Waugh, J. D.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-7-76
PY- Jan 76
PG- 36p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7613
AB- Very little quantitative information exists as to survivability of a lone or surviving helicopter pilot who is incapacitated by wounds

received during a mission. Since the pilot normally uses all four limbs, his ability to maintain control of an otherwise flyable aircraft is expected to be impaired. A safe, yet realistic approach to the investigation was to physically restrain single hands, limbs, etc. of Army aviators hovering a DHT-1 Whirlymite Trainer--a semitethered but otherwise genuine single-place helicopter. The relative accuracy with which subjects followed a prescribed flight path under the restraints was the primary means of comparison. Statistical analysis of integrated error scores showed that the only effective restraints were those involving an entire limb. Since this investigation only involved hovering flight, recommendations included further work in cruise considerations in favor of multiple-limb restraints.
DE- *Pilots; *Incapacitation; *Flight control systems; Helicopters; Human factors engineering; Hovering; Wounds and injuries; Army research; Statistical analysis; Survival(Personnel); Tables(Data); Performance(Human); Simulation
ID- NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0545712
AA- <NTIS> AD-A022 782/7/XAB
TI- Vision with the AN/PVS-5 Night Vision Goggles
AU- Wiley, R. W. ; Holly, F. F.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
CN- DA-1498
PY- 8 Apr 76
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7611
AB- This paper presents the results from a series of experiments in which visual performance using the AN/PVS-5 night vision goggle was measured. Modulation transfer functions of the man-goggle system were determined and compared to results obtained with unaided viewing. It was found that the man-goggle system performance was superior to unaided visual performance at average target luminances equivalent to 5% and 25% moon illuminances. At a target luminance equivalent to a full moon illuminance, unaided visual performance was superior at higher spatial frequencies, while remaining poorer at the lower spatial frequencies. Using a modified Howard-Dolman apparatus, it was determined that the stereoscopic threshold was degraded with the man-goggle system. Field measurements of relative depth discrimination using all available visual cues showed that performance of the man-goggle system was statistically equivalent to unaided photopic visual performance at intermediate viewing distances, but was inferior to unaided viewing at distances of 500 feet or greater. While the night vision goggle reduces the ambient light level necessary for military rotary wing support, use of the goggle does not allow the operator to perform with photopic visual efficiency. (Author)
DE- *Night vision devices; Goggles; Night vision; AN/PVS-5; Optical detectors; Performance(Engineering); Transfer functions; Comparison; Target detection; Visual perception; Range(Distance); Man machine systems; Field tests
ID- NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0541519
AA- <NTIS> AD-D002 147/7/XAB
TI- Blended Manual-Automatic Control System
TI- <NOTE> Patent
AU- Knemeyer, S. ; McElreath, K. W.
CS- Department of the Air Force Washington D C
CS- <CODE> 109850
RN- PAT-APPL-464 876; PATENT-3 920 966
PY- Filed 29 Apr 74 patented 18 Nov 75
PG- 10p
NT- Supersedes AD-164 761.
NT- Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7609
AB- The patent relates to a control method comprising generating a command signal proportional to the difference between a desired control effect and the instantaneous control effect, splitting the command signal into a high frequency portion and a low frequency portion, applying the high frequency portion to a mechanical servomechanism for automatically executing the high frequency portion of the command, and displaying only the low frequency long term portion of the command for manual execution. As a specific example, apparatus is disclosed for

controlling the airspeed of a helicopter in accordance with the method.
DE- *Man machine systems; *Patents; Control systems; Flight control systems ; Signal generators; Helicopters; Airspeed
ID- PAT-CL-235-150; NTISGPAF
SH- 90GE (Government Inventions For Licensing--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0539741
AA- <NTIS> N76-13770/2/XAB
TI- Emergency Descent Device
TI- <NOTE> Patent Application
AU- Belew, R. R.
CS- National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RN- PAT-APPL-623 188; NASA-CASE-MFS-23074-1
PY- Filed 16 Oct 75
PG- 17p
NT- Government-owned invention available for licensing. Copy of application available NTIS. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Patent
PC- PC A02/MF A01
JA- GRAI7608; STAR1404
AB- A descent device is provided for emergency descent from tall structures and for lowering objects from high elevations such as a hovering helicopter. The device includes a rotating spool having a cable wound thereon for descent and a rotation-retarding vane member which rotates in a fluid cylinder. An adjustable bypass is provided for the fluid as the vane member rotates therein so that the speed of descent can be adjustably controlled.
DE- *Cables (Ropes); *Descent; *Emergency life sustaining systems; *Rotating cylinders; *Patent applications; Equipment specifications; Safety devices
ID- NTISNASA
SH- 90A (Government Inventions For Licensing--Mechanical Devices and Equipment); 95GE (Biomedical Technology and Human Factors Engineering--General)

AZ- 0534581
AA- <NTIS> AD-A019 935/6/XAB
TI- SEEKVAL PROJECT ID1 - Characteristics of Inherent and Apparent Scenes
TI- <NOTE> Final rept. Jul 74-Sep 75
AU- Power, D. R.
CS- Air Force Test and Evaluation Center Kirtland AFB N Mex
CS- <CODE> 409008
PY- Dec 75
PG- 266p
NT- Joint Test Project Report of Combat Air Support Target Acquisition Program.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A12/MF A01
JA- GRAI7606
AB- SEEKVAL Project ID1 was conducted to determine instrumentation and data reduction techniques suitable for measuring and documenting both apparent and inherent contrast during field tests. Three types of instrumentation were used: (1) cameras to photograph scenes from target acquisition ranges, (2) photometers to measure illumination of scene objects at close range, and (3) airborne and ground instruments for measuring atmospheric characteristics. Field data collection occurred at Ft Lewis, Washington, during July 1974. It involved photographing and measuring illumination characteristics of a target scene consisting of trucks and portable Gray Scale panels. Simultaneously, characteristics of the atmosphere were measured by highly specialized equipment designed for the purpose. Eleven missions were flown covering both clear and overcast weather. Data reduction techniques, compatibility of instrumentation with field test aircraft and operations, costs, and adequacy of data are factors leading to recommendations for field test instrumentation. Guidance is given on use of photometers for vehicle type targets, the use of Gray Scale panels, targets, math models, color film, and infrared black and white film for determining target/background contrast. (Author)
DE- *Photographic contrast; *Photographic images; *Aerial photographs; *Photosensitivity; Surface targets; Trucks; Panels; Atmospheres; Cloud cover; Reflectance; Target acquisition; Range(Distance); Photometers; Photometry; Illumination; Color film; Infrared film; Black and white photographic film; Background; Comparison; Data reduction; Densitometers; Helicopters; Transport aircraft; Field tests; Field conditions
ID- *SEEKVAL project; NTISDODXA; NTISDODAF
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0532311
AA- <NTIS> AD-A019 407/6/XAB
TI- Engineering Evaluation JOH-58A Helicopter with an Automatic Relight System
TI- <NOTE> Final rept. 12 Feb-11 Apr 75
AU- Benson, T. P. ; Mittag, C. F. ; Buckanin, R. M.
CS- Army Aviation Engineering Flight Activity Edwards AFB Calif
CS- <CODE> 409025
RN- USAAEFA-74-22
CN- PRON-EJ-4-H0044-00-EJ-EJ
PY- Jun 75
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7605
AB- The United States Army Aviation Engineering Flight Activity conducted a limited in-flight evaluation of an automatic engine relight system installed in an OH-58A helicopter at Edwards Air Force Base, California, from 12 February through 11 April 1975. During the program, 33 test flights were flown for a total of 13.5 productive flight hours. Results of the evaluation showed that established limitations may be exceeded if the automatic relight system functions at certain points within the current operating envelope. Required additional limitations to the current operating envelope with the automatic relight system activated include in-ground-effect, hover below 10 feet and specific combinations of airspeeds and engine power settings. Two deficiencies and one shortcoming were noted during the evaluation.
DE- *Helicopter engines; *Engine starters; Gas turbines; Flight testing; Flameout; Response; Pilots; Yaw; Roll; Pitch(Motion); Drives; Landing gear; Instrumentation; Automatic
ID- *Restarters; OH-58 aircraft; NTISDODXA; NTISDODA
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines) ; 81A (Combustion, Engines, and Propellants--Combustion and Ignition); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0531957
AA- <NTIS> AD-A019 049/6/XAB
TI- The Development of an Advanced Anti-Icing/Deicing Capability for U.S. Army Helicopters. Volume II. Ice Protection System Application to the UH-1H Helicopter
TI- <NOTE> Final rept. 30 Jun 73-30 Jun 75
AU- Werner, J. B.
CS- Lockheed-California Co Burbank
CS- <CODE> 209970
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va. Eustis Directorate.
RN- LR-27180-VOL-2; USAAMRDL-TR-75-34B
CN- DAAJ02-73-C-0107; DA-1-F-262209-AH-76; 1-F-262209-AH-7600
PY- Nov 75
PG- 220p
NT- See also Volume 1 dated Nov 75, AD-A019 044.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A10/MF A01
JA- GRAI7605
AB- The work which has been accomplished under this program is reported in two volumes. The first volume, Design Criteria and Technology Considerations, discusses (1) icing severity level analysis and recommended design criteria, (2) adverse weather protection technology, (3) a trade-off comparison between different types of ice protection systems for various categories of helicopters, and (4) a technology development program for an advanced electrothermal deicing system. This volume describes the application of the recommended electrothermal deicing dystem to a UH-1H test aircraft. It provides a detailed description of the modifications to the basic aircraft (including the flight test instrumentation) and the results of the ground and flight test program for that aircraft conducted in the winter of 1974-75.
DE- *Helicopters; *Ice prevention; *Deicing systems; Army aircraft; Modification; Systems engineering; Technology; Electrical equipment; Protective equipment
ID- Electrothermal deicing; UH-1H aircraft; H-1 aircraft; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0531952
AA- <NTIS> AD-A019 044/7/XAB
TI- The Development of an Advanced Anti-Icing/Deicing Capability for U.S. Army Helicopters. Volume 1. Design Criteria and Technology

Considerations
TI- <NOTE> Final rept. 30 Jun 73-30 Jun 75
AU- Werner, J. B.
CS- Lockheed-California Co Burbank
CS- <CODE> 209970
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va. Eustis Directorate.
RN- LR-27180-VOL-1; USAAMRDL-TR-75-34A
CN- DAAJ02-73-C-0107; DA-1-F-262209-AH-76; 1-F-262209-AH-7600
PY- Nov 75
PG- 253p
NT- See also Volume 2 dated Nov 75, AD-A019 049.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A12/MF A01
JA- GRAI7605
AB- The work which has been accomplished under this program is reported in two volumes. Volume 1 discusses (1) icing severity level analysis and recommended design criteria, (2) adverse weather protection technology, (3) a trade-off comparison of different types of ice protection systems for various categories of helicopters, and (4) a technology development program for an advanced electrothermal deicing system. Volume 2, Ice Protection System Application to the UH-1H Helicopter, describes the application of the recommended electrothermal deicing system to a UH-1H test aircraft. It provedes a detailed description of the modifications to the basic aircraft (including the flight test-instrumentation) and the results of the ground and flight test program for that aircraft conducted in the winter of 1975-75.
DE- *Helicopters; *Ice prevention; *Deicing systems; Army aircraft; Technology; Systems engineering; Comparison; Electrical equipment; Protective equipment
ID- Electrothermal deicing; UH-1H aircraft; H-1 aircraft; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0531912
AA- <NTIS> AD-A019 004/1/XAB
TI- A Comparison of the Light Distribution of Externally-Lit and Integrally-Lit Lighting Systems
TI- <NOTE> Technical note
AU- Poston, A. M.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-11-75
PY- Dec 75
PG- 13p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7605
AB- A statistical analysis was performed to determine if there are any differences between externally-lit and integrally-lit (wedge) lighting systems. The light distribution in an existing OH-58 helicopter was compared against two OH-58 helicopters which had their lighting systems modified to an integrally-lit lighting system for another study. The ratio of the standard deviation to mean value was computed for each instrument and the statistical analysis was performed on this ratio.
DE- *Lighting equipment; *Helicopters; *Cockpits; Human factors engineering ; Illumination; Comparison; Instrument dials; Experimental data
ID- OH-58 aircraft; H-58 aircraft; NTISDODA
SH- 94E (Industrial and Mechanical Engineering--Environmental Engineering); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0527077
AA- <NTIS> AD-A018 080/2/XAB
TI- Test of a Model of Visual Spatial Discrimination and its Application to Helicopter Control
TI- <NOTE> Final rept. 1 Jun 72-31 May 75
AU- Crowder, N. A. ; Bynum, J. A. ; Matheny, W. G.
CS- Life Sciences Inc Hurst Tex
CS- <CODE> 207260
RN- LSI-TR-75-2
CN- DADA17-72-C-2110
PY- Jun 75
PG- 55p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01

JA- GRAI7602
AB- A series of 4 laboratory studies and 3 field studies using a helicopter in hovering flight were undertaken to validate and test the assumptions made in and the predictions made from the Thielges-Matheny 'Analysis of Visual Discrimination in Helicopter Control'. The results of the field studies generally were in accordance with the predictions made from the model. In particular, certain results suggest that improved hover accuracy is obtained when the pilot is required or otherwise induced to use an eye-line-of-regard depressed substantially below his customary visual scan pattern. The laboratory studies were concerned primarily with validating the assumptions made in the Thielges-Matheny model concerning visual discrimination of changes in angular separation or relationship of two points in the visual field. The results of the laboratory studies show that the simple Weber ratio is not an adequate index of discriminability of displacement of one point with respect to the other. One of the results, that detection of motion across the imaginary line separating the two points is at least as easy as detection of displacement along that line, allows a considerable simplification of the model without changing its more important predictions. The most striking finding of the laboratory studies is the appearance of an 'Angular shrinkage illusion' which causes the angular separation of two points to be recalled as less than it actually was.
DE- *Visual perception; *Pilots; *Mathematical models; Helicopters; Performance(Human); Hovering; Validation; Experimental data; Models; Test methods; Field tests; Laboratory tests; Statistical analysis; Standard deviation
ID- *Space discrimination; Thielges-Matheny analysis; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0527034
AA- <NTIS> AD-A018 036/4/XAB
TI- Noise Certification Criteria and Implementation Considerations for V/STOL Aircraft. Volume I
TI- <NOTE> Final rept
CS- Man-Acoustics and Noise Inc Seattle Wash
CS- <CODE> 408220
SP- Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
RN- MAN-101H; FAA-RD-75-190
CN- DOT-FA74WAI-490
PY- Nov 75
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7602
AB- As a means of determining the accuracy and reliability of engineering calculation procedures that could be utilized as a basis for noise certification of V/STOL commercial aircraft, 36 persons made annoyance judgments to 34 noise signals presented at 5 different levels. The signals included recordings of conventional jet aircraft operations, turboprop and reciprocating engine powered commercial aircraft, helicopter flybys, and simulations of V/STOL operations. Both relative annoyance and absolute acceptability judgments were obtained.
DE- *Commercial aircraft; *Aircraft noise; *Short takeoff aircraft; *Psychophysics; Intensity; Experimental data; Test methods; Human factors engineering; Magnetic tape; Standards; Vertical takeoff aircraft; Ratings
ID- Annoyance; Noise levels; Certification; Judgment; Criteria; DOT/2A; DOT/5B; NTISDODFAA; NTISDOTFAA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 51C (Aeronautics and Aerodynamics--Aircraft); 92B (Behavior and Society--Psychology)

AZ- 0526071
AA- <NTIS> N75-32113/3/XAB
TI- Flight Instrumentation Specification for Parameter Identification: Program User'S Guide
AU- Mohr, R.
CS- Systems Control, Inc., Palo Alto, Calif.
RN- NASA-CR-132676
CN- NAS1-10791
PY- Jun 75
PG- 134p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7601; STAR1323
AB- A set of four digital computer programs is presented which can be used to investigate the effects of instrumentation errors on the accuracy of aircraft and helicopter stability-and-control derivatives identified

from flight test data. The programs assume that the differential equations of motion are linear and consist of small perturbations about a quasi-steady flight condition. It is also assumed that a Newton-Raphson optimization technique is used for identifying the estimates of the parameters. Flow charts and printouts are included. (Author)
DE- *Error analysis; *Flight instruments; *Independent variables; *Instrument errors; *Specifications; *User manuals (Computer programs); Digital techniques; Equations of motion; Error correcting codes; Flow charts; Optimization; Printouts
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0526070
AA- <NTIS> N75-32112/5/XAB
TI- Instrumentation Requirements for Aircraft Parameter Identification with Application to the Helicopter
AU- Sorensen, J. A. ; Mohr, R. L. ; Cline, T. B.
CS- Systems Control, Inc., Palo Alto, Calif.
RN- NASA-CR-132675
CN- NAS1-12876
PY- Jun 75
PG- 163p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- GRAI7601; STAR1323
AB- The extent to which instrumentation errors cause degradation in the knowledge of stability and control derivatives identified for flight tests was studied along with the resultant degradation of the flight system performance base on these derivatives. The error in measurement and data processing systems used for parameter identification, error analysis techniques, and the effects of instrumentation, errors on the accuracy of parameter estimates are discussed. The analysis programs were used to study instrumentation error effects on the accuracy of the identified stability and control derivatives of the CH-46 helicopter.
DE- *Aircraft instruments; *Helicopters; *Instrument errors; Aircraft control; Aircraft stability; Error analysis; Flight tests; Parameterization
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0525575
AA- <NTIS> AD-A017 441/7/XAB
TI- Pilot Performance in a Helicopter Simulator
TI- <NOTE> Final technical memo
AU- Waugh, J. D.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-23-75
PY- Sep 75
PG- 336p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A15/MF A01
JA- GRAI7601
AB- Six Army helicopter pilots, instrument rated, flew a difficult precision instrument flight pattern in this Laboratory's GAT-2H helicopter simulator. For each flight, each subject was given a different combination of thrust to weight, cyclic control sensitivity and cyclic spring centering force gradient condition making up an incomplete, balanced block-type experimental design. Several error measurements were recorded during the trials; however, none could be satisfactorily utilized to predict either accuracy of performance, or be an indicator of relative workload. An unanticipated large variation of measures taken is thought to be the cause. Additional approaches and further study of the problem is recommended.
DE- *Flight simulation; *Helicopters; *Pilots; Experimental data; Research planes; Man machine systems; Work measurement; Difficulty; Instrument flight; Human factors engineering
ID- Workload; Difficulty levels; NTISDODA
SH- 74GE (Military Sciences--General); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0524075
AA- <NTIS> AD-A016 887/2/XAB
TI- Annual Progress Report, 1 July 1974 - 30 June 1975
AU- Bailey, R. W.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578

CN- DA-3-A-762758-A-819; 3-A-762758-A-81900
PY- 30 Jun 75
PG- 117p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7526
AB- The mission of the US Army Aeromedical Research Laboratory is to conduct fundamental and applied research on the medical aspects of Army aviation, airborne and ground operations that affect the health, welfare and efficiency of the soldier; perform medical research on visual/auditory functions; man/machine integration; the medical aspects of non-medical materiel; physiological/psychological responses to the operational environments; and military operational training impacts upon ecology. (Author)
DE- *Aviation medicine; *Medical research; *Aviation personnel; Helicopters ; Army personnel; Vibration; Orthopedics; Crashes; Wounds and injuries; Physiology; Life support; Human factors engineering; Man machine systems; Economics; Ground support; Protection; Army training; Fatigue(Physiology); Stress(Physiology); Bioengineering; Biochemistry; Visual perception; Hearing; Visual acuity; Performance(Human); Retina; Oxygen; Research management
ID- NTISDODXA; NTISDODA
SH- 57GE (Medicine and Biology--General); 74GE (Military Sciences--General)

AZ- 0523630
AA- <NTIS> AD-A016 441/8/XAB
TI- A Comparison of Optimal Control Theory Predictions with Actual Pilot Performance in a Helicopter Longitudinal Tracking Task
TI- <NOTE> Master's thesis
AU- Wheat, L. W.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- Jun 75
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A03/MF A01
JA- GRAI7526
AB- A fixed base helicopter simulation was implemented which may be easily altered to represent a variety of conventional single rotor aircraft. Test subjects performed 90-second tracking tasks utilizing two cockpit displays for longitudinal control during landing approach. The performance data generated were compared with predicted values from an optimal pilot modeling technique. Tentative conclusions were drawn as to the effectiveness of each display as well as the predictive power of the pilot model.
DE- *Flight control systems; *Flight simulators; *Helicopters; Approach; Aircraft landings; Cockpits; Display systems; Cathode ray tube screens; Low velocity; Performance(Human); Tracking; Performance tests; Pilots; Mathematical models; Theses
ID- NTISDODN
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 76A (Navigation, Guidance, and Control--Control Devices and Equipment)

AZ- 0523289
AA- <NTIS> PB-245 550/9/XAB
TI- Methodologies for the Evaluation and Improvement of Emergency Medical Service Systems. Volume II. Appendices
TI- <NOTE> Final rept. 1 May 68-29 Feb 72
AU- Davis, L. E. ; Andrews, R. B. ; Durbin, E. P. ; Nahum, A. N. ; Trist, E. L.
CS- California Univ., Los Angeles. Div. of Operations Research.
SP- National Highway Traffic Safety Administration, Washington, D.C.
RN- DOT-HS-801 704
CN- FH-11-6849
PY- Aug 75
PG- 240p
NT- See also PB-244 462, and PB-245 551.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- GRAI7525
AB- The volume contains the appendices to the Final Report of the UCLA Emergency Medical Service Systems Project. Several kinds of detailed information are provided. These include: (1) the numerous data and questionnaire forms, which were developed for studies and surveys, (2) the enabling state legislation, training program, medication and

supplies, and sample transcripts of operational runs for the demonstration study of Mobile Intensive Care Units manned by paramedics, (3) the protocol for the demonstration of air ambulance helicopters, and (4) the contents of helicopter transportable field kits for Mobile Disaster Teams.
DE- *Medical services; Evaluation; Methodology; Surveys; Planning; Questionnaires; Tests; Training programs
ID- *Emergency medical services; Health care delivery systems; DOT/3D; DOT/4DZ/DF; Paramedical personnel; NTISDOTHTS
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0521610
AA- <NTIS> AD-A015 735/4/XAB
TI- A-Weighted Sound Levels in Cockpits of Fixed- and Rotary-Wing Aircraft
TI- <NOTE> Progress rept. Dec 72-Dec 74
AU- Gasaway, D. C.
CS- School of Aerospace Medicine Brooks AFB Tex
CS- <CODE> 317000
RN- SAM-TR-75-22
CN- AF-7755; 775508
PY- Aug 75
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7525
AB- Noise measurements obtained within the cockpits of 339 fixed- and rotary-wing aircraft during normal cruise are reported. The sample includes 271 fixed-wing and 68 rotary-wing aircraft that are grouped according to type and number of power plants. Mean A-weighted levels ranged from 92 to 105 dB for fixed-wing vehicles and from 98 to 106 dB for helicopters. Means and standard deviations are reported by octave-bands, all-pass (flat), A-levels, and preferred speech interference levels (PSIL, average of 500, 1000 and 2000 Hz). Also, at-the-ear A-levels are reported for generalized amounts of attenuation provided by headsets commonly worn in aircraft. (Author)
DE- *Aircraft noise; *Hearing; Conservation; Flight crews; Pilots; Background noise; Intensity; Cockpits; Military aircraft; Rotary wing aircraft; Voice communications; Interference; Engine noise; Level(Quantity); Acoustic measurement; Fatigue(Physiology); Deafness; Risk; Losses; Headgear; Flight helmets; Aviation medicine; Helicopters
ID- Fixed wing aircraft; NTISDODXA; NTISDODAF
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0517385
AA- <NTIS> AD-A014 942/7/XAB
TI- Laser Rangefinding Techniques for Helicopter Fire Control Applications. Phase II - Nonstabilized Gimballed Laser Concept
TI- <NOTE> Final test rept. Jun -Oct 74
AU- Cappiella, A. C.
CS- Frankford Arsenal Philadelphia Pa
CS- <CODE> 142720
SP- Army Missile Command, Redstone ARsenal, Ala.
RN- FA-TR-75029
CN- DA-1-F-263206-DK-62; 1-F-263206-DK-6214
PY- Mar 75
PG- 37p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7523
AB- The concept of employing a non-stabilized gimbal for mounting a laser rangefinder on an AH-1G helicopter was evaluated using existing hardware. The overall results indicate that this technique produced slant range errors of approximately 7% over the altitudes tested (300, 500, 1000, and 1500 feet). The evaluation showed the range error to increase significantly as operational altitude decreased. This is due to angular pointing errors translating into large slant range errors when small grazing angles are incurred. Range errors approaching 15% were projected with this system at 50-100 foot altitudes. It was also determined that the use of first pulse return logic generally produced smaller range errors than last pulse logic. In addition, a reduction in operational airspeed resulted in a slight decline in the range error. In summary, utilization of a non-stabilized gimballed laser rangefinder configuration by the copilot/gunner for helicopter fire control systems was only marginally effective at lower altitudes. The need for stabilization of the pointing system is indicated particularly under nap-of-the-earth (NOE) conditions. The addition of a stabilization capability will aid laser pointing while simultaneously allowing use of

magnification to improve target detection, recognition and identification ranges. (Author)
DE- *Lasers; *Range finding; *Aircraft fire control systems; Helicopters; Gimbals; Slant range; Accuracy; Flight crews; Human factors engineering

ID- AH-1G aircraft; NTISDODXA; NTISDODA
SH- 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0513099
AA- <NTIS> AD-A013 861/0/XAB
TI- Evaluation of an OH-58A Helicopter with an Allison 250-C20B Engine
TI- <NOTE> Final rept. 17 Oct-6 Dec 74
AU- Benson, T. P. ; Buckanin, R. M. ; Mittag, C. F. ; Jenks, J. E.
CS- Army Aviation Engineering Flight Activity Edwards AFB Calif
CS- <CODE> 409025
RN- USAAEFA-74-48
PY- Apr 75
PG- 83p
NT- See also AD-907 291.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7521
AB- The United States Army Aviation Engineering Flight Activity conducted a limited performance and handling qualities evaluation of a Bell Helicopter Company OH-58A helicopter with an Allison 250-C20B engine installed. The evaluation was conducted at Edwards Air Force Base and Bishop, California, from 17 October through 6 December 1974. Twenty-two flights with 17.6 productive test hours were required for the evaluation. Test results obtained with the Allison 250-C20B engine were compared with those previously obtained with the Allison 250-C20 engine and the standard T63-A-700 engine. Primary performance improvement over the standard T63-A-700 engine was an increase in out-of-ground-effect hover ceiling from 4600 to 11,050 feet standard-day density altitude at a gross weight of 3000 pounds. One deficiency and five shortcomings were noted. Unsatisfactory handling qualities characteristics are inherent to the basic OH-58A helicopter and are not associated with the installation of the 250-C20B engine. The engine/airframe compatibility characteristics (cooling and vibration levels) of the OH-58A helicopter with the 250-C20B engine are similar to the standard OH-58A helicopter with the T63-A-700 engine. Within the scope of the test, the performance of the OH-58A helicopter with an Allison 250-C20B engine installed was improved over the basic OH-58A helicopter. Handling qualities were essentially unchanged.
DE- *Helicopter engines; *Helicopters; Flight testing; Hovering; Ceiling; Handling; Compatibility; Human factors engineering; Pilots; Performance(Engineering); Turboshaft engines; Vibration; Cooling; Temperature; Climbing; Acceleration; Horizontal orientation; Vertical orientation; Airframes
ID- OH-58A Helicopters; H-58 Helicopters; Allison 250-C20 Engines; T-63-A-700 Engines; NTISDODXA; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0510905
AA- <NTIS> AD-A013 365/2/XAB
TI- Acoustic Noise Suppression in Airborne Communications
TI- <NOTE> Research and development technical rept
AU- Mayer, M. S.
CS- Army Electronics Command Fort Monmouth N J
CS- <CODE> 037620
RN- ECOM-4336
CN- DA-1-F-2623207-DB-97; 1-F-2623207-DB-9701
PY- Jul 75
PG- 55p
NT- See also AD-767 222.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7520
AB- One of the major recommendations of ECOM Report 4140 (AD-767 222) was the improvement or replacement of the M-87 microphone with one that had improved noise cancelling capabilities and a flatter frequency response. This area of concern is covered extensively. A program has been established to further evaluate militarized, improved-microphone candidates for possible incorporation into the Army system in FY-77. Another recommendation of ECOM Report 4140 was the improvement of the Heli-Notch filter (presently on all CH-47 aircraft) with an extended frequency response and the capability of eliminating all pure tone components not cancelled by the microphone. One such filter was investigated and was found to be somewhat successful in achieving this goal. An AD phase of the whine filter development is expected to begin in FY-76.

DE- *Microphones; *Noise reduction; *Aircraft noise; *Intercommunication systems; *Earphones; Intelligibility; Acoustic filters; Helmets; Hearing; Helicopters; Suppressors; Noise analyzers; Cancellation; Frequency response; Cargo aircraft
ID- CH-47 aircraft; H-47 aircraft; NTISDODXA; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 68B (Environmental Pollution and Control--Noise Pollution and Control)

AZ- 0510642
AA- <NTIS> AD-A013 101/1/XAB
TI- Crew Stress and Fatigue in Prolonged Helicopter Missions. The Crested Rooster Program
TI- <NOTE> Final rept. Jan-Jun 74
AU- Bollinger, R. R. ; Crigler, J. C. ; Hartman, B. O.
CS- School of Aerospace Medicine Brooks AFB Tex
CS- <CODE> 317000
RN- SAM-TR-75-15
CN- AF-7930; 793009
PY- Jun 75
PG- 28p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7520
AB- Aircrew stress and fatigue are being evaluated throughout prolonged helicopter (HH-53C) flights, as part of joint research by the School of Aerospace Medicine and the AF Satellite Control Facility (SAMSO, Los Angeles, Calif.). Data concern such factors as: Crew comfort modifications; Fatigue and sleep; Feeding systems; Workload; Heart rate; Endocrine-metabolic indices of stress; and Effects of a high noise/vibration environment. Information in this report is based on data from single long recovery missions. Tolerance to frequent long flights is not yet known, and will require further study.
DE- *Stress(Physiology); *Stress(Psychology); *Fatigue(Physiology); *Flight crews; Helicopters; Human factors engineering; Sleep; Metabolism; Vibration; Aircraft noise; Endurance(Physiology); Time dependence; Job analysis; Performance(Human); Tolerances(Physiology); Food dispensing
ID- H-53 aircraft; HH-53 aircraft; Workload management; Comfort; Heart rate ; Crested Rooster project; NTISDODXA; NTISDODAF
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0510614
AA- <NTIS> AD-A013 073/2/XAB
TI- Methods for Aircraft State and Parameter Identification
TI- <NOTE> Conference proceedings
CS- Advisory Group for Aerospace Research and Development Paris (France)
CS- <CODE> 400043
SP- North Atlantic Treaty Organization, Brussels (Belgium).
PY- May 75
PG- 436p
NT- Papers presented at a Specialists' Meeting of the Flight Mechanics Panel of AGARD held at NASA Langley Research Center, Hampton, Va., USA on 5-8 November 1974. NATO furnished.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A19/MF A01
JA- GRAI7520
AB- Twenty-nine papers and comments are contained in these Proceedings. Several discuss and compare results obtained with different parameter identification techniques applied to specific fighter aircraft at high angles of attack, subsonic and supersonic transports, VTOL and STOL aircraft, and helicopters. Special problem areas such as systems modelling with high internally-generated fluctuations, aircraft state estimation in non-steady flight and parameter identification for non-linear aerodynamic regimes are covered. The sessions at the Specialists' Meeting were titled mathematical models, instrumentation and filters, flight test techniques, analysis of flight test data, rotorcraft parameter identification and selected topics.
DE- *Aircraft; *Aerodynamics; Jet fighters; Short takeoff aircraft; Vertical takeoff aircraft; Transport aircraft; Supersonic aircraft; Helicopters; Flight instruments; Flight testing; Mathematical models; NATO
ID- NTISDODSD
SH- 51GE (Aeronautics and Aerodynamics--General)

AZ- 0507172
AA- <NTIS> AD-A012 084/0/XAB
TI- A Transitional Design Study of the Position and Azimuth Determining System (PADS)
TI- <NOTE> Final rept

AU- Weber, W. S.
CS- Litton Systems Inc Woodland Hills Calif Guidance and Control Systems Div
CS- <CODE> 401044
SP- Army Engineer Topographic Labs., Fort Belvoir, Va.
RN- G/CSD-402 392; ETL-0001
CN- DAAK02-74-C-0193
PY- Jan 75
PG- 71p
NT- See also AD-A012 085.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7518
AB- This report summarizes the results of a Position and Azimuth Determining System (PADS) transitional design study conducted to provide significant operational reliability, maintainability, and human factors engineering advancements over the prototype PADS. Included among the results of this effort are the elimination of the Velocity Reference Unit (VRU) used in the prototype PADS (thus reducing the prototype weight by more than 50 percent), a preliminary design of a PADS pallet, and a new power supply design which provides the PADS the added flexibility of full-time operation in an OH-58A Light Observation Helicopter. In addition, qualification tests were performed on the PADS unique 32-speed azimuth resolver, and the Inertial Measurement Unit (IMU) calibration equations were reviewed.
DE- *Position finding; *Inertial measurement units; Modification; Pallets; Reliability(Electronics); Maintainability; Power supplies; Calibration
ID- PADS(Position and Azimuth Determining System); Position and azimuth determining system; NTISDODA
SH- 76C (Navigation, Guidance, and Control--Navigation and Guidance System Components)

AZ- 0507089
AA- <NTIS> AD-A012 001/4/XAB
TI- Helicopter Display Improvement Study
TI- <NOTE> Final rept
AU- Clark, W. E. ; Intano, G. P.
CS- Instrument Flight Center Randolph AFB Tex
CS- <CODE> 407583
RN- IFC-TN-75-1
CN- IPIS-CDG-PFH-1
PY- May 75
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7518
AB- This Technical Note, IFC-TN-75-1, presents the results of the USAF Instrument Flight Center Helicopter Display Improvement Study (CDG-PFH-1). A representative cross-section of active duty Air Force Helicopter Pilots were sampled by means of a questionnaire. The returned questionnaires provide a data base of approximately 20% of the active helicopter force. Pilots responded to questions directed at their current instrument panels, as well as future panel designs with instrument location, lighting, and operation being addressed. Specific displays were also treated in that pilots were asked to rate their attitude indicators, altimeters, heading indicators and airspeed displays. The desirability of stability augmentation systems, as well as the priority the pilots place on augmenting the various axes is also established. The remaining questions treated helicopter flight directors, tape displays, navigation systems and the control and performance concept of instrument flying.
DE- *Helicopters; *Flight instruments; *Display systems; Flight control systems; Attitude indicators; Instrument panels; Human factors engineering; Pilots; Questionnaires; Reaction(Psychology)
ID- NTISDODAF
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0505362
AA- <NTIS> AD-A011 244/1/XAB
TI- Development of a Prototype Experimental Plan to Evaluate Stabilized Optical Viewing Devices: I. Inflight Measures of Visual Acuity
TI- <NOTE> Final rept
AU- Glick, D. D. ; Wiley, R. W. ; Guedry, F. W. ; Hixson, W. C.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
SP- Naval Aerospace Medical Research Lab., Pensacola, Fla.
RN- USAARL-75-12; NAMRL-1213
PY- Apr 75
PG- 20p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7517
AB- An improved XM-76 stabilized viewing device was tested in a scout helicopter flight scenario. Target acquisition performance was significantly correlated with the airsickness ratings of an onboard experimenter. Since there was no significant difference between the magnitude of the symptoms observed when the device was stabilized and the magnitude when caged, the stabilization feature proper could not be identified as a problem source. Parts II and III of the report will deal with inflight measures of airsickness potential and the laboratory evaluation of individual susceptibility to airsickness respectively.
DE- *Motion sickness; *Target acquisition; Human factors engineering; Gyro stabilizers; Visual perception; Performance(Human); Display systems; Optics; Experimental data; Helicopters; Vertigo; Signs and symptoms; Pathology; Vestibular apparatus
ID- *Viewers; Evaluation; Recommendations; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0503467
AA- <NTIS> AD-A010 867/0/XAB
TI- An Analysis of the Need for a Coast Guard Search and Rescue Facility
TI- <NOTE> Master's thesis
AU- Hollemon, K. C.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- Jun 75
PG- 138p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A07/MF A01
JA- GRAI7516
AB- This study is a step-by-step process for examining the need and probable effectiveness of new Coast Guard facilities. The vehicle for the study is a proposed Coast Guard Air Station to be located at Arcata, California, but the process is adaptable to any locale or any type of SAR facility. Data from historic SAR incidents was analysed and the SAR environment of the area to be served by the air station was simulated. The study indicated that the air station will reduce response time to maritime SAR incidents 15 to 25 minutes without considering possible delays caused by low visibility at the Arcata airport. Additional study in specific areas was recommended.
DE- *Coast Guard; *Search and rescue; *Military facilities; Air sea rescues ; Helicopters; Weather; Computerized simulation; Computer programs; Theses; California
ID- Arcata(California); NTISDODN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0503434
AA- <NTIS> AD-A010 834/0/XAB
TI- Evaluation of an Integrated Electronic Instrument Display for Helicopter Hover Operations Using a Six-Degree-of-Freedom Fixed-Base Simulation
TI- <NOTE> Master's thesis
AU- Ammerman, L. R.
CS- Naval Postgraduate School Monterey Calif
CS- <CODE> 251450
PY- Mar 75
PG- 95p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Thesis
PC- PC A05/MF A01
JA- GRAI7516
AB- The report discusses the development and evaluation of an integrated electronic instrument display designed to help alleviate pilot work load and improve aircraft control during the precision hover task while flying solely by reference to instruments. The evaluation uses a hybrid computer system to implement a six=degree-of-freedom fixed-base simulation of the SH-2F helicopter and a graphics processor to generate the integrated instrument display. Evaluation pilots were asked to rate the integrated display against conventional flight instruments after flying a simulated night over-water rescue mission. The evaluation revealed that the simulated aircraft dynamics were susceptible to pilot induced oscillations in a hover and, therefore, unsatisfactory for use

as an evaluation tool. In general, the evaluation pilots considered the integrated display preferable to conventional cockpit instruments; however, further study is recommended since meaningful quantitative data were not obtained.
DE- *Display systems; Instrument flight; Helicopters; Cockpits; Flight instruments; Integrated systems; Instrumentation; Hovering; Computerized simulation; Computer programs; Theses; FORTRAN; Degrees of freedom
ID- Evaluation; Six degrees of freedom; SH-2F aircraft; H-2 aircraft; FORTRAN 4 programming language; NTISDODN
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0498159
AA- <NTIS> AD-A009 507/5/XAB
TI- Helmet-Mounted Display Implications for Army Aviation
TI- <NOTE> Final rept
AU- Poston, A. M. ; DeBellis, W. B.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-7-75
PY- Mar 75
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7514
AB- This report contains a compilation of information pertaining to helmet-mounted displays (HMDs). The topics discussed include methods of mounting the HMD, methods of resolving the line of sight, methods of presenting information, fields of view and weight considerations. Comparisons are made between HMD display techniques and other display methods. Various ramifications of implementing an HMD into U.S. Army helicopters are considered.
DE- *Army aviation; *Display systems; All weather aviation; Night vision devices; Systems engineering; Human factors engineering; Line of sight; Target acquisition; Instrumentation; Mission profiles; Images
ID- *Helmet mounted display systems; Visual field; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0498073
AA- <NTIS> AD-A009 421/9/XAB
TI- Air Bag Protection of the Gunner in the U.S. Army Cobra AH-1Q
TI- <NOTE> Final rept
AU- Loushine, T. M.
CS- Army Materiel Command Texarkana Tex Intern Training Center
CS- <CODE> 408058
SP- Texas A and M Univ. Graduate Center, College Station.
RN- USAMC-ITC-02-08-75-411
PY- Apr 75
PG- 61p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7514
AB- The new version of the U.S. Army Cobra attack helicopter, the AH-1Q, makes use of a new rigid column sighting device. This rigid column introduces a serious hazard to the gunner who may come in contact with it during a crash. This report looks at the possibility of using an inflatable air bag to protect the gunner from sight inflicted injury. An overall description of the mechanics and reliability of the air bag, as found in present day automobiles, is included to give the reader a basic understanding of how air bags work. With this understanding, various considerations are made as to how an air bag system, similar to an automobile air bag system, could be designed into the gunner position of the AH-1Q.
DE- *Helicopters; *Gun mounts; *Protective equipment; *Human factors engineering; Inflatable structures; Bags; Safety; Gunners; Gases; Army aircraft; Reliability
ID- *Air bags; AH-1Q aircraft; H-1 aircraft; Huey Cobra; Design; Helicopter gunships; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0496322
AA- <NTIS> AD-A009 316/1/XAB
TI- An Evaluation for the Location and Type of Hand Portable Fire Extinguisher Used on Board the AH-1 Army Helicopter
TI- <NOTE> Final rept
AU- Jones, J. R.

CS- Army Materiel Command Texarkana Tex Intern Training Center
CS- <CODE> 408058
SP- Texas A and M Univ. Graduate Center, College Station.
RN- USAMC-ITC-02-08-75-408
PY- Apr 75
PG- 48p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7513
AB- The report evaluates various extinguishing agents for their desirability during inhabitable helicopter cockpit fires and states the most desirable agent as being Halon 1301. Graphs illustrating the concentration of Halon 1301 (% by volume) vs. time (seconds) for two extinguisher discharge conditions are presented. The applicability of the Air Force design criteria for fire extinguisher placement in the Army AS-1 helicopter is evaluated. The utilization of fire extinguishers in the Southeast Asia Conflict indicates that locating the extinguisher in the helicopter cockpit is not necessary. Relocation is an alternative to the total removal of the extinguisher and is recommended for safety reasons.
DE- *Fire extinguishers; *Army aircraft; *Helicopters; Fire extinguishing agents; Cockpits; Relocation; Aviation safety; Halogenated hydrocarbons ; Toxic hazards
ID- Att-1 aircraft; H-1 aircraft; Huey Cobra; Evaluation; Methane/bromo-trifluoro; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 85D (Transportation--Transportation Safety); 57Y (Medicine and Biology--Toxicology)

AZ- 0495432
AA- <NTIS> PB-240 780/7/XAB
TI- The Evaluation of Policy-Related Research in Emergency Medical Services: Volume III. Emergency Medical Services Transportation (A Bibliographic Review)
TI- <NOTE> Final rept. Sep 73-Sep 74
AU- Plaas, H. ; Dodson, D. C. ; King, H. ; Pike, D. H. ; Shipley, F. B.
CS- Tennessee Univ., Knoxville. Bureau of Public Administration.
SP- National Science Foundation, Washington, D.C. Div. of Advanced Productivity Research and Technology.
RN- NSF/RA/S-74-018C
CN- NSF-GI-39338
PY- 30 Aug 74
PG- 83p
NT- Paper copy also available in set of 4 reports as PB-240 777-SET, PC E99. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC A05/MF A01
JA- GRAI7512
AB- The report deals with emergency medical transportation system as it relates to the entire emergency care system and its various subsystems. Transportation system performance measures are discussed and the field of operations research is presented as it applies to and has been used in EMS transportation systems. There is a bibliography of 87 citations.

DE- *Medical services; *Ambulances; Policies; Operations research; Helicopters; Transportation; Bibliographies; Evaluation; Research
ID- *Emergency medical care; Health care delivery systems; NTISNSFRA
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0495430
AA- <NTIS> PB-240 778/1/XAB
TI- The Evaluation of Policy-Related Research in Emergency Medical Services: Volume I. A Selected and Critical Annotated Bibliography
TI- <NOTE> Final rept. Sep 73-Sep 74
AU- Plaas, H. ; Didson, D. C. ; King, H. ; Pike, D. H. ; Shipley, F. B.
CS- Tennessee Univ., Knoxville. Bureau of Public Administration.
SP- National Science Foundation, Washington, D.C. Div. of Advanced Productivity Research and Technology.
RN- NSF/RA/S-74-018A
CN- NSF-GI-39338
PY- 30 Aug 74
PG- 455p
NT- Paper copy also available in set of 4 reports as PB-240 777-SET, PC E99. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

DT- Bibliography
PC- PC A20/MF A01
JA- GRAI7512
AB- The purpose of this 12-month study was to review the research in emergency medical services and to systematically evaluate the usefulness of such research for policy-making. The purpose of this annotated bibliography is to provide an assessment and critical review of policy-related studies and research which have been undertaken in the field of emergency medical services. It concentrates on research items completed from 1968 to the present and excludes research of a clinical nature other than that which deal with basic resuscitation and maintenance of life. The bibliography emphasizes research materials in transportation, and EMS planning, system models and performance measures. Additional areas such as the hospital emergency department and pre-hospital care are covered but they are not exhaustive and do not represent a clear sample of the available literature on these topics. The bibliography contains 322 citations.
DE- *Medical services; *Bibliographies; Hospitals; Policies; Transportation ; Economics; Systems analysis; Communicating; Helicopters; Regional planning; Education; Research
ID- *Emergency medical care; Health care delivery systems; Health care facilities; NTISNSFRA
SH- 95G* (Biomedical Technology and Human Factors Engineering--Protective Equipment); 91I* (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0494335
AA- <NTIS> AD-A008 320/4/XAB
TI- Dynamic Evaluation of Absolute Altimeter Configurations
TI- <NOTE> Final rept
AU- Johnson, N. A. ; DeBellis, W. ; Antenucci, A. ; Fry, C.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-8-75
PY- Mar 75
PG- 21p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7512
AB- Six absolute altimeter display configurations were evaluated in a dynamic situation. Utilizing a GAT II-H simulator, seven rotary-wing aviators 'flew' two simulated nap-of-the-earth missions using each of the six different altimeters. Performance data was collected on reading speed, reading accuracy and pilot preference. The results indicated a significant difference between altimeters with regard to range, scale changes, and placement of the zero point. Questionnaire and rating scale data indicated strong personal preferences.
DE- *Helicopters; *Terrain following; *Altimeters; Human factors engineering; Flight simulators; Pilots; Reaction time; Analysis of variance; Questionnaires
ID- *Nap of the earth flight; Absolute altimeter; NTISDODA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0494292
AA- <NTIS> AD-A008 277/6/XAB
TI- A Report of HumRRO Activities in Support of Project 'HITVAL'
TI- <NOTE> Research product
AU- Baldwin, R. D. ; Kubala, A. L. ; Foskett, R. J. ; Benson, L. C.
CS- Human Resources Research Organization Alexandria Va
CS- <CODE> 405260
SP- Ballistic Research Labs., Aberdeen Proving Ground, Md.
RN- HUMRRO-RP-WD(TX)-75-3
CN- DAAD05-73-C-0510
PY- Jan 75
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7512
AB- The report describes activities dealing with human factors principles in the preparation and conduct of HITVAL, a Department of Defense field test evaluating the effectiveness of selected antiaircraft gun systems. The test evaluated hit probabilities for four types of non-U.S. antiaircraft guns firing and fixed and rotary wing aircraft. A task analysis was conducted of the crew positions of each gun system, providing a basis for determining the basic psychological skills and the visual and psychomotor skills required for each duty position. Tests were obtained or designed to test individual skills, and questionnaires were designed to obtain self ratings, peer ratings and supervisor ratings of motivation and morale factors. To assist in

assigning the crews for the field test, psychological abilities of each potential crewman were compared with the skills judged to be critical for successful performance of each duty position.
DE- *Job analysis; *Antiaircraft weapons; *Skills; Military training; Motivation; Morale; Radar equipment; Guns; Ratings
ID- NTISDODA
SH- 92A (Behavior and Society--Job Training and Career Development); 92B (Behavior and Society--Psychology); 74A (Military Sciences--Antiaircraft Defense Systems)

AZ- 0494169
AA- <NTIS> AD-A008 154/7/XAB
TI- LAMPS: A Case History of Problems/Design Objectives for an Airborne Data Handling Subsystem
TI- <NOTE> Technical rept
AU- Cattie, H. J. ; Reed, R.
CS- Naval Air Development Center Warminster Pa Systems Analysis and Engineering Dept
CS- <CODE> 403731
RN- NADC-74201-50
PY- 30 May 74
PG- 24p
NT- See also report N75-16257.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7512
AB- The paper is presented to clarify and broaden understanding of the problems relating to computer-based real-time systems. A current U.S. Navy Avionics Data Handling Subsystem aboard a destroyer-based helicopter, will be reviewed as it progressed from the concept evaluation and flight test phases of an engineering test bed, to the present engineering prototype. An analysis of the test bed's positive and negative data handling features are discussed with respect to their influence on the follow-on design. The prevailing philosophies and constraints surrounding such a development impacts the design alternatives while a balancing of hardware/software parameters assists in optimizing system performance.
DE- *Data processing equipment; *Man machine systems; Avionics; Airborne; Helicopters; Integrated systems; Computers; Real time; Command and control systems
ID- LAMPS(Light Airborne Multipurpose Systems); Light airborne multipurpose systems; NTISDODN
SH- 62A (Computers, Control, and Information Theory--Computer Hardware); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0491993
AA- <NTIS> AD-A007 812/1/XAB
TI- Aviator Visual Performance in the UH-1. Study II
TI- <NOTE> Technical rept
AU- Frezell, T. L. ; Hofmann, M. A. ; Snow, A. C. ; McNutt, R. P.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-75-11
CN- DA-3-A-061101-A-91-C
PY- Mar 75
PG- 46p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7511
AB- The study monitored, via the corneal reflection technique, visual performance of Army aviators while flying incline maneuvers in a UH-1 helicopter. Visual performance, to include time and transition information, was gathered over 13 sectors. In addition to visual data, performance measurements were recorded simultaneously on an incremental digital recorder. Results acquired by both techniques are provided.
DE- *Helicopters; *Aircraft landings; *Pilots; *Visual perception; Performance(Human); Psychomotor function; Slope
ID- *Slope landings; *Inclined landings; *Corneal reflection; UH-1 aircraft ; H-1 aircraft; NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0489478
AA- <NTIS> AD-A007 090/4/XAB
TI- Crashworthy Troop Seat Investigation
TI- <NOTE> Final rept

AU- Reilly, M. J.
CS- Boeing Vertol Co Philadelphia Pa
CS- <CODE> 403682
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va. Eustis Directorate.
RN- D210-10778-4; USAAMRDL-TR-74-93
CN- DAAJ02-72-C-0077; DA-1-F-162205-A-529
PY- Dec 74
PG- 343p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A15/MF A01
JA- GRAI7510
AB- The purpose of this investigation was to perform a research program for the development, analytical verification, mockup evaluation, and comparison of designs for practical crashworthy forward-, aft-, and side-facing troop seating systems for U.S. Army helicopters. Tasks performed during the program included a literature survey, military organization survey, and questionnaire distribution to obtain data on existing seats, restraint systems, accommodation and human factors requirements, mathematical simulation of crash force attenuation, and energy attenuator development. These data were used in developing 19 crashworthy troop seat concepts and several restraint systems applicable to troop use.
DE- *Helicopters; *Aircraft seats; *Army aircraft; *Safety belts; *Human factors engineering; Safety; Dynamic tests; Crash resistance; Impact tests; Military requirements; Loads(Forces); Military equipment; Clothing; Soldiers; Crash injuries
ID- *Crashworthiness; Design criteria; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0486951
AA- <NTIS> AD-A006 139/0/XAB
TI- Contaminant Evaluation of Helicopter Oxygen System
TI- <NOTE> Progress rept., Mar 74-Aug 74
AU- Kilian, H. J. ; Miller, R. L.
CS- School of Aerospace Medicine Brooks AFB Tex
CS- <CODE> 317000
RN- SAM-TR-74-59
CN- AF-7164; 716416
PY- Dec 74
PG- 13p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7509
AB- A new aircrew oxygen delivery system using multiple sodium chlorate oxygen generators was tested for contaminant offgassing to assure physiological compatibility under anticipated use conditions. Measurements were made of oxygen flow, temperature, pressure, purity, and contaminant analyses for chlorine, carbon monoxide, carbon dioxide, total hydrocarbons, and water vapor in the breathing oxygen. The system met all specifications for oxygen purity and contaminant content under both normal and emergency use conditions.
DE- *Oxygen; *Helicopters; Respiration; Contaminants; Assessment; Generators; Chlorates; Candles
ID- Sodium chlorates; NTISDODAF
SH- 95E (Biomedical Technology and Human Factors Engineering--Life Support Systems)

AZ- 0486722
AA- <NTIS> AD-A005 910/5/XAB
TI- SKYHOOK CHURCHILL 1974
TI- <NOTE> Interim rept. 29 Mar 74-17 Jan 75
AU- Pappas, T.
CS- Raven Industries Inc Sioux Falls S Dak Flight Operations Dept
CS- <CODE> 405675
SP- Office of Naval Research, Arlington, Va.
RN- R-1274011
CN- N00014-74-C-0339; NR-211-187
PY- 19 Jan 75
PG- 100p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7509
AB- The 1974 Churchill SKYHOOK program provided sufficient funding and balloons for a total of twelve successful flights. Raven provided a field crew, suspension and rigging hardware, aircraft and helicopter

tracking, parachutes, balloon telemetry and control instrumentation, electronic tracking, and reports and documentation as necessary. The report describes individual flights, equipment used, flight data, and various program data.
DE- *Meteorological balloons; *Stratosphere; Flight testing; Ceiling; Balloon equipment; Tracking; Performance(Engineering); Telemeter systems; Recovery; Canada
ID- SKYHOOK program; NTISDODN
SH- 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

AZ- 0485963
AA- <NTIS> NTIS/PS-75/336/8/XAB
TI- Flight Simulator Training (A Bibliography with Abstracts)
TI- <NOTE> Rept. for 1964-Nov 74
AU- Adams, G. H.
CS- National Technical Information Service, Springfield, Va.
PY- Feb 75
PG- 124p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC N01/MF N01
JA- GRAI7508
AB- Methodology and equipment used in flight simulation for the training of Air Force, Navy, and Army airmen are documented in the bibliography of 119 abstracts. Coverage includes such topics as maneuvering, visual fields and perception, simulator characteristics, flight control and guidance, approach and landings, VTOL, STOL, helicopter operations, pilot performance, training concepts, cost effectiveness, task performance prediction, space shuttles, television equipment, instrument flight, and jet craft dynamics. Physiological and psychological aspects are also discussed. See also the Published Search, NTIS/PS-75/335, Simulators in Education and Training.
DE- *Training simulators; *Bibliographies; Flight simulation; Students; Computerized simulation; Performance evaluation; Specialized training; Education; Training devices; Pilots; Flight simulators; Abstracts
ID- NTISNTIS
SH- 92A* (Behavior and Society--Job Training and Career Development); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0485741
AA- <NTIS> N75-14456/8/XAB
TI- Some Remarks on Using Clear Visors During Night Flights in the Alouette 3
AU- Walraven, J.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
RN- IZF-1974-13; TDCK-64630
CN- A73/KLU/076
PY- 1974
PG- 6p
NT- In Dutch; English Summary. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7508; STAR1305
AB- Wearing an (obligatory) clear visor during night flights in the Alouette III may cause, according to complaints from some pilots, visual discomfort because of reflections from the rim of the visor. It was verified that these reflections cause no reduction of visual functions but that the visibility of the rim might indeed cause some hindrance, particularly during landing operations. Three solutions are suggested: (1) beveling and polishing the rim of the visor, causing a noticeable reduction reflections; (2) using safety glasses; and (3) withdrawing the regulation, at least under the given circumstances, that helicopter pilots should wear the clear visor. (Author)
DE- *Aircraft landing; *Alouette helicopters; *Pilot performance; *Visors; Comfort; Glare; Human factors engineering; Night; Reflection; Rims; Transparence; Visual aids
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0484768
AA- <NTIS> AD-A005 563/2/XAB
TI- Crashworthy Helicopter Gunner's Seat Investigation
TI- <NOTE> Final rept
AU- Reilly, M. J.
CS- Boeing Vertol Co Philadelphia Pa
CS- <CODE> 403682
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va. Eustis Directorate.

RN- D210-10840-1; USAAMRDL-TR-74-98
CN- DAAJ02-73-C-0021; DA-1-F-262209-AH-76; 1-F-262209-AH-7605
PY- Jan 75
PG- 256p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A12/MF A01
JA- GRAI7508
AB- The poor crash-impact performance of seats designed to current military specifications was revealed by the U.S. Army in the early 1960's. It was discovered that numerous seat occupants were being injured during moderate impacts because of inadequate upper torso restraint, inadequate seat strength, absence of any meaningful vertical crash-force attenuation, and inadequate testing criteria. Following extensive design and testing efforts, improved crashworthiness design and testing criteria were developed for Army aircraft seating systems.
DE- *Helicopters; *Gunners; *Seats; *Human factors engineering; Crash resistance; Experimental design; Restraint; Harnesses; Armor plate; Body armor
ID- *Crashworthiness; *Design specifications; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0484764
AA- <NTIS> AD-A005 559/0/XAB
TI- Human Engineering Laboratory Helicopter Acquisition Test (HELHAT)
TI- <NOTE> Final rept
AU- Barnes, J. A.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-20-74
PY- Sep 74
PG- 229p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- GRAI7508
AB- The U.S. Army Human Engineering Laboratory conducted a series of flight tests in 1972 (HELHAT I) and 1973 (HELHAT II) in which the low-level target acquisition performances of combat-trained OH-58 and AH-1 helicopter crewmen were measured. The stationary targets used were both ordnance and high-visibility box-type targets. This study contains all of the data gathered during these tests and also reports on the 25 performance variables measured for each of the 851 recorded target acquisitions. These variables were used to form the linear equations which were analyzed by the use of a step-wise multiple-regression technique in order to identify the variables contributing to stationary target acquisition performance. There were 831 acquisitions recorded during the low-level route reconnaissance flights flown at above the ground levels of 80 to approximately 400 feet and 20 acquisitions recorded during the six nap-of-the-earth 's' search reconnaissance flights flown at above the ground levels of 1 to approximately 40 feet.

DE- *Helicopters; *Aerial reconnaissance; *Target acquisition; Observation; Surface targets; Flight paths; Performance(Human); Analysis of variance ; Human factors engineering
ID- HELHAT 1 operation; HELHAT 2 operation; H-58 aircraft; OH-58 aircraft; H-1 aircraft; AH-1 aircraft; Huey Cobra; NTISDODA
SH- 63F (Detection and Countermeasures--Optical Detection); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0483342
AA- <NTIS> N75-12933/8/XAB
TI- Simulation Study of Intracity Helicopter Operations under Instrument Conditions to Category 1 Minimums
AU- Callan, W. M. ; Houck, J. A. ; Dicarlo, D. J.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TN-D-7786; L-9709
PY- Dec 74
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7507; STAR1304
AB- A fixed-base simulator study was conducted to define pilot workload and task performance associated with instrument flight operations for an intracity helicopter passenger service. Displays considered necessary to provide a minimal capability under Instrument Flight Rules conditions were used to fly a representative commercial helicopter

route structure in the New York area, with each terminal assumed to be equipped with a precision approach guidance system. A cross section of pilots participated as test subjects, and despite the high workload level, the results indicated that for the assumptions employed, minimums of 61 m (200 ft) ceiling and 805 m (0.5 mile) visibility were feasible. (Author)
DE- *Flight simulators; *Helicopters; *Urban transportation; *Visibility; Air traffic control; Instrument approach; Instrument flight rules; Pilot performance; Tracking stations
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0480488
AA- <NTIS> AD-A003 949/5/XAB
TI- Development of an Advanced Display for a Wide Field Night Vision System
TI- <NOTE> Final rept. Jun 72-Jun 74
AU- Attler, A. R. ; Shenker, M. ; Parr, A.
CS- Farrand Optical Co Inc Valhalla N Y
CS- <CODE> 134700
RN- PTR-2115
CN- DAAK02-72-C-0538; FOCI-475
PY- Jun 74
PG- 56p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7506
AB- The program covers the design, development and test of a wide angle version of pupil forming Head-Up Display System. The unit was designed for installation in a UH-1 helicopter cockpit and has the following characteristics: 60 degrees horizontal by 33 degrees vertical field, 2.7 in. x 5.1 in. pupil located at 14 1/4 inches from a curved combiner; the weight is 55 lbs. The unit uses a rectangular CRT (7 in. x 4 1/8 in.) with a fiber optic faceplate having a 6 1/8 in sperical radius focal plane.
DE- Head up displays; Helicopters; Wide range; Cathode ray tubes; Fiber optics; Night vision devices; Cockpits; Beam splitting
ID- H-1 helicopters; UH-1 helicopters; NTISDODA
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0480456
AA- <NTIS> AD-A003 917/2/XAB
TI- Helicopter Lift Margin System
TI- <NOTE> Final rept
AU- Edgerton, B. W. ; Williams, S. B.
CS- Trans-Sonics Inc Burlington Mass
CS- <CODE> 352400
SP- Joint Army-Navy Aircraft Instrumentation Research Project, Washington, D.C.
RN- S. O.-80003; JANAIR-731003
CN- N00014-72-C-0001; NR-213-067
PY- Dec 74
PG- 47p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7506
AB- Helicopter power requirements are generally maximum when hovering out of ground effect. Thus, takeoff and landing maneuvers are the most critical, since the power requirements may not be clear to the pilot at the time he must make the corresponding decisions. Power deficiencies at takeoff or landing are very hazardous. To maximize safety of takeoff and landing operations, a system has been devised which presents to the pilot his lift margin, a figure which represents the excess weight which could be accommodated under locally-existing barometric pressure, outside-air-temperature conditions, and engine and rotor system conditions.
DE- *Helicopters; *Lift; *Power levels; Hovering; Instrumentation; Avionics ; Digital systems; Specifications
ID- NTISDODN
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0479136
AA- <NTIS> N75-10106/3/XAB
TI- Nasa-Langley Helicopter Tower Instrumentation Systems
AU- Stoffel, S. W.
CS- Wyle Labs., Inc., Hampton, Va. Scientific Services and Systems Group.
RN- NASA-CR-132522; REPT-50601

CN- NAS1-12841
PY- Oct 74
PG- 118p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7505; STAR1301
AB- Background information is presented for the helicopter rotor test facility, in preface to a more detailed discussion of major subsystems equipment, including error considerations, frequency response, and display instrumentation.
DE- *Helicopter design; *Measuring instruments; *Test facilities; *Towers; Display devices; Frequency response; Instrument errors; Rotary wings
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0478368
AA- <NTIS> AD-D000 030/7/XAB
TI- Helicopter Lift Margin Determining System
TI- <NOTE> Patent
AU- Edgerton, B. W. ; Williams, S. B. ; Westcott, V. C.
CS- Department of the Navy Washington D C
CS- <CODE> 110050
RN- PAT-APPL-281 079; PATENT-3 754 440
PY- Filed 16 Aug 72 patented 28 Aug 73
PG- 15p
NT- Supersedes PAT-APPL-281 079.
NT- Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7505
AB- The patent concerns a systems for determining in flight and continuously indicating to a helicopter pilot the lift margin of his craft. Lift margin is the difference between the maximum available lift and the effective gross weight, both expressed in pounds, and is obtained from the ratio of lift to horsepower and the variation of the relative performance of the engine under ambient conditions. Input parameters of topping torque, hover torque, outside air temperature, static pressure, fuel weight, and rotor speed are both theoretically and empirically derived and combined to obtain maximum available lift and effective gross weight.
DE- *Patents; *Helicopters; *Flight instruments; Lift; Analog computers; Display systems; Aviation safety; Human factors engineering
ID- *Lift margin; *Aircraft onboard checkout systems; PAT-CL-73-178-H; NTISGPN
SH- 90GE (Government Inventions For Licensing--General); 51C (Aeronautics and Aerodynamics--Aircraft); 85A (Transportation--Air Transportation); 85D (Transportation--Transportation Safety); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0476505
AA- <NTIS> AD-A002 423/2/XAB
TI- Aircrew Protective Clothing and Devices System (Rotary Wing Aircraft)
TI- <NOTE> Phase rept
AU- Winsko, S. J. ; Hellman, A. S.
CS- Naval Air Development Center Warminster Pa Crew Systems Dept
CS- <CODE> 406610
RN- NADC-74215-40
CN- W4567001
PY- 1 Nov 74
PG- 67p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7504
AB- A study was conducted to portray the major mission profiles in which the helicopter community is engaged, and by so doing, to identify the problem areas associated with the current inventory of helicopter aircrew protective equipment toward fulfilling the requirements of these missions. The ultimate objective of this effort is to provide a sound basis from which a series of separate but coordinated engineering developments will be conducted to provide a new generation of mission-specific protective systems for the helicopter community. The net effect of the program will be to enhance the inflight performance and effectiveness of all helicopter aircrewmen with little or no sacrifice to their safety in the event of an emergency situation.
DE- *Protective clothing; *Protective equipment; *Search and rescue; *Helicopters; Flight crews; Emergencies; Safety; Protection; Helmets; Life rafts; Life preservers; Mobility; Thermal insulation; Naval aircraft; Mission profiles
ID- NTISDODN

SH- 74E (Military Sciences--Logistics, Military Facilities, and Supplies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0474405
AA- <NTIS> AD-A001 683/2/XAB
TI- Aviator Performance During Local Area, Low Level and Nap-of-the-Earth Flight
TI- <NOTE> Final rept
AU- Kimball, K. A. ; Frezell, T. L. ; Hofmann, M. A. ; Snow, A. C.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-75-3
PY- Sep 74
PG- 25p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7503
AB- The paper presents baseline data concerning aviator performance and aircraft state variables during local area, low level and nap-of-the-earth flights. Further, information is provided concerning differences in aviator control inputs per unit of time across the three profiles. From the data, it is evident that NOE flight places more demands on both crews and aircraft than the other two types of flight.
DE- *Pilots; *Stress(Psychology); *Terrain following; *Tactical reconnaissance; Flight instruments; Performance(Human); Army aircraft; Helicopters
ID- UH-1H aircraft; H-1 aircraft; HIMS(Helicopter Inflight Monitoring Systems); Helicopter inflight monitoring systems; Performance tests; NTISDODA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 0473389
AA- <NTIS> AD-A001 544/6/XAB
TI- Review of the U.S. Army Aeromedical Research Laboratory Conference on Aeromedical Evacuation Held on 15-16 January 1974
AU- Pettyjohn, F. S. ; Nagel, E. L.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-75-4
PY- Aug 74
PG- 62p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A04/MF A01
JA- GRAI7502
AB- The U.S. Army Aeromedical Research Laboratory has supported the helicopter medical evacuation mission throughout its rapid growth. The concept of dedicated evacuation helicopters and crews has been well proven during the Vietnam Conflict. Concurrent with this development has been the rapid emergence of the civilian emergency medical services within the Continental U.S. The utilization of the military helicopter in a joint role with the civilian community, the Military Assistance to Safety and Traffic, as well as in its combat evacuation role requires combined emphasis and upgrading of medical equipment and procedures.
DE- *Aeromedical evacuation; *Military medicine; *Meetings; Medical equipment; Medical services; Helicopters; Rescues; Civilian population
ID- Emergency medical care; NTISDODA
SH- 74G (Military Sciences--Military Operations, Strategy, and Tactics); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0473372
AA- <NTIS> AD-A001 527/1/XAB
TI- U.S. Army Human Engineering Laboratory Helicopter Cockpit Lighting Study. Phase I. An Evaluation of Current and Potential Instrument Panel Lighting Techniques for Use in Army Helicopters
AU- Stowell, H. R. ; Poston, A. M.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-7-74
PY- Aug 74
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A03/MF A01
JA- GRAI7502
AB- The objective of the study is to evolve lighting specifications which will alleviate current cockpit lighting problems. The objective of this phase was to quantitatively identify the problems with current lighting systems in Army helicopters. It also investigated the potential improvements afforded by some of the state-of-art lighting techniques. Luminance measurements were made at various points on instrument dial faces. Results are shown in tabular and pictorial forms. The results also showed that the current techniques of post and eyebrow lighting are unacceptable. From a comparison of all the techniques examined, the circular wedge technique gave the best light distribution. Illuminance measurements were made at the pilots' eye positions for use in other phases of the lighting study.
DE- *Instrument panels; *Illumination; *Helicopters; Human factors engineering; Specifications; Lighting equipment; Cockpits; Luminosity; Visibility; Army aircraft
ID- NTISDODA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0472652
AA- <NTIS> AD-A000 801/1/XAB
TI- An Advanced Instrumentation and Data Analysis System for Army Flight Testing
TI- <NOTE> Study rept. 15 May-10 Jul 73
AU- Lewis, R. B.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-74-94
PY- Jul 73
PG- 27p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7502
AB- This study introduces the United States Army Aviation Systems Test Activity, its helicopter engineering flight test mission, a state-of-the-art Advanced Instrumentation and Data Acquisition System, and results from a number of recent test programs. Five years ago, it was recognized that to conduct tests in new technical areas and to meet the increasing desire for rapid data analysis and reporting, improved methods of data acquisition and handling were required. As a result, an Advanced Instrumentation and Data Acquisition System, known as AIDAS, was specified and procured. The first delivery of equipment occurred in the summer of 1970. AIDAS consists of airborne instrumentation and data recording components, ground-based playback equipment, and computers for data analysis.
DE- *Flight testing; *Data processing; Data acquisition; Data management; Recording systems; Instrument flight; Instrumentation; Data storage systems
ID- AIDAS computer program; H-6 aircraft; OH-6A aircraft; H-58 aircraft; OH-58A aircraft; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0469067
AA- <NTIS> AD-787 428/2/XAB
TI- Rotor Flow Survey Program UH-1M Helicopter
TI- <NOTE> Final rept
AU- Boirun, B. H. ; Jefferis, R. P. ; Holasek, R. S.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-72-05
CN- DA-1-M-262303-A-214
PY- May 74
PG- 75p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7426
AB- Tests were conducted to determine the rotor wake boundaries and to measure the instantaneous airflow in a test volume adjacent to a UH-1M helicopter under actual flight conditions. The primary test volume of interest was a 4 by 5 by 6-foot box forward of the weapons- mount location. Airflow data were measured by a rake containing 7 split-film total vector anemometers during steady forward airspeeds ranging from hover to 90 knots true airspeed. Flight testing was terminated after one productive flight because of failure of the anemometer instrumentation. However, the data obtained prior to the sensor failure appeared to be of good quality and are presented for analysis. A second test on an AH-1G helicopter is planned, when a correction for the sensor failures is determined. The UH-1M airflow testing was conducted

during April and June 1973. (Author)
DE- *Helicopters; *Helicopter rotors; *Flow fields; Rotor blades(Rotary wings); Wake; Autorotation; Vibrational spectra; Air flow; Airspeed
ID- H-1 aircraft; UH-1M aircraft; NTISDODA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0468950
AA- <NTIS> AD-787 311/0/XAB
TI- Self-ropelled Aircraft Maintenance Crane User Evaluation Report
TI- <NOTE> Final rept. 28 Oct 73-10 Jun 74
AU- Allen, K. W.
CS- Modern Army Selected Systems Test Evaluation and Review Fort Hood Tex
CS- <CODE> 406662
SP- Army Aviation Systems Command, St. Louis, Mo.
RN- MASSTER-TEST-FM-195A
PY- 20 Sep 74
PG- 52p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7426
AB- The user evaluation of a commercial self-propelled hydraulic crane was conducted by MASSTER from 28 Oct 73 to 10 Jun 74 to determine if the crane was operationally acceptable or needed modification to perform aircraft maintenance. After the test began, production of the crane was terminated. Testing was continued to determine characteristics that might be desirable in a successor crane. The crane, with a 10,000-pound capacity winch, was acceptable for aircraft maintenance. A few human factors engineering changes are recommended. Any successor crane should be tested to determine its ability to perform aviation maintenance. (Author)
DE- *Aircraft maintenance; *Cranes; Helicopters; Maintenance vehicles; Self propelled; Performance(Engineering); Human factors engineering
ID- NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0466116
AA- <NTIS> AD-786 565/2/XAB
TI- Nuclear Helicopter Air Density Indicating System Flight Test Program
AU- Blincow, D. W.
CS- Tyco Labs Inc Pomona Calif General Nucleonics Div
CS- <CODE> 405000
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va.
RN- ER-9016; USAAMRDL-TR-74-19
CN- DAAJ02-73-C-0015; DA-1-F-162203-A-434; 1-F-162203-A-43405
PY- May 74
PG- 69p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7425
AB- This report describes the design, construction, and testing of the Nuclear Helicopter Air Density Indicating (NUHADI) system. The NUHADI measures the scattering of X-rays, generated by an isotopic source, from the air volume outside the helicopter. The number of X-rays backscattered into the detector is proportional to the number of molecules per unit volume, i.e., the air density. The air scatter signal is compared to an internal signal, from the same source, during each cycle to provide a continuous self calibration. (Modified author abstract)
DE- *Helicopters; *Lift; *Atmospheric density; Air; X rays; Dosimetry; Radiation measuring instruments; Flight testing
ID- NUHADI system; NTISDODA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics); 77E (Nuclear Science and Technology--Nuclear Instrumentation); 55E (Atmospheric Sciences--Physical Meteorology)

AZ- 0466051
AA- <NTIS> AD-786 500/9/XAB
TI- Applications of Helicopter Mockups to Maintainability and Other Related Engineering Disciplines
TI- <NOTE> Final rept
AU- Hawkins, E. D.
CS- Army Materiel Command Texarkana Tex Intern Training Center
CS- <CODE> 408058
SP- Texas A and M Univ. Graduate Center, College Station.
RN- USAMC-ITC-02-08-73-105
PY- Mar 74
PG- 58p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S.

customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7425
AB- The purpose of the study is to present applications of helicopter mockups to the engineering disciplines involved in the design. The paper consists of a series of examples and suggestions, discussing how mockups can be used for: (1) Integration and coordination between customer/contractor/subcontractor/vendor levels; (2) coordination between engineering design and support groups at the contractor level; (3) improved design and demonstration of human factors and maintainability related functions. Proper application of mockups results in a savings of time, materials, and money during the later states of development. The final outcome is a more cost effective project. (Author)
DE- *Helicopters; *Manufacturing; *Models; Maintainability; Human factors engineering; Cost effectiveness
ID- *Mock ups; *Design; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 94A (Industrial and Mechanical Engineering--Production Planning and Process Controls)

AZ- 0462267
AA- <NTIS> AD-785 542/2/XAB
TI- Air Scout Night Goggle Test
TI- <NOTE> Final rept
AU- Bauer, R. W. ; Pettit, G. D.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-14-74
PY- Jul 74
PG- 31p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7423
AB- A night target detection/recognition test was developed to follow a daylight air reconnaissance test. The night flights were flown in a modified OH-58 helicopter about 30 meters above ground level by pilots trained to use night vision goggles. Detection/recognition scores and ranges are compared among day flights, night flights with no visual aids for the copilot-observers and night flights with observations aided by night vision goggles. User comments on the total system are reported in some detail. (Modified author abstract)
DE- *Goggles; *Night vision; *Aerial reconnaissance; Target detection; Target recognition; Helicopters; Human factors engineering; Test methods; Performance(Human); Day; Low altitude
ID- Comparison; NTISDODA
SH- 63F (Detection and Countermeasures--Optical Detection)

AZ- 0459220
AA- <NTIS> AD-784 132/3/XAB
TI- Model 301 HLH/ATC (Heavy Lift Helicopter/Advanced Technology Component) Transmission Noise Reduction Program
TI- <NOTE> Final rept
AU- Hartman, R. ; Badgley, R.
CS- Boeing Vertol Co Philadelphia Pa
CS- <CODE> 403682
SP- Army Air Mobility Research and Development Lab., Fort Eustis, Va.
RN- USAAMRDL-TR-74-58
CN- DAAJ01-71-C-0840
PY- May 74
PG- 176p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7422
AB- The report presents the results of a transmission noise reduction program. The emphasis of the program is to reduce transmission noise at its source. The program included a dynamic test of a CH-47C helicopter transmission with internal instrumentation to measure strains, displacements, and accelerations of rotating components and external instrumentation to measure case acceleration and noise levels. Test results were used to verify prediction methodology which in turn was used to analyze the dynamic response of the Heavy Lift Helicopter (HLH) transmission components. (Modified author abstract)
DE- *Transmissions(Mechanics); *Noise reduction; Helicopters; Aircraft noise; Dynamic response
ID- Boeing 301 aircraft; Heavy lift helicopters; CH-47C aircraft; H-47 aircraft; NTISDODA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0456286
AA- <NTIS> N74-27504/1/XAB
TI- Noise Levels in the CH-113A and Cuh-in Helicopter
AU- Strong, R. A. ; Crabtree, R. B.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Behavioural Sciences Div.
RN- DCIEM-73-R-993
PY- Dec 73
PG- 10p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7420; STAR1217
AB- Noise levels were measured on board the CUH-IN and CH-113A helicopters. Properly fitted flight helmets provide adequate hearing protection for personnel in the cockpits of both aircraft and in the cargo/passenger area of the CUH-IN. However ear plugs or ear muffs do not provide adequate hearing protection for flight exceeding two hours in the cargo/passenger area of the CH-113A. (Author)
DE- *Acoustic measurements; *Aircraft noise; *Helicopters; *Human tolerances; Ear protectors; Human factors engineering; Noise intensity; Noise propagation
ID- NTISNASA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0449816
AA- <NTIS> N74-21663/1/XAB
TI- Problems of Pilot-Automatic Control Interactions in Flight Control das Problem des Zusammenwirkens von Flugzeugfuehrer und Regler in der Flugfuehrung
AU- Dey, D. ; Kirchhoff, U.
CS- Technische Univ., Berlin (West Germany). Inst. fuer Luft- und Raumfahrt.
RN- ILR-4-1973
PY- May 73
PG- 134p
NT- Language in German. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7417; STAR1213
AB- The problems in pilot-controller interaction are discussed from the viewpoints of blind landing automation for CTOL aircraft and stabilization of VTOL aircraft. For the optimization of the task division between pilot and automation, the properties and capabilities of the human being were compared with those of the technical controller. Optimization criteria for the design of a flight control system are requirements of safety, performance, and economy. Based on the complementary properties of the pilot and the automatic system, a strong man-machine integration is proposed, and the model representations of a hierarchical systems structure for systematic design of flight control systems is described. The hierarchy model is applied to the guidance simulation study of a hovering VTOL aircraft.
DE- *Automatic flight control; *Blind landing; *Pilot performance; *Vertical landing; Aircraft landing; Controllers; Man machine systems
ID- NTISNASA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0446749
AA- <NTIS> AD-779 852/3/XAB
TI- Design Criteria for Airborne Map Displays. Volume II. Design Criteria
TI- <NOTE> Final rept
AU- Carel, W. L. ; Hershberger, M. L. ; Herman, J. A. ; McGrath, J. J.
CS- Hughes Aircraft Co Culver City Calif Display Systems and Human Factors Dept
CS- <CODE> 405763
RN- HAC-REF-C2151-003-VOL-2; JANAIR-731101-VOL-2
CN- N00014-71-C-0070; NR-213-075
PY- Mar 74
PG- 182p
NT- Prepared in cooperation with Anacapa Sciences, Santa Barbara, Calif. See also Volume 1, AD-779 851.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7416
AB- This is the final report of research conducted under ONR contract N00014-71-C-0070, NR 213-075 entitled Development of Design Criteria for Projected Map Displays. Volume 2 consists of the statement of the

design criteria. The criteria described are grouped under two main headings: (1) The Displayed Map Image and (2) Other Design Issues. Criteria appropriate to the displayed map image were developed from operational requirements and from legibility requirements. Criteria appropriate to other design issues deal with features of map displays that are not directly related to the displayed map image; i.e., operating modes, controls, updating, and the like.
DE- *Display systems; *Navigational aids; *Aircraft equipment; Maps; Resolution; Contrast; Human factors engineering; Attack bombers; Jet fighters; Helicopters
ID- Design criteria; Legibility; A-7E aircraft; A-7 aircraft; NTISN
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 76D (Navigation, Guidance, and Control--Navigation Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0446748
AA- <NTIS> AD-779 851/5/XAB
TI- Design Criteria for Airborne Map Displays. Volume I. Methodology and Research Results
TI- <NOTE> Final rept
AU- Carel, W. L. ; McGrath, J. J. ; Hershberger, M. L. ; Herman, J. A.
CS- Hughes Aircraft Co Culver City Calif Display Systems and Human Factors Dept
CS- <CODE> 405763
RN- HAC-REF-C2151-003-VOL-1; JANAIR-731101-VOL-1
CN- N00014-71-C-0070; NR-213-075
PY- Mar 74
PG- 480p
NT- See also Volume 2, AD-779 852. Prepared in cooperation with Anacapa Sciences, Inc., Santa Barbara, Calif.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A21/MF A01
JA- GRAI7416
AB- The work accomplished under the contract is reported in two volumes. Volume I describes the methods used to develop the design criteria and the results of the surveys, analyses, and experimental research conducted in the course of the program. The research is categorized under the following headings: (1) mission requirements analysis, (2) the legibility problem, (3) a survey of contemporary map displays, (4) a survey of users of operational map displays, and (5) a survey of contemporary cartographic support systems. (Modified author abstract)
DE- *Display systems; *Navigational aids; *Aircraft equipment; Maps; Contrast; Resolution; Human factors engineering; Attack bombers; Jet fighters; Helicopters
ID- Design criteria; Legibility; A-7 aircraft; A-7E aircraft; UH-1B aircraft; H-1 aircraft; NTISN
SH- 49E (Electrotechnology--Optoelectronic Devices and Systems); 76D (Navigation, Guidance, and Control--Navigation Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0445785
AA- <NTIS> N74-20659/0/XAB
TI- The Noise Environment of a School Classroom Due to the Operation of Utility Helicopters
AU- Hilton, D. A. ; Pegg, R. J.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TM-X-71957
PY- 24 Apr 74
PG- 16p
NT- Conf-Presented at 87TH Meeting of the Acoust. Soc. Of AM., New York City, 24 Apr. 1974.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7415; STAR1212
AB- Noise measurements under controlled conditions have been made inside and outside of a school building during flyover operations of four different helicopters. The helicopters were operated at a condition considered typical for a police patrol mission. Flyovers were made at an altitude of 500 ft and an airspeed of 45 miles per hour. During these operations acoustic measurements were made inside and outside of the school building with the windows closed and then open. The outside noise measurements during helicopter flyovers indicate that the outside db(A) levels were approximately the same for all test helicopters. For the windows closed case, significant reductions for the inside measured db(A) values were noted for all overflights. These reductions were approximately 20 db(A); similar reductions were noted in other subjective measuring units. The measured internal db(A) levels with the windows open exceeded published classroom noise criteria values; however, for the windows-closed case they are in general agreement with

the criteria values. (Author)
DE- *Acoustic measurements; *Aircraft noise; *Helicopters; *Noise intensity ; *Utility aircraft; Acoustic properties; Human factors engineering; Noise propagation; Noise spectra
ID- NTISNASA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 85A (Transportation--Air Transportation)

AZ- 0444875
AA- <NTIS> AD-779 409/2/XAB
TI- Summary of the Human Engineering Laboratory's Air-to-Ground Target Detection Studies Using Stationary Targets
TI- <NOTE> Final technical note
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-5-74
PY- Mar 74
PG- 12p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7415
AB- Recent events have increased interest in the ranges at which the helicopter crewman can be expected to detect and/or identify a target. Studies of air-to-ground target detection identification have all concluded with essentially the same results; a stationary, passive, noncamouflaged military ordnance type of target can be detected by an observer in a slow speed, 60 knots, low flying, less than 300 feet, helicopter at maximum ranges up to 2000 meters but cannot be reliably identified at ranges greater than 1000 meters.
DE- *Target detection; *Air to surface; *Helicopters; Performance(Human); Targets; Human factors engineering; Low altitude; Low velocity; Range(Distance); Terrain; Foliage; Probability
ID- NTISA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 0442782
AA- <NTIS> AD-778 768/2/XAB
TI- An Experimental Investigation of Vortex Rings and Helicopter Rotor Wakes Using a Laser Doppler Velocimeter
TI- <NOTE> Final technical rept. 7 Jun 72-6 Jun 73
AU- Sullivan, J. P.
CS- Massachusetts Inst of Tech Cambridge Aerophysics Lab
CS- <CODE> 009200
RN- TR-183
CN- N00019-72-C-0450; F44620-69-C-0090; MIT-DSR-80038
PY- Jun 73
PG- 127p
NT- Sponsored in part by Contract DAAB07-71-C-0300.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7414
AB- The report describes a laser Doppler velocimeter (LDV) capable of performing measurements in vortex cores, presents detailed measurements of structure and stability of vortex rings and also presents measurements in the wake of a model helicopter rotor. The use of conventional instrumentation such as hot wire anemometer for measuring velocity in vortex filament is hampered by probe interference and the difficulty of calibrating the probe in a flow field where the velocity is changing rapidly in magnitude and direction. For these reasons, a laser Doppler velocimeter (LDV) is used throughout these experiments. The LDV measures the velocity of smoke particles by measuring the Doppler shift of laser light scattered from the particles. (Modified author abstract)
DE- *Helicopter rotors; *Wake; Vortices; Flow fields; Flow visualization; Laser velocimeters; Doppler systems
ID- *Vortex rings; NTISN
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0434958
AA- <NTIS> AD-776 421/0/XAB
TI- Escape Problems and Manoeuvres in Combat Aircraft
TI- <NOTE> Conference proceedings no. 134
AU- Jones, W. L.
CS- Advisory Group for Aerospace Research and Development Paris (France)
CS- <CODE> 400043
RN- AGARD-CP-134
PY- Feb 74
PG- 121p

NT- Presented at the Aerospace Panel Specialist Meeting. Soesterberg, Netherlands, 4 Sep 73.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A06/MF A01
JA- GRAI7411
AB- The purpose of the session was to delineate the important aspects of the escape problems in helicopters and V/STOL aircraft and to review new concepts in escape technology, including some techniques recently put into operation as well as others under test. An impressive amount of material was covered during the one day session. Fifteen papers were presented. Six of these treated escape problems in conventional and STOL aircraft. Nine presentations treated various aspects of the escape problem in helicopter aircraft. The spectrum of information covered was broad, ranging from biomedical issues in air combat mishaps in high performance aircraft to human factors and engineering aspects of inflight escape in all types of aircraft of concern.
DE- *Escape systems; *Military aircraft; *Meetings; Human factors engineering; Ejection seats; Helicopters; Vertical takeoff aircraft; Aerospace medicine; Bioengineering; Explosive actuators; Aviation safety
ID- NTISSD
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 85D (Transportation--Transportation Safety)

AZ- 0434890
AA- <NTIS> AD-776 353/5/XAB
TI- Soft (Hydrophilic) Contact Lenses in U.S. Army Aviation: An Investigative Study of the Bausch and Lomb Soflens (Trade Mark)
AU- Crosley, J. K. ; Braun, E. G. ; Bailey, R. W.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-74-10
CN- DA-3-A-762758-A-819
PY- Mar 74
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7411
AB- The use of standard acrylic or 'hard' contact lenses has been relatively unsuccessful in the military aviation environment, particularly when worn by personnel flying rotary wing aircraft. The purpose of this study was to evaluate the applicability of one type of hydrophilic lens to U.S. Army aviation. Nineteen volunteer helicopter pilots served as subjects and three specific areas were investigated. These were: clinical procedures, foreign body involvement, and the effect of extended (72 hours) continuous wear. The results indicate that the Soflens offers certain advantages over acrylic lenses for this specialized application. There were, however, distinct problems encountered which may be lessened with the introduction of new lens materials and asepticizing techniques. (Author)
DE- *Eyeglasses; *Optical lenses; Aviation medicine; Visual acuity; Vision; Ophthalmology
ID- *Contact lenses; NTISA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0433045
AA- <NTIS> AD-776 261/0/XAB
TI- Present Capabilities to Modify Warm Fog and Stratus
TI- <NOTE> Technical rept
AU- Moschandreas, D. J.
CS- Geomet Inc Rockville Md
CS- <CODE> 388699
RN- GEOMET-EF-300
CN- N00014-71-C-0271; NR-082-275
PY- 18 Jan 74
PG- 109p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7410
AB- Numerical model simulations, chamber tests, and field experiments are the three scientific approaches used to investigate the modification of warm fog and stratus. This study is an in-depth review of the literature on warm fog dissipation; both theoretical and experimental projects are reviewed and critical comments are made on the reported

claims. Most all the projects on warm fog modification are summarized in various tables while a few are analyzed in a more detailed fashion. Special emphasis is put on the sponsoring agencies; the goals, objectives, and the amounts allocated by the various research sponsoring organizations are also reviewed. The need for greater statistical analysis in evaluating the results of field experiments is noted. Among the numerous techniques used to improve visibility, two are proposed as the most promising: the thermal dissipation of warm fog and stratus, and the combination of the seeding and helicopter techniques. (Modified author abstract)
DE- *Fog; *Weather modification; *State of the art; Cloud seeding; Stratus clouds; Wake; Heating; Computerized simulation; Instrumentation
ID- *Fog dispersal; NTISN
SH- 55F (Atmospheric Sciences--Weather Modification); 48GE* (Natural Resources and Earth Sciences--General)

AZ- 0431304
AA- <NTIS> N74-14765/3/XAB
TI- A Study of the Effect of Flight Density and Background Noise on V/STOL Acceptability
TI- <NOTE> Final Report
AU- Sternfeld, H. ; Hinterkeuser, E. G. ; Hackman, R. B. ; Davis, J.
CS- Boeing Vertol Co., Philadelphia, Pa.
RN- NASA-CR-2197; D210-10662-2
CN- NAS1-11607
PY- Jan 74
PG- 84p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7409; STAR1206
AB- A study was conducted in which test subjects evaluated the sounds of a helicopter, a turbofan STOL and a turbojet airplane while engaged in work and leisure activities. Exposure to a high repetitive density of the aircraft sounds did not make the individual sounds more annoying but did create an unacceptable environment. The application of a time duration term to db(A) resulted in a measure which compared favorably with EPNL as a predictor of annoyance. Temporal variations in background noise level had no significant effect on the rated annoyance. (Author)
DE- *Acoustic measurements; *Acoustic properties; *Aircraft noise; *Short takeoff aircraft; Effective perceived noise levels; Human factors engineering; Psychological effects
ID- NTISNASA
SH- 68B (Environmental Pollution and Control--Noise Pollution and Control); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0430011
AA- <NTIS> AD-774 966/6/XAB
TI- SKYHOOK Churchill 1973
TI- <NOTE> Interim rept. Jan-Dec 73
AU- Pappas, T. ; White, P. S.
CS- Raven Industries Inc Sioux Falls S Dak Flight Operations Dept
CS- <CODE> 405675
RN- R-0174002
CN- N00014-73-C-0456; NR-211-177
PY- 18 Jan 74
PG- 117p
NT- See also AD-732 483.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7409
AB- The program was funded to conduct balloon field operations from Fort Churchill, Manitoba and from Thompson, Manitoba, Canada. The contract also called for the delivery of three balloons to be used in the program. Raven provided a field crew, suspension and rigging hardware, aircraft and helicopter tracking, parachutes, balloon telemetry and control instrumentation, electronic tracking, and reports and documentation as necessary. This report describes individual flights, equipment used, flight data, and various program information. (Author)
DE- *Atmospheric sounding; *Stratosphere; *Meteorological balloons; Balloon equipment; Launching; Tracking; Telemeter systems; Control systems; Flight testing
ID- SKYHOOK program; Fort Churchill(Manitoba); NTISN
SH- 55GE (Atmospheric Sciences--General)

AZ- 0429843
AA- <NTIS> AD-774 797/5/XAB
TI- Performance of Battery BB-641/A in OH-6A Helicopter
TI- <NOTE> Research and development technical rept

AU- Duze, S.
CS- Army Electronics Command Fort Monmouth N J
CS- <CODE> 037620
RN- ECOM-4190
CN- DA-1-S-762705-AG-94; 1-S-762705-AG-94-P-2
PY- Feb 74
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7409
AB- Instrumentation was devised at ECOM to simultaneously monitor the voltage, current, and temperature of a battery during start and flight of an aircraft. Data were collected continuously on a tape recorder so that any portion of the flight could be replayed in the laboratory. A portable oscilloscope was connected to the output terminals of the tape recorder to check its operation during flight of the aircraft. Battery BB-641/A, a 24 V, 13 Ah nickel-cadmium battery used in the OH-6A Helicopter, was selected for this investigation. After flight information was collected on the tape recorder, it was played back into a memory oscilloscope in the Laboratory and significant portions of the information were photographed. In addition, continuous written record of the data was obtained by replaying the tapes back on a recording voltmeter. This information can be used to determine the adequacy of the battery under its assigned conditions of location and performance in the aircraft, and various battery designs in the aircraft can be more positively evaluated. (Modified author abstract)
DE- *Nickel cadmium batteries; *Helicopters; Performance(Engineering); Aircraft equipment; Instrumentation; Monitors; Temperature; Voltage; Electric current; Tape recorders; Oscilloscopes
ID- Performance evaluation; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0428209
AA- <NTIS> AD-774 764/5/XAB
TI- Ship-Helicopter System Analysis
TI- <NOTE> Final rept. 16 May-30 Nov 73
AU- Egen, R. A. ; Minor, J. C. ; Cress, H. A.
CS- Battelle Columbus Labs Long Beach Calif Long Beach Research Facility
CS- <CODE> 407629
RN- USCG-D-44-74
CN- DOT-CG-23223-A; CG-741260
PY- 7 Dec 73
PG- 40p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7408
AB- The objective of the report is to identify limitations to Coast Guard ship-helicopter (ship/helo) operations on WMEC and WHEC class vessels, and to study possible ways to remove these limitations to increase ship/helo utilization. A systems analysis technique was used to identify and describe the interrelationships among the system elements which affect ship/helo operations. Inherent limitations of ships and helicopters are described, as well as possible missions and modes of combined operations. Special consideration is given to the HARPOON, BEARTRAP, and SHAG helicopter rapid-securing and release systems. (Modified author abstract)
DE- *Helicopters; *Ships; *Systems analysis; Coast Guard; Flight decks; Compatibility; Maintenance; Ship personnel; Human factors engineering
ID- H-52 aircraft; HH-52A aircraft; WMEC class vessels; WHEC class vessels; Coast Guard cutters; NTISCG
SH- 47A (Ocean Technology and Engineering--Marine Engineering); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0428170
AA- <NTIS> AD-774 725/6/XAB
TI- Development of Design Criteria for Sensor Displays
TI- <NOTE> Annual rept. May-Dec 73
AU- Rogers, J. G. ; Carel, W. L.
CS- Hughes Aircraft Co Culver City Calif Display Systems and Human Factors Dept
CS- <CODE> 405763
RN- HAC-REF-C6619
CN- N00014-72-C-0451; NR-213-107
PY- Dec 73
PG- 128p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A07/MF A01
JA- GRAI7408
AB- The program objective is: To conduct applied research using analytical and experimental investigations for identifying, defining and validating advanced concepts which may be applied to future, improved Naval and Army aircraft instrumentation systems. This includes sensing elements, data processors, displays, controls and man/machine interfaces for fixed and rotary wing aircraft for all flgiht regimes. The following topics are treated in the report: Psychophysical studies, modulation sensitivity function; cognitive demand studies; and analysis of display mechanization performance criteria.
DE- *Display systems; *Human factors engineering; Man machine systems; Interfaces; Detectors; Cockpits; Avionics; Aircraft equipment; Data processing equipment; Flight crews; Control; Aircraft; Psychophysiology ; Threshold effects; Radar; Electrooptics
ID- Design criteria; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 49E (Electrotechnology--Optoelectronic Devices and Systems); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0425442
AA- <NTIS> AD-773 688/7/XAB
TI- A Design Study to Standardize Collective-Stick Controls in U.S. Army Helicopters: A Human Factors Engineering (HFE) Evaluation
TI- <NOTE> Technical memo
AU- Stowell, H. R. ; Fry, C. A.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-24-73
PY- Oct 73
PG- 83p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7407
AB- The design study was conducted by HEL to standardize collective-stick controls in U.S. Army helicopters. The objective was to formulate a standard which will specify functions and arrangement of switches on collective-stick controls in Army helicopters. Two types of collective-stick controls were developed to meet requirements in all categories of helicopters designed for the U.S. Army. A human factors engineering (HFE) evaluation was done by HEL on functional hard mock-up models representing the general design configuration developed for standardization of collective-stick controls. Results of the HFE test indicate that the configurations developed for standardization is suitable for developing airworthy designs for flight test. (Author)
DE- *Helicopters; *Control sticks; *Human factors engineering; Flight control systems; Standardization; Switches; Performance(Human); Response(Biology); Flight crews
ID- NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0421339
AA- <NTIS> N74-10978/6/XAB
TI- Effects of Helicopter Noise and Vibration on Pilot Performance (As Measured in a Fixed-Base Flight Simulator)
AU- Stave, A. M.
CS- United Aircraft Corp., Stratford, Conn. Sikorsky Aircraft Div.
RN- NASA-CR-132347
CN- NAS1-11222
PY- 7 Dec 73
PG- 89p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7405; STAR1202
AB- The effects of noise and vibration on pilot performance are described. Pilot subjects were required to fly VTOL commercial IFR schedules using the computer simulation facilities. The routes flown simulated closely metropolitan routes flown currently by a helicopter airline. The duration of simulator flights ranged from 3 to 8 hours. Subjects were exposed to noise sound pressure levels ranging from 74dB (ambient) to 100dB and 17 Hz vibration stimuli ranging from .1 g to .3 g measured at the floor directly beneath the pilot's seat. Despite subject reports of extreme fatigue in these long flights, performance did not degrade. A curve of performance shows a slow improvement for the first three hours of exposure and a slight loss in performance during the remainder of the flight. As environmental stress conditions (noise, vibration, and time in the simulator) increased, subject performance improved. Within the limits of this study, the higher the stress the better the performance. (Author)

DE- *Aircraft noise; *Helicopters; *Pilot performance; *Vibration effects; Computerized simulation; Flight fatigue; Vertical takeoff aircraft
ID- NTISNASA
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0417566
AA- <NTIS> AD-771 053/6/XAB
TI- Instrumentation Specification for Climatic Laboratory Tests
AU- Ferrell, K. R. ; Lynch, T. L.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAASTA-73-41
CN- UVSCOM-73-41
PY- Aug 73
PG- 9p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7404
AB- The specification defines the test instrumentation requirements for Climatic Laboratory tests conducted by the United States Army Aviation Systems Test Activity (USAASTA). This document is intended to provide guidance to contractors and activities that are required to instrument and support Climatic Laboratory tests conducted at Eglin Air Force Base, Florida.
DE- *Helicopters; *Environmental tests; *Instrumentation; *Specifications; Helicopter rotors; Gearboxes; Hydraulic equipment; Fuel systems; Transmissions(Mechanics); Temperature
ID- NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0414071
AA- <NTIS> AD-770 418/2/XAB
TI- Flight Information Scale Test for Heads-Up and Panel Mounted Displays
TI- <NOTE> Technical memo
AU- DeBellis, W. B.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-22-73
PY- Oct 73
PG- 49p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7402
AB- Scales which were designed to provide altitude, airspeed and heading information, were combined into six candidate flight display formats for heads-up and panel mounted applications. Twelve U. S. Army aviators flew each format under static base simulation conditions. The subjects responded to the displays by providing a cyclic control stick response to various scale value changes. Response time and incorrect control motion were used as dependent variables. Results of this experiment tend to indicate that considerable leeway in scale design is permissible without causing significant difference in pilot performance as measured by the dependent variables. The only statistically significant comparison occurred between best and worst display formats. On a moving thermometer tape display, the pilot performance was significantly lower. This difference was the result of scaling requirements rather than scale type. (Author)
DE- *Display systems; *Helicopters; Head up displays; Panels; Scale; Information; Altitude; Airspeed indicators; Pilots
ID- Design; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0408864
AA- <NTIS> AD-768 673/6/XAB
TI- LDF Powered Balloon Program
TI- <NOTE> Instrumentation papers
AU- Koran, A. O. ; Leclaire, R. C. ; Rice, C. B.
CS- Air Force Cambridge Research Labs L G Hanscom Field Mass
CS- <CODE> 011800
RN- AFCRL-TR-73-0424; AFCRL-IP-198
CN- ILIR01
PY- 18 Jul 73
PG- 47p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7324

AB- The report describes POBAL, a test flight to demonstrate the feasibility of accomplishing station-keeping by powering a 711,000-cu. ft. free balloon against the wind in the minimum wind field near 60,000-ft altitude. The propulsion system, fabricated from off the shelf components, incorporated a 35-ft diameter helicopter rotor and an 8-hp electric motor powered by Ag-Zn batteries. Line of thrust was controlled by a 9-ft high rudder, steerable either by radio command or by autopilot. POBAL was flown from Holloman AFB, New Mexico in September 1972. System components, flight results, recommendations and feasibility studies for a long duration POBAL system are discussed. (Author)
DE- *Balloons; Propulsion; Propellers(Aerial); Power supplies; Flight paths ; Balloon equipment; Aerial rudders; Wind; Flight testing
ID- Powered flight; Stationkeeping; NTISAF
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0401281
AA- <NTIS> AD-767 070/6/XAB
TI- LLNO MEDEVAC Human Factors Analysis
TI- <NOTE> Final rept
AU- Peterson, J. R. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Center
CS- <CODE> 402349
RN- 12609-FR1; JANAIR-730704
CN- N00014-69-C-0460; NR-213-072
PY- 1 Feb 73
PG- 122p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7322
AB- The report presents the results of a study to support the preliminary System Synthesis task of the Low Level Night Operations (LLNO) program, as it applies to LLNO Search and Rescue and LLNO Medical Evacuation Missions. The study consisted of analytic studies of human factors problems. Recommendations are made for displays and controls and for a layout in the helicopter cockpit. (Author)
DE- *Airmobile operations; *Human engineering; *Helicopters; *Close support ; Navigational aids; Night flight; Low altitude; Flight control systems ; Display systems; Cockpits; Instrumentation
ID- LLNO(Low Level Night Operations); Low level night operations; MEDEVAC(Medical Evacuation); Medical evacuation; Avionics; NTISN
SH- 74H (Military Sciences--Nuclear Warfare); 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0396511
AA- <NTIS> AD-765 456/9/XAB
TI- Transportability
TI- <NOTE> Final rept. on Materiel test procedure
CS- Army Test and Evaluation Command Aberdeen Proving Ground Md
CS- <CODE> 041750
RN- TOP-1-2-500
CN- AMRC-310-6
PY- 7 Feb 73
PG- 73p
NT- Supersedes reports dated 22 Jun 70, AD-872 617, 30 Apr 68, AD-721 600, 2 Dec 69, AD-866 647, 30 Nov 67, AD-718 742 and 30 Jul 70, AD-875 697.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7320
AB- The report describes a method for evaluation of military equipment transportability characteristics; discusses preliminary activities, facilities, and equipment required; and provides procedures for lifting and tiedown attachments; rail, highway, and marine transportability; terminals handling and movement; air portability, fixed and rotary wing, internal and external carried, to include airdropped materiel, shock, vibration, safety, human factors, and maintenance evaluation. Appendixes provide railway landing procedures, highway vehicle and load limits, marine transport environmental factors and characteristics, aircraft capacities, shock and vibration environments during transport by rail, sea, and air. The method is applicable to equipment whether towed, self-propelled, or moved by carrier over highway, cross-country, railway, waterway, or air. (Author)
DE- *Electronic equipment; *Transportation; *Communication equipment; Test methods; Loading(Mechanics); Mobility; Air transportation; Shipping(Marine); Railroads; Cargo vehicles
ID- *Common engineering test procedures; Transportability; NTISA
SH- 49GE (Electrotechnology--General); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0396392
AA- <NTIS> AD-163 636/4/XAB
TI- Powered Litter Rack
TI- <NOTE> Patent
AU- Vichness, J. A. ; Lane, R. E.
CS- Office of the Secretary of the Army Washington D C
CS- <CODE> 403499
RN- PAT-APPL-869 573; PATENT-3 605 136
PY- Filed 27 Oct 69 patented 20 Sep 71
PG- 4p
NT- Supersedes PAT-APPL-869 573.
NT- Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.
DT- Patent
PC- Not available NTIS
JA- GRAI7320
AB- This invention relates to a powered litter rack and more particularly to a device for quickly loading wounded personnel in stacked relation in a helicopter or other hospital type carrier. A pair of upright and spaced frames are provided each with a pair of powered, upright, endless chains to lift litters bearing the wounded into stacked arrangement in an aircraft. Electric motors drive the chains which have clamps to engage the litters for lifting. A pair of rails fixed to the racks receive the legs of a litter in position for engagement with the clamps.
DE- *Medical equipment; *Patents; Military personnel; Evacuation; Battle injuries
ID- *Powered litter rack; *Stretchers; PAT-CL-5-8; NTISGPA
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 90GE (Government Inventions For Licensing--General)

AZ- 0396327
AA- <NTIS> PB-222 598/5/XAB
TI- A Study of Military Assistance in Safety and Traffic (MAST)
TI- <NOTE> Final rept. 14 Feb-31 Dec 72
AU- Keller, M. D. ; Gemma, W. R. ; Chase, R. C. ; Ptak, H. F.
CS- Ohio State Univ., Columbus.
CS- <CODE> 267200
RN- DOT-HS-800 883
CN- DOT-HS-115-2-304
PY- Jun 73
PG- 140p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7319
AB- Four MAST operations--Fort Lewis, Luke AFB, Fort Carson, Mountain Home AFB--established after the San Antonio MAST were analyzed. Organizational and regional differences were examined to underline significant data and factors for future MAST operations. A comprehensive list of emergency medical services components and variables related to MAST planning resources is given. The report is a continuation of an earlier study of the first MAST operation at San Antonio. The initial report conducted by the Department of Health, Education, and Welfare is included.
DE- *Medical services; *Military assistance; Communities; Rural areas; Mountains; Helicopters; Ambulances; Radio communication; First aid; Public health; Motor vehicle accidents; Accidents; Disasters
ID- *MAST(Military Assistance in Safety and Traffic); *Military assistance in safety and traffic; Emergency medical services; Community health care; Emergency health care delivery systems; NTISNHSB
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0395635
AA- <NTIS> AD-765 320/7/XAB
TI- Higher Harmonic Circulation Control Rotor Model - Model Instrumentation and Data Acquisition
TI- <NOTE> Technical note
AU- Stone, M. B.
CS- Naval Ship Research and Development Center Bethesda Md Aviation and Surface Effects Dept
CS- <CODE> 387695
RN- TN-AL-288
CN- WF41-421-210
PY- Apr 73
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC E02/MF A01

JA- GRAI7319
AB- A higher harmonic circulation control rotor was tested in the 8' x 10' subsonic wind tunnel at various advance ratios, blade tip Mach numbers, blowing air pressures, shaft angles and collective angles. The model was instrumented with strain gages, pressure transducers, thermocouples, magnetic pick-ups and a pitch-roll trim resolver. This information was recorded on an analog to digital acquisition system and on F.M. tape recorders for later digitization. The purpose of the report is to provide descriptive documentation of the model instrumentation and data acquisition portion of the test, and there is no attempt made to elaborate on helicopter or higher harmonic theory. (Author)
DE- *Rotor blades(Rotary wings); *Helicopter rotors; Fluid dynamic properties; Model tests; Wind tunnel models; Instrumentation; Strain gages; Transducers; Resonant frequency; Data processing systems; Coanda effect
ID- NTISN
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0395230
AA- <NTIS> AD-764 914/8/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume VII. Navy Combat SAR Avionics Capability Study (1972-1974 Era)
TI- <NOTE> Final rept. Jun 72-Jan 73
AU- Jones, A. L. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-7; JANAIR-730702
CN- N00014-69-C-0460; NR-213-072
PY- Feb 73
PG- 52p
NT- See also Volume 6, AD-752 625.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7319
AB- The report presents results of a study to assess the avionics capability of the present generation Navy combat search and rescue helicopters (HH-3A's). The study used interviews of experienced combat SAR pilots. Analyses were performed to evaluate the baseline HH-3A avionics and presently available avionic equipments against various search and environmental conditions. The most cost-effective improvement to the present HH-3A avionic capability for search and rescue was found to be Night-Vision Goggles for the pilot and a crew member. (Author)
DE- *Rescues; *Helicopters; *Display systems; Sensors; Effectiveness; Aircraft equipment; Night vision; Eyeglasses; Infrared equipment; Radar ; Low-intensity illumination; Television equipment
ID- *Avionics; *Search and rescue; HH-3A aircraft; H-3 aircraft; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 49GE (Electrotechnology--General)

AZ- 0390587
AA- <NTIS> N73-23340/XAB
TI- An Analytical Investigation of Acquisition Techniques and System Integration Studies for a Radar Aircraft Guidance Research Facility, Phase 2
TI- <NOTE> Final Report Supplement
AU- Thompson, W. S. ; Ruedger, W. H.
CS- Research Triangle Inst., Research Triangle Park, N.C.
RN- NASA-CR-111931-1; RTI-43U-443-1
CN- NAS1-8912
PY- Apr 73
PG- 74p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC E03/MF A01
JA- GRAI7316; STAR1114
AB- A review of user requirements and updated instrumentation plans are presented for the aircraft tracking and guidance facility at NASA Wallops Station. User demand has increased as a result of new flight research programs; however, basic requirements remain the same as originally reported. Instrumentation plans remain essentially the same but with plans for up- and down-link telemetry more firm. With slippages in the laser acquisition schedule, added importance is placed on the FPS-16 radar as the primary tracking device until the laser is available. Limited simulation studies of a particular Kalman-type filter are also presented. These studies simulated the use of the

filter in a helicopter guidance loop in a real-time mode. Disadvantages and limitations of this mode of operation are pointed out. Laser eyesafety calculations show that laser tracking of aircraft is readily feasible from the eyesafety viewpoint. (Author)
DE- *Radar tracking; *Tracking stations; *Wallops island; Kalman filters; Lasers; Telemetry
ID- NTISNASA
SH- 63H (Detection and Countermeasures--Radiofrequency Detection); 84D (Space Technology--Spacecraft Trajectories and Flight Mechanics)

AZ- 0382049
AA- <NTIS> AD-760 206/XAB
TI- Infrared Fourier Spectroscopy Applied to the Measurement of Aircraft Spectra
TI- <NOTE> Research memo
AU- Slack, M. W.
CS- Grumman Aerospace Corp Bethpage N Y Research Dept
CS- <CODE> 406165
RN- RM-572
PY- Apr 73
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7313
AB- Fourier spectroscopy has been used to obtain infrared (1 to 5) from a number of aircraft, including an OV-1D Mohawk, an F-14, and a UH1. The report presents performance specifications of the instrumentation together with a description of data reduction techniques and examples of measured IR spectra. (Author)
DE- *Helicopters; *Jet fighters; *Observation planes; Spectrum signatures; Spectra(Infrared); Vertical take-off planes; Infrared detectors; Spectroscopy
ID- V-1 aircraft; OV-1D aircraft; F-14 aircraft; H-1 aircraft; UH-1 aircraft; NTISSD
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 63C (Detection and Countermeasures--Infrared and Ultraviolet Detection)

AZ- 0377506
AA- <NTIS> AD-758 881/XAB
TI- HELHAT 1 - The Effect of Observer Position on Target Detection
TI- <NOTE> Technical memo
AU- Barnes, J. A.
CS- Human Engineering Lab Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-7-73
PY- Mar 73
PG- 48p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7311
AB- A flight experiment was performed to determine the effect of the observer's position in a helicopter on his ability to detect ordnance targets. The positions tested were: left seat, front seat and rear seat. The 34 U. S. Army pilot subjects each flew two trial flights in opposite directions over a three-leg course at Coso Military Target Range, Naval Weapons Center, China Lake, California. (Author Modified Abstract)
DE- *Target discrimination; *Performance tests; *Aerial reconnaissance; Surface targets; Flight testing; Performance(Human); Human engineering; Statistical analysis
ID- *Observer positions; Helhat project; NTISA
SH- 92B (Behavior and Society--Psychology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0374046
AA- <NTIS> N73-16100/XAB
TI- The Transmission of Triaxial Vibration to Pilots in the Scout AH Mki Helicopter
AU- Griffin, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
RN- ISVR-TR-58
PY- Aug 72
PG- 82p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC E03/MF A01
JA- GRAI7309; STAR1107

AB- Three experiments designed to determine the triaxial vibration experienced by pilots in the P-531 (Scout) helicopter are described. In the first experiment, eight Scout helicopters were flown by the same pilot in seven different flight conditions. In each condition, the mean and range of floor vibration were determined at frequencies of maximum vibration for each of three perpendicular axes. In the other two experiments, eight pilots flew in a single Scout helicopter with known floor vibration characteristics. The spectra of triaxial head vibration during four flight conditions were determined from trial two. In trial three, vertical vibration at the heads and at the interface between their bodies and the seat cushion were determined during the hover. The vibration data obtained from the three experiments are presented together with detailed consideration of the differences in vibration level associated with the different flight conditions, vibration axes, helicopters, and pilots. (Author)
DE- *Human factors engineering; *P-531 helicopter; *Pilots (personnel); *Triaxial stresses; *Vibration effects; Flight conditions; Physiological effects; Pilot performance; Vibration measurement; Vibrational spectra
ID- NTISNASA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 0367528
AA- <NTIS> AD-755 367/XAB
TI- An Assessment of the 'Paper Pilot' - An Analytical Approach to the Specification and Evaluation of Flying Qualities
TI- <NOTE> Final rept. Dec 70-Jun 72
AU- Teper, G. L.
CS- Systems Technology Inc Hawthorne Calif
CS- <CODE> 340425
RN- STI-TR-1006-1; AFFDL-TR-71-174
CN- F33615-71-C-1071; AF-8219
PY- Jun 72
PG- 129p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7307
AB- The 'Paper Pilot' is an approach to flying qualities specification and evaluation based on pilot-vehicle system analysis. A fixed-base simulation program was conducted to test its application in the precision hover task. Pilot ratings and system performance measures and describing functions were obtained. An efficient technique was developed by which pilot model parameters were obtained from the describing function data. This provides a unique data base for a realistic, multi-loop (single-controller, multi-input) task. A comparison of the data with the predictions of the 'Paper Pilot' indicate that the pilot model used should be expanded if improved predictions of pilot and system characteristics are to be obtained. Initial steps in this direction were taken but further developments are desirable. (Author)
DE- *Short take-off planes; *Pilots; Hovering; Attitudes; Flight; Performance(Engineering); Performance(Human); Man-machine systems; Specifications; Simulation
ID- Evaluation; NTISAF
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 92B (Behavior and Society--Psychology)

AZ- 0365781
AA- <NTIS> AD-754 644/XAB
TI- Measurements of Velocity Components in the Wake of a Full-Scale Helicopter Rotor in Hover
TI- <NOTE> Final rept. Sep 70-Sep 71
AU- Boatwright, D. W.
CS- Mississippi State Univ State College Dept of Aerophysics and Aerospace Engineering
CS- <CODE> 403854
RN- AASE-72-59; USAAMRDL-TR-72-33
CN- DAAJ02-67-C-0105; DA-1-F-162204-A-139; 1-F-162204-A-13903
PY- Aug 72
PG- 128p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7306
AB- The report presents three-component wake velocity measurements made with a split-film total vector anemometer. The measurements were made in the wake of a full-scale OH-13E helicopter rotor which was mounted on a 60-foot rotor test tower at Mississippi State University. Time-averaged velocity distributions along wake radii at various

distances below the rotor disk were measured for two conditions of disk loading and three combinations of blade pitch and rotor speed. Instantaneous velocity measurements were made across the helical vortex trails to investigate the effects of blade pitch and rotor speed on vortex structure, core size, transport velocity, and distribution of axial and tangential velocity components within the vortices. (Author)
DE- *Helicopter rotors; Wake; Rotor blades(Rotary wings); Vortices; Instrumentation; Calibration; Data processing systems
ID- H-13 aircraft; OH-13E aircraft; Vortex shedding; Computer aided analysis; NTISA
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0356992
AA- <NTIS> AD-752 639/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume IV. Results of Honeywell/Bell Mockup Review
TI- <NOTE> Final rept. Jan-Jul 71
AU- Lindquist, O. H. ; Olson, B. A. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-4; JANAIR-701222
CN- N00014-69-C-0460; NR-213-072
PY- Sep 72
PG- 54p
NT- See also Volume 3, AD-728 043, and Volume 5, AD-750 463.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7302
AB- A SAR cockpit mockup review was held to emphasize the working session evaluation of the avionics recommendations as presented in the cockpit mockup. Two multi-service teams reviewed the recommended configuration and evaluated it in terms of the SAR mission segments information requirements and estimated man/machine performance of the system. The evaluation teams findings are summarized in a recommended instrument panel arrangement. (Author)
DE- *Helicopters; *Display systems; *Rescues; Human engineering; Systems engineering; Job analysis; Man-machine systems; Aircraft equipment
ID- *Avionics; *Search and rescue; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 49GE (Electrotechnology--General)

AZ- 0356978
AA- <NTIS> AD-752 625/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume VI. Avionics Requirements for the HH-53C Helicopter
TI- <NOTE> Final rept. Sep 71-Jan 72
AU- Lindquist, O. H. ; Olson, B. A. ; Jones, A. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-6; JANAIR-720902
CN- N00014-69-C-0406; NR-213-072
PY- May 72
PG- 102p
NT- See also Volume 5, AD-750 463.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7302
AB- An analytical study was conducted to define the avionics system and the display and controls concept required for the HH-53C helicopter so that it could accomplish the USAF's all-weather SAR mission. The study tasks included development of an avionics concept based on a representative mission scenario, avionics and sensor package selection, a man/machine function allocation and crew workload analysis. A recommended avionics configuration was defined. The HH-53C can be upgraded by an avionics configuration, within the cost constraints, to perform the all-weather SAR mission. This upgraded HH-53C can be operated by the crew within their workload limitations. (Author)
DE- *Rescues; *Helicopters; *Display systems; Man-machine systems; Job analysis; Human engineering; Sensors; Aircraft equipment
ID- *Avionics; *Search and rescue; HH-53C Aircraft; H-53 Aircraft; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 49GE (Electrotechnology--General)

AZ- 0351029

AA- <NTIS> AD-751 217/XAB
TI- High Performance Helicopter Hoist Program
TI- <NOTE> Final rept. on Phase I
AU- Lawson, L. J. ; Duddy, J. H. ; Gilbert, R. R. ; Helvey, M. R. ; Jacobsen, E. H.
CS- Lockheed Missiles and Space Co Sunnyvale Calif Ground Vehicle Systems
CS- <CODE> 406768
RN- LMSC-D267477; LWL-CR-02M72
CN- DAAD05-72-C-0099
PY- Aug 72
PG- 167p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- GRAI7301
AB- The report presents a feasibility astudy on a flywheel powered personnel rescue hoist for helicopters. It includes investigations of flywheel configurations, materials, and associated equipment including bearings, seals, and pumps. Also included are discussions of human factors considerations and design considerations affecting component selection, hoist configuration, and hoist installation. Particular attention is given to the capability of a 13.5-lb, 73.5 w-hr flywheel to provide the short duration high power required to affect rescue hoisting speed as high as 500 ft per min. without overtaxing the helicopter's limited accessory power capacity. (Author)
DE- *Helicopter hoists; *Helicopters; *Rescues; Design; Feasibility studies ; Flywheels; Hoists; Cables(Mechanical); Control systems; Human engineering; Checkout procedures
ID- Energy storage systems; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0349453
AA- <NTIS> N72-28014/XAB
TI- The Effectiveness of Two Types of Insulation in the Chss-2 Helicopter
AU- Forshaw, S. E. ; Stong, R. A.
CS- Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Behavioural Sciences Div.
RN- DCIEM-839
PY- Mar 72
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7224; STAR1019
AB- Narrow-band, octave-band, and overall sound pressure levels were measured in two CHSS-2 helicopters, one with an older thin acoustic treatment and one with a new thick treatment. The noise levels at the sonar operator's position are not reduced significantly when an acoustic bulkhead and door treated with the thin sound absorbed are installed across station 155. The noise levels at this location are reduced by 8 to 15 db in the octave bands between 500 and 4000 Hz, however, when the bulkhead and door are treated with the thick absorber. Provided crew members wear properly fitted flight helmets, the noise in the CHSS-2 helicopter does not constitute a potential long-term hazard to the hearing of the crew. However, its pure tone components undoubtedly reduce the detection efficiency of sonar operations. (Author)
DE- *Aerodynamic noise; *Helicopters; *Human factors engineering; *Noise intensity; *Noise reduction; Acoustic attenuation; Acoustic measurements; Insulation
SH- 46A (Physics--Acoustics)

AZ- 0348795
AA- <NTIS> AD-750 615/XAB
TI- The Princeton Pennsylvania Army Avionics Research Program. Take Off of Heavily Loaded Helicopters
TI- <NOTE> Final task rept. 1 Sep 66-30 Dec 71
AU- Born, G. J. ; Durbin, E. J. ; Schmitz, F. H.
CS- Princeton Univ N J
CS- <CODE> 288450
RN- ECOM-02412-7
CN- DA-28-043-AMC-02412(E); DA-1-H-162202-A-219; 1-H-162202-A-21907
PY- Jan 72
PG- 92p
NT- See also AD-747 732.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7224
AB- In the report are given the results of the optimal control theory

applied to the take-off of heavily loaded helicopters and the instrumentation requirements to enhance VTOL-STOL pilot flight control during the take-off maneuvers. The analysis and computation determined constrained and uncontrained extremal trajectories which maximize final altitude at a given distance (Research and Development Technical Report, ECOM 02412-4, August, 1969). The constrained optimal leads to a slightly decreased performance, but this is more than offset by the ease of implementation. The proposed take-off technique was simulated on an analog computer. A parameter sensitivity study was made which resulted in the formulation of specific instrumentation requirements. (Author)
DE- *Helicopters; Take-off; Hovering; Ground effect; Mathematical models; Flight paths; Optimization; Airspeed; Acceleration
ID- *Heavily loaded helicopters; Control theory; Computerized simulation; NTISA
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0347659
AA- <NTIS> N72-27027/XAB
TI- Overall Ground Experiments on Flying Test Bed for VTOL Aircraft at National Aerospace Laboratory
AU- Takizawa, N. ; Tanabe, Y. ; Shibuya, A. ; Ogawa, T. ; Fujieda, H.
CS- National Aerospace Lab., Tokyo (japan).
RN- NAL-TR-276
PY- Feb 72
PG- 93p
NT- LANG- IN JAPANESE ENGLISH SUMMARY. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC E04/MF A01
JA- GRAI7223; STAR1018
AB- The overall ground experiments on the flying test bed which has been developed for the purpose of studying the problems associated with hovering, vertical take-off and landing of VTOL aircraft are described. The experiments were made on the complete assembly but without engines and fuel, and consisted of three items; (1) the functional performance of several subsystems, (2) the capability of the attitude control, and (3) the vibration characteristics of the framework. The subsystems tested were the air turbine system connected with the electrical and hydraulic systems, the bleed air distribution system, the attitude control system, the airborne instrumentation system, and the redundant back-up system. The attitude control experiments made with varying amounts of artificial damping and stabilization showed that their optimum ranges in pitch and roll were revealed independently. In the vibration tests, the measurements covered natural frequencies, modes, damping ratios and phases of vibration of the framework. (Author)
DE- *Aerodynamic characteristics; *Attitude control; *Performance tests; *Vertical takeoff aircraft; *Vibration tests; Aircraft configurations; Aircraft control; Aircraft performance
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0346438
AA- <NTIS> AD-750 097/XAB
TI- The Effect of Fatigue on Visual Search Activity
TI- <NOTE> Final rept. 1965-1972
AU- Stern, J. A.
CS- Washington Univ St Louis Mo
CS- <CODE> 370000
CN- DA-49-193-MD-2715
PY- 1 Jul 72
PG- 41p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7223
AB- The report reviews work on the development of recording techniques for obtaining outputs from the manipulanda of helicopters (UH-1D) and automobiles. as well as techniques for processing such data. The majority of the report deals with the recording and utilization of measures of visual search activity for the assessment of pilot performance as a function of such variables as level of training, time on task, and sleep deprivation. Necessary hardware for electrooculographic recording of visual search activity was developed, as well as computer techniques for abstracting relevant information from these records. Two published studies utilizing these procedures are included. The report details some further development of the application of analytic programs to the evaluation of reading activity. (Author)
DE- *Pilots; *Visual perception; *Fatigue(Physiology); Performance(Human); Helicopters; Passenger vehicles; Training; Sleep; Electrophysiology; Vision; Aviation medicine
ID- UH-1D aircraft; H-1 aircraft; NTISA

SH- 92B (Behavior and Society--Psychology)

AZ- 0339413
AA- <NTIS> N72-26086/XAB
TI- Secondary Task Performance of Helicopter Pilots During Low-Level Flight
AU- Nagaraja Rao, B. K. ; Griffin, M. J.
CS- Southampton Univ. (england). Inst. of Sound and Vibration Research.
RN- ISVR-TR-54
PY- Dec 71
PG- 61p
NT- Subm- Sponsored By Min. of Defense
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC E03/MF A01
JA- GRAI7219; STAR1017
AB- An investigation was made into the changes of pilot performance at a complex reaction time task during low-level helicopter flight. The two-choice task required responses to a continuous and a similar tone pulse 6 Hz pitch repetition frequency. The mean reaction times for eight pilots are tabulated and commented upon. An extensive bibliography is appended. (Author)
DE- *Auditory signals; *Helicopters; *Pilot performance; *Reaction time; Bibliographies; Human factors engineering; Low altitude
SH- 70B (Administration and Management--Management Practice)

AZ- 0335513
AA- <NTIS> PB-210 819/XAB
TI- Evaluation of the APRAC-1A Urban Diffusion Model for Carbon Monoxide
TI- <NOTE> Final rept
AU- Ludwig, F. L. ; Dabberdt, W. F.
CS- Stanford Research Inst., Menlo Park, Calif.
CS- <CODE> 332500
RN- APTD-1172
CN- CAPA-3-68(1-69)-CRC; SRI-8563
PY- Feb 72
PG- 162p
NT- See also PB-210 820.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- GRAI7217
AB- An experimental program was conducted in St. Louis for the further development and testing of a practical, multipurpose urban diffusion model (APRAC-1A) for carbon monoxide to determine whether earlier (1970) findings in San Jose, California could be generalized to larger cities with highly developed urban cores. Two adjacent downtown street canyons were instrumented to obtain measurements of CO concentration at 30 points and winds at eight. Helicopter-and van-borne instrumentation was used to supplement data collected with the automated street-canyon instrumentation system. The model was revised to improve the specification of atmospheric stability and small-scale street-canyon effects. The distribution of CO in the street canyon indicates the presence of a single-cell, helical circulation in the deep St. Louis street canyons under cross-street, roof-level flow conditions; the same pattern was found in the shallow San Jose canyon.
DE- *Air pollution; *Atmospheric diffusion; *Carbon monoxide; *Urban areas; Mathematical models; Wind(Meteorology); Mixing; Temperature; Field tests; Streets; Exhaust gases; Diurnal variations; Missouri
ID- Saint Louis(Missouri); NTISOAP
SH- 68A (Environmental Pollution and Control--Air Pollution and Control); 91H (Urban and Regional Technology and Development--Regional administration and Planning)

AZ- 0327217
AA- <NTIS> N72-20437/XAB
TI- Stabilization and Guidance of Vehicles Using Indicating Instruments. Part 2 Above the Ground Indication and Artificial Horizon . Stabilisierung und Lenkung von Fahrzeugen MIT Hilfe der Voranzeige. Teil 2 Uebergrundanzeige und Kuenstlicher Horizont
AU- Dey, D. ; Johannsen, G.
CS- Technische Univ., Berlin (west Germany). Inst. Fuer Flugfuehrung Und Luftverkehr.
RN- REPT-61
PY- Feb 71
PG- 93p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01

JA- GRAI7214; STAR1011
AB- An indicating instrument, the main part of which is the display of an extrapolated trajectory element, has been developed, simulated and ndanzeige und kuenstlicher horizont abs An indicating instrument, the main part of which is the display of an extrapolated trajectory element, has been developed, simulated and investigated for the above-the-ground motion of a VTOL aircraft. The improvements acquired from using this pre-indication are depicted by spectral density and power density functions. The results show that the indicator simplifies manual control of the above-ground motion of a hovering aircraft. In addition, an artificial horizon indicating extrapolated position, has been developed for manual position control of a hovering VTOL aircraft. The results show that the extrapolated horizon line simplifies control, shortens learning time, and augments control quality.
DE- *Hovering stability; *Indicating instruments; *Manual control; *Vertical takeoff aircraft; Extrapolation; Flight simulators; Horizon; Human factors engineering; Man machine systems; Power spectra; Trajectory analysis
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0322225
AA- <NTIS> N72-18005/XAB
TI- An Experimental Investigation of the Helicopter Rotor Blade Element Airloads on a Model Rotor in the Blade Stall Regime
AU- Fisher, R. K. ; Tompkins, J. E. ; Bobo, C. J. ; Child, R. F.
CS- Boeing Co., Philadelphia, Pa. Vertol Div.
RN- NASA-CR-114424; D210-10347-1
CN- NAS2-5473
PY- Sep 71
PG- 120p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7212; STAR1009
AB- A wind tunnel test program was conducted on an eight foot diameter model rotor system to determine blade element airloads characteristics in the unstalled and stalled flight regimes. The fully articulated model rotor system utilized three blades with a Vertol 23010-1.58 airfoil section, the blades being 17.5 scale models of the Ch-47C rotor blades. Instrumentation was incorporated at the blade 75% radial station to measure pressure and skin friction distributions, surface streamline directions and local angle of attack. The test program was conducted in three phases; non-rotating, hover and forward flight at advance ratios of 0.15, 0.35 and 0.60. Test data were analyzed with respect to providing insight to the mechanisms affecting foi HC css Vertol Div. csc 01b blade stall, particularly retreating blade stall during forward flight conditions. From such data, an assessment was made as to the applicability of current theoretical analyses used for the prediction of blade element airloads in the stall regime. (Author)
DE- *Aerodynamic loads; *Helicopter performance; *Rotary wings; *Wind tunnel models; Aerodynamic stalling; Ch-47 helicopter; Performance prediction; Pressure distribution
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0320974
AA- <NTIS> AD-741 218/XAB
TI- Visual Requirements Study for Head-Up Displays
TI- <NOTE> Final rept
AU- Gold, T. ; Perry, R. F.
CS- Sperry Rand Corp Great Neck N Y Sperry Gyroscope Div
CS- <CODE> 403189
RN- JANAIR-700407
CN- N00014-68-C-0465; NR-213-068
PY- Mar 72
PG- 64p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7212
AB- An experimental study was conducted to determine the binocular disparity tolerances for pilots viewing dynamic head-up display images against a moving real world background. An existing head-up display simulator, which could generate images with controlled disparities for each eye, was modified to incorporate a background of projected motion pictures taken in flight at low altitudes. Six pilots served as test subjects, three from the Army Aviation School and three from the Naval Air Test Center. The results indicate maximum disparity levels for sustained comfortable viewing of 1.0 milliradian for vertical and convergent horizontal disparities, and 2.5 milliradians for divergent horizontal disparities. These results are the same as those obtained with the display viewed against a static real world background in a preceding study involving a different group of subjects. (Author)

DE- *Pilots; *Visual perception; *Helicopters; *Display systems; Cathode ray tube screens; Binoculars; Servomechanisms; Drives; Visual acuity; Performance(Human); Analysis of variance
ID- Headup display systems; Intraservice activities; Optical disparaties; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0318682
AA- <NTIS> AD-740 773/XAB
TI- Evaluation of an Advanced Instrumentation System for Helicopter Rotors
TI- <NOTE> Final rept
AU- Shockey, G. A. ; Bowden, T. H.
CS- Bell Helicopter Co Fort Worth Tex
CS- <CODE> 054200
RN- BHC-299-099-497; USAAMRDL-TR-71-72
CN- DAAJ02-70-C-0036; DA-1-F-162204-A-139; 1-F-162204-A-13903
PY- Feb 72
PG- 99p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7211
AB- A test was conducted on the Bell Helicopter High Accuracy Rotor Test Stand to evaluate a time division multiplexing system for a rotor environment. The test model was a standard UH-1 tail rotor with a 0.1-inch-thick glove wrapped around the surface for the installation of transducers. The objective of this program was to develop and test a method of obtaining numerous channels of transducer information from a rotating system using a small number of slip rings. The system multiplexed the signal in the rotating system and demultiplexed the signal in the stationary system. Aerodynamic data were measured to evaluate the instrumentation system. Comparisons were made between multiplexed and unmultiplexed signals and between measured data and theory. (Author)
DE- *Transducers; *Tail helicopter rotors; Data transmission systems; Aerodynamic characteristics; Captive tests; Slip rings; Hovering; Multiplex; Pulse amplitude modulation; Test methods
ID- Evaluation; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0317897
AA- <NTIS> PB-208 268/XAB
TI- Coal Mine Rescue and Survival System. Volume III: Rescue Subsystem
TI- <NOTE> Final rept
CS- Westinghouse Electric Corp., Baltimore, Md. Special Systems.
RN- 71-1332; BUMINES-OFR-9(3)-72
CN- HO1O1262
PY- Sep 71
PG- 68p
NT- See also Volume 2, PB-208 267
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- GRAI7210
AB- Once trapped miners are located by the Communication/Location Subsystem of the Coal Mine Rescue and Survival System, it is the purpose of the Rescue Subsystem to complete a probe hole as soon as possible from the surface to their location through which their survival needs can be met until a rescue hole reaches them in a minimum of additional time, the report points out. The entire operation must be carried out without creating additional hazards for the men trapped underground. Two separate rotary type drilling rigs, along with their associated drilling equipment, were assembled to carry out the probe and the rescue drilling operations. Much of the equipment selected for assembly of the two drill rigs consisted of standard items available from drilling equipment manufacturers; however, special requirements of the Rescue Subsystem, such as the safety of trapped miners and helicopter or aircraft transport, made extensive special detail design and fabrication of equipment components necessary. The two drill rigs and the operating techniques represented commercial state of the art in the commercial drilling industry. (Author)
DE- *Survival equipment; *Rotary drilling rigs; *Coal mines; *Disasters; Drill holes; Drilling fluids; Casing processes; Site surveys; Design criteria; Environmental tests
ID- *Mine rescues; Survival techniques; NTISBM
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 48A (Natural Resources and Earth Sciences--Mineral Industries)

AZ- 0314851
AA- <NTIS> N72-14999/XAB
TI- Motion Effects on an Ifr Hovering Task Analytical Predictions and Experimental Results
AU- Ringland, R. F. ; Stapleford, R. L. ; Magdaleno, R. E.
CS- Systems Technology, Inc., Hawthorne, Calif.
RN- NASA-CR-1933
CN- NAS2-5261
PY- Nov 71
PG- 203p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A10/MF A01
JA- GRAI7209; STAR1006
AB- No abstract available.
DE- *Hovering; *Pilot performance; *Space perception; Display devices; Instrument flight rules; Motion stability; Simulators; Vestibular tests
SH- 92B (Behavior and Society--Psychology)

AZ- 0304211
AA- <NTIS> AD-735 693/XAB
TI- Human Factors in Anticollision Lighting for VTOL and V/STOL Aircraft
AU- Bauer, R. W. ; Barnes, J. A.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-LETTER-64
PY- Oct 67
PG- 23p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7205
AB- The VTOL and V/STOL flight regimes are sufficiently different from those of fixed wing aircraft to magnify certain aspects of the collision avoidance problem. For example, high rates of climb and the capability for lateral translation may require increased visibility vertically and laterally. In addition, the contrasts and intensities required for light visibility against high luminance day-lighted surfaces are very different from those required for night flight conditions. These considerations have initiated a review and re-examination of anticollision lighting requirements. (Author)
DE- *Human engineering; *Lighting equipment; *Helicopters; Warning systems; Aviation accidents; Aviation safety; Signal lights; Intensity; Vertical take-off planes; Thresholds(Physiology); Frequency; Detection
ID- *Anticollision lighting; *Collision avoidance; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0303785
AA- <NTIS> AD-735 266/XAB
TI- AFCRL's Experimental Aerial Gravimetry Program
TI- <NOTE> Environmental research papers Dec 65-Mar 68
AU- Anthony, D. ; Perry, R. M.
CS- Air Force Cambridge Research Labs L G Hanscom Field Mass
CS- <CODE> 011800
RN- AFCRL-71-0411; AFCRL-ERP-366
CN- AF-7600; 760003
PY- 27 Jul 71
PG- 40p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7205
AB- Between December 1965 and March 1968 AFCRL conducted a series of experimental aerial gravity measurements to determine the feasibility of large scale aerial gravity surveys. This report gives the results of the program and includes a program background, instrumentation description including the four gravimeters tested, upward continuation of gravity methods and evaluation in the test area, data processing procedures including corrections and smoothing methods applied, representative sample profiles, accuracy achieved in terms of profile and mean anomalies, and other aerial gravity tests and studies including helicopter gravity tests, a systems analysis of aerial gravimetry, and gravimetry by means of gradient measurements. (Author)
DE- *Gravity; Measurement; Aircraft equipment; Feasibility studies; Flight testing; Errors
ID- Gravimeters; Gravity reduction; Gravimetric geodesy; Aerial surveys; NTISAF
SH- 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

AZ- 0297921
AA- <NTIS> AD-733 671/XAB
TI- Warm Fog Modification Studies
TI- <NOTE> Final rept. 18 Aug 69-31 Aug 71
AU- Smith, T. B.
CS- Meteorology Research Inc Altadena Calif
CS- <CODE> 227500
RN- MRI-71-978; AFCRL-71-0467
CN- F19628-70-C-0069; AF-7605; AF-8620; 760501; 862005
PY- 31 Aug 71
PG- 98p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7202
AB- A series of field experients were carried out to investigate the treatment of warm fogs by hygroscopic materials. The program philosophy has involved strong interaction between physical observations made in the field experiment phases and computer modeling which attempts to simulate the treatment effects. An instrumented ground site was set up in October 1969 in the Noyo River Valley in northern California. Fourteen tests were carried out using a DC-3 aircraft and a helicopter to dispense hygroscopic material at the fog top. Extensive ground instrumentation recorded the effects of the treatment. Results of the Noyo Valley experiments led to the establishment of a semi-operational test program at McClellan AFB in Sacramento, California, in January 1971. C-130 aircraft and an Air Force helicopter were used as the seeding aircraft. A previous study was made at Forbes AFB iN November 1970 to obtain dispensing characteristics from the helicopter. Ground instrumentation at McClellan recorded the results of the tests. It was found that the hygroscopic treatment could be carried out readily within the constraints of an operational base, using operational personnel for aircraft vectoring and dissemination. (Author)
DE- *Fog; Removal; Interactions; Wind; Meteorological instruments; Military facilities; Encapsulation; Particles; Scattering; California
ID- *Fog dispersal; Noyo River Valley; Cloud seeding; McClellan Air Force Base; Sacramento(California); Forbes Air Force Base; NTISAF
SH- 55F (Atmospheric Sciences--Weather Modification)

AZ- 0295351
AA- <NTIS> AD-732 483/XAB
TI- Skyhook Churchill 1971
TI- <NOTE> Interim rept, for 1971
AU- Pappas, T. ; White, P. S.
CS- Raven Industries Inc Sioux Falls S Dak
CS- <CODE> 297250
RN- R-1071006
CN- N00014-71-C-0295; NR-211-128
PY- 15 Oct 71
PG- 121p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7201
AB- The program was funded to conduct balloon field operations from Fort Churchill, Manitoba and at other sites as designated. A field crew, suspension and rigging hardware, aircraft and helicopter tracking, parachutes, balloon telemetry and control instrumentation, electronic tracking, and reports and documentation were provided as necessary. Thirteen launches were performed at Fort Churchill, one at Dauphin, Manitoba, and one at Sioux Falls, South Dakota. Of these fifteen flights, two were aborted on the ground and one failed during ascent. This report describes individual flights, equipment used, flight data, and various program information. (Author)
DE- *Atmospheric sounding; *Stratosphere; *Meteorological balloons; Performance(Engineering); Balloon equipment; Launching; Tracking; Telemeter systems; Control systems; Cordage; Flight testing; Parachutes ; Payload; Manitoba; South Dakota
ID- *Skyhook program; Fort Churchill(Manitoba); Dauphin(Manitoba); Sioux Falls(South Dakota); NTISN
SH- 55A (Atmospheric Sciences--Aeronomy); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting); 55D (Atmospheric Sciences--Meteorological Instruments and Instrument Platforms)

AZ- 0292789
AA- <NTIS> N71-32864/XAB
TI- Some Effects of the Vibration of Reading Material Upon Visual Performance
AU- Griffin, M. J. ; Ohanlon, J. G.
CS- Southampton Univ. (England). Inst. of Sound and Vibration.
RN- ISVR-TR-49

PY- May 71
PG- 47p
NT- Spon- Sponsored By Min. of Defence
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7123; STAR0920
AB- No abstract available.
DE- *Low frequencies; *Pilot performance; *Vibration effects; *Visual acuity; *Visual tasks; Helicopters; Human factors engineering; Reading
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0291087
AA- <NTIS> N71-31660/XAB
TI- Pilot Visual Acuity During Helicopter Flight
AU- Griffin, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
RN- ISVR-TR-44
PY- Feb 71
PG- 43p
NT- Spon- Sponsored By Min. of Defence
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7122; STAR0919
AB- No abstract available.
DE- *Aircraft pilots; *Flight tests; *Visual acuity; Ground tests; Helicopters; Pilot performance; Visual tasks
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0288206
AA- <NTIS> AD-729 840/XAB
TI- Human Factors in Design and Control of Aircraft
TI- <NOTE> Report bibliography Jul 55-Jul 70
CS- Defense Documentation Center Alexandria Va
CS- <CODE> 107200
RN- DDC-TAS-71-43
PY- Aug 71
PG- 234p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC A11/MF A01
JA- GRAI7121
AB- The annotated bibliography contains references to reports which provide human engineering configurations dealing with location and arrangement of controls and displays in aircraft. It also includes pertinent information on the psychological and biomedical aspects of human performance in aviation training as well as in actual flight. A corporate Author-Monitoring Agency and Subject Index are included. (Author)
DE- *Aircraft; *Bibliographies; *Human engineering; Aircraft equipment; Anthropometry; Cockpits; Display systems; Flight crews; Flight instruments; Instrument dials; Jet planes; Instrument panels; Helicopters; Performance(Human); Pilots; Control sticks; Training
ID- NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0284581
AA- <NTIS> AD-873 821/XAB
TI- Suitability of a Drag Sphere Anemometer for Measurement of VTOL Aircraft Downwash
TI- <NOTE> Technical note
AU- Stanton, R. O.
CS- Army Aviation Material Labs., Fort Eustis, Va.
CS- <CODE> 036425
RN- USAAVLABS-TN-4
PY- Jun 70
PG- 27p
NT- Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7119
AB- Tests were conducted on a simple, low-cost drag sphere anemometer to determine its suitability for measuring wind velocities in the vicinity

of VTOL aircraft and helicopters. A drag sphere anemometer is a device for determining wind velocity by measuring the drag force acting on a spherical body of known drag coefficient. The drag sphere anemometer, as tested, was found to be capable of measuring wind velocities and direction in one plane over a speed range of 10 to 110 mph. Instrumentation accuracy was found to be plus or minus 2.5 mph in the speed range of 10 to 50 mph and plus or minus 7% in the speed range of 50 to 110 mph. Directional accuracy was found to be approximately plus or minus 30 deg at low wind speeds, plus or minus 10 deg for speeds from 30 to 60 mph, and plus or minus above 60 mph. On the basis of the relatively unsophisticated tests performed, the drag sphere anemometer is considered to be suitable for measurement of downwash velocities in close proximity to hovering VTOL aircraft. If required, the upper end of the usable speed range could be extended through additional wind-tunnel calibration. (Author)
DE- *Anemometers; *Vertical take-off planes; *Downwash; Performance(Engineering); Wind; Drag; Spheres; Measurement; Helicopters ; Hovering
ID- NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0284561
AA- <NTIS> AD-867 795/XAB
TI- 1100-HP Roller Gear Drive
TI- <NOTE> Final rept
AU- Nasvytis, A. L. ; Hemlein, J. H.
CS- TRW Mechanical Products Div., Cleveland, Ohio.
CS- <CODE> 404984
RN- ER-7378; USAAVLABS-TR-70-3
CN- DA-44-177-AMC-30(T); DA-1-G-162203-D-144; 1-G-162203-D-14414
PY- Jan 70
PG- 83p
NT- Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7119
AB- The report reviews the dynamic load tests performed on two roller gear test units. The primary purpose of the task was to conduct a 200-hour dynamic load test at 100-percent design speed and 100-percent design load. The testing system employed the principle of back-to-back coupling (Four-square loop) of two test units in a closed-power path. An instrumentation system was provided to measure loads, speed, oil flows, pressures, temperatures, and vibration levels. In addition, frequent analysis of the lubrication oil was made to determine the iron content in parts per million to provide a warning of incipient failure. (Author)
DE- *Helicopters; *Reduction gears; Transmission; Performance(Engineering); Test facilities; Test methods; Materials; Design; Loading(Mechanics); Army aircraft
ID- Roller gears; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0283743
AA- <NTIS> AD-728 043/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume III. Avionics Analysis and System Synthesis
TI- <NOTE> Final rept. 30 Jun 69-1 Dec 70
AU- Lindquist, O. H. ; Jones, A. L. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-3; JANAIR-701221
CN- N00014-69-C-0460; NR-213-072
PY- Jul 71
PG- 324p
NT- See also Volume 1, AD-728 041 and Volume 2, AD-728 042.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A14/MF A01
JA- GRAI7119
AB- The analysis and synthesis of an avionics system for a search and rescue mission must take into account the constraints imposed by the aircraft along with the requirements imposed by the mission and the avionic equipment available as described in Volume II. For this purpose an estimate of the helicopter size and operational characteristics required for the 1972-1974 SAR missions was made. These characteristics are presented. In the study the crew workload analyses and the system synthesis were cycled through twice, once for a baseline system and once for a revised system. Prior to the start of the second crew workload analysis, the number of crew members was reduced from five to four, necessitating a redistribution of functions among the crew. Furthermore, the results of the first analyses indicated that a

detailed investigation of the flight control system was required to define the required modes and associated workloads. (Author)
DE- *Rescues; *Helicopters; *Electronic equipment; *Display systems; Analysis; Armed forces operations; Aircraft equipment; Job analysis; Systems engineering
ID- *Search and rescue; *Avionics; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0283742
AA- <NTIS> AD-728 042/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume II. SAR Requirements and Technology Survey
TI- <NOTE> Final rept. 30 Jun 69-1 Dec 70
AU- Lindquist, O. H. ; Jones, A. L. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-2; JANAIR-701220
CN- N00014-69-C-0460; NR-213-072
PY- Jul 71
PG- 188p
NT- See also Volume 1, AD-728 041 and Volume 3, AD-728 043.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- GRAI7119
AB- The volume covers the initial work tasks of this multiservice (USN, USA, USAF, USCG) research effort which pertains to airborne displays and controls for search and rescue vehicles for the 1972-1974 time frame. The work tasks include collection of SAR mission objectives from the four services, description of flight misssion profiles by mission segments, identification of functional requirements to be met and technology surveys of industry to determine applicable avionics capabilities. (Author)
DE- *Rescues; *Helicopters; *Electronic equipment; *Display systems; Aircraft equipment; Analysis; Sensors; Armed forces operations; Search radar; Television equipment; Low-intensity illumination; Infrared detectors
ID- *Search and rescue; *Avionics; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0283741
AA- <NTIS> AD-728 041/XAB
TI- An Investigation of Airborne Displays and Controls for Search and Rescue (SAR). Volume I. Summary
TI- <NOTE> Final rept. 30 Jun 69-1 Dec 70
AU- Lindquist, O. H. ; Jones, A. L. ; Wingert, J. W.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12609-FR1-VOL-1; JANAIR-701219
CN- N00014-69-C-0460; NR-213-072
PY- Jul 71
PG- 46p
NT- See also Volume 2, AD-728 042 and Volume 3, AD-728 043.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7119
AB- An analytical synthesis and evaluation of an avionic system and its airborne displays and controls was performed for a hypothetical Search and Rescue helicopter of the 1972-1974 era. The requirements for the system were based on composite mission and operational requirements obtained from four services: U.S. Navy, U.S. Air Force, U.S. Army and U.S. Coast Guard. The candidate systems evaluated were selected from equipment that was state of the art now or readily could be by 1972. The evaluations of the candidate systems were based on the functional performance of the equipment and on the crew-equipment interface suitability as measured by crew workload. The configuration recommended met most, but not all, of the composite mission requirements. Additional development was suggested in areas where the equipment or the crew-equipment interface evaluations indicated a deficiency in performance. (Author)
DE- *Rescues; *Helicopters; *Electronic equipment; *Display systems; Aircraft equipment; Analysis; Armed forces operations
ID- *Search and rescue; *Avionics; NTISN
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and

Development--Emergency Services and Planning); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0282240
AA- <NTIS> AD-727 772/XAB
TI- Acquisition Slant Ranges for Targets
TI- <NOTE> Final rept
AU- Self, H. C.
CS- Aerospace Medical Research Lab Wright-Patterson AFB Ohio
CS- <CODE> 009850
RN- AMRL-TR-70-96
CN- AF-7184; 718404
PY- May 71
PG- 29p
NT- Presented at the Remote Control Technologies Symposium held in Santa Monica, Calif., 20 May 70.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7118
AB- The report summarizes several studies on display systems having to do with target detection or recognition and all having implications for target acquisition slant range. It considers size, contrast and resolution as important. It is noted that large, clearly-resolved targets are often missed or are detected only at close ranges, even at helicopter speeds. A requirement of 15-20 TV lines on target and 12-20 minutes of arc angular subtense on displays is discussed for unbriefed targets. This means that only narrow ground swaths can be displayed. Percentages of unbriefed targets detected as well as acquisition ranges are noted in relation to the maximum permited by the displayed size and resolution of the target images. (Author)
DE- *Target recognition; *Target discrimination; *Television display systems; Performance(Human); Performance tests; Target acquisition; Images; Factor analysis; Statistical analysis; Ranges(Distance); Velocity
ID- Slant range; NTISAF
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0279904
AA- <NTIS> AD-726 949/XAB
TI- Environmental Effects on Attack Helicopter Crew Task Performance in the NATO Theater
AU- Knapp, S. C.
CS- Army Aeromedical Research Lab Fort Rucker Ala
CS- <CODE> 404578
RN- USAARL-71-21
CN- DA-3-A-062110-A-819
PY- May 71
PG- 43p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7117
AB- The report addresses the unique tasks, requirements and demands upon attack helicopter crews and the effects of the environment upon the performance of these tasks. Night operations under low ceilings, reduced visibility, high or low speeds, nap-of-the-earth flight profiles and a threat of sophisticated antiaircraft weaponry is defined as the 'worst-credible-environment' for the NATO theater. In this environment, the attack helicopter and its crew will be expected to fly a large percentage of its missions and deliver its ordnance with a high degree of accuracy. Task performance is outlined in a detailed matrix. Collective tasks are grouped into functional task clusters. The effects of climatic conditions, the hostile threat, social and civil factors upon performance of these task clusters are discussed. The effects of the machine/mission created environment are presented and include hypoxia, toxic products, temperature extremes, visual and optical problems, acoutics, vibration, and human factors. Aircraft safety and reliability are directly affected by all of these factors. (Author)
DE- *Flight crews; *Aviation medicine; Helicopters; Environment; Man-machine systems; Stress(Psychology); Stress(Physiology); Mission profiles; Performance(Human); Aerial warfare
ID- NATO; NTISA
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0276871
AA- <NTIS> SAN-805-1/XAB
TI- Feasibility Study of Design and Fabrication of Nuclear Helicopter Lift Indicator (Nuheli). Final Report, July 1968-July 1970, Phases I and II
AU- Blincow, D. W.

CS- Tyco Labs., Inc., Pomona, Calif. General Nucleonics Div.
CN- AT(04-3)-805
PY- Feb 71
PG- 138p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- GRAI7115; NSA2511
AB- For abstract, see NSA 25 11, number 23881.
DE- *Aircraft; *Densimeters; *Gages and meters
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 0271013
AA- <NTIS> AD-831 126/XAB
TI- Container for Air-Ground Pickup of Casualties
TI- <NOTE> Technical information rept
CS- Pittsburgh Univ., Washington, D.C. Research Staff.
CS- <CODE> 400454
RN- AMC-TIR-33.8.7.9
CN- DA-49-186-AMC-214(D); DA-1-F-141812-D-194; 1-F-141812-D-19402
PY- Mar 68
PG- 15p
NT- Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7113
AB- The report describes an aluminum container and its associated equipment for the air-ground pickup of casualties. Intended for use in isolated areas lacking adequate medical facilities and transport vehicles, it can contain a human casualty 6 feet 6 inches in height and 2 feet wide, weighing 250 pounds. It is strong enough to withstand a 15-g hoist acceleration. Lift is by means of an aircraft, equipped with a skyhook anchor, locking on to a lift line suspended from a balloon filled with helium gas. (Author)
DE- *Casualties; *Aerial pickup systems; Evacuation; Army operations; Parachutes; Medical equipment; Rescues; Balloons; Aluminum; Pallets; Hoists; Helicopters; Air drop operations; Limited war; Unconventional warfare
ID- HC-130 H aircraft; C-130 aircraft; NTISA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0270997
AA- <NTIS> AD-819 971/XAB
TI- CAL/TRECOM Symposium Proceedings. Volume II. Dynamic Load Problems Associated with Helicopters and V/STOL Aircraft, June 26-28 Buffalo, N.Y
CS- Army Transportation Research Command, Fort Eustis, Va.
CS- <CODE> 042200
PY- 28 Jun 67
PG- 298p
NT- See also Volume 1, AD-819 970, and Volume 3, AD-819 972. Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A13/MF A01
JA- GRAI7113
AB- ;Contents: A review of the structural dynamic characteristics of the XC-142A aircraft; propeller whirl flutter considerations for V/STOL aircraft; high-speed shafting for power transmission in aircraft; dynamic torsional problems in VTOL drive trains with universal joints; recent work at the Royal Aircraft Establishment on helicopter dynamic loads, with particular reference to high blade incidence problems; some results from the army low altitude, high-speed flight program (man-machine); human factor problems associated with low altitude high-speed (LAHS) flight; effect of gust alleviation system on dynamic airloads; and an analytical investigation of aircraft loads induced by rough terrain landings.
DE- *Helicopters; *Vertical take-off planes; *Short take-off planes; Aerodynamic characteristics; Aerodynamic loading; Symposia; Army aircraft; Wind tunnel models; Airplane models; Flight testing; Stresses ; Level flight; Transport planes; Tilt wings; Structural properties; Propellers(Aerial); Flutter; Military requirements; Drive shafts; Vibration; Data processing systems; Rotor blades(Rotary wings); Rotary wings; Man-machine systems; Human engineering; Gust loads; Loading(Mechanics); Aircraft landings

ID- C-142 aircraft; Gust alleviation; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0270974
AA- <NTIS> AD-801 262/XAB
TI- International Aerospace Instrumentation Symposium (4th) Presentation on the Measurement and Analysis of Rotor Blade Airloads and the Resulting Dynamic Response of a Large Tandem Rotor Helicopter
AU- Pruyn, R. ; Obbard, J. ; Shakespeare, C.
CS- Boeing Co., Morton, Pa. Vertol Div.
CS- <CODE> 365150
RN- D8-0296
CN- DA-44-177-AMC-124(T)
PY- 22 Mar 66
PG- 47p
NT- Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A03/MF A01
JA- GRAI7113
AB- A highly instrumented tandem rotored helicopter has been flight tested to obtain rotor airload pressures, rotor blade bending, rotor hub motions, rotor shaft and control loads and the resulting fuselage vibration. These data were recorded in flight on magnetic tape and ground processed using an analog to digital converter and extensive computer analyses. The systems and procedures utilized included extensive interaction calibration corrections. Analyses to determine the accuracy of the data have been developed to compare redundant but independent measurements. The results were prepared for review, analysis and further consideration with the aid of automatic plotting equipment. (Author)
DE- *Helicopters; *Helicopter rotors; *Rotor blades(Rotary wings); Flight testing; Aerodynamic loading; Motion; Instrumentation; Measurement; Bending; Deflection; Vibration; Fuselages; Magnetic recording systems; Data; Analog-to-digital converters
ID- H-47 aircraft; Tandem helicopter rotors; Symposia; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0270406
AA- <NTIS> AD-723 352/XAB
TI- The Shock and Vibration Bulletin. Part 7. Mathematical Analysis, Fluid-Structure Interactions
CS- Shock and Vibration Information Center (Defense) Washington D C
CS- <CODE> 389004
RN- BULL-41-PT-7
PY- Dec 70
PG- 226p
NT- Symposium on Shock and Vibration (41st) held at the Air Force Academy, Colo., on 27-29 Oct 70. See also PART >4 AD-723 351.
NT- Paper copy available from Director, Navy Publications and Printing Service Office, Naval District of Washington, Bldg. 157-2, Washington Navy Yard, Washington, D. C. 20390 at $15.00/set. No copies furnished by DDC or NTIS.
DT- Conference proceeding
PC- Not available NTIS
JA- GRAI7113
AB- ;Contents: Determination of structural properties from test data; Validity of mathematical models of dynamic response of structures to transient loads; Dynamic response of plates with cut-outs; Natural frequencies and mode shapes of plates with interior cut-outs; Finite beam elements for dynamic analysis; Evaluation of models for one-dimensional vibration systems; Dynamic elastoplastic response of nonlinear shells of revolution under impulsive and thermal loadings; Rigid body motions of elastically restrained underwater structures from detonation-induced shock; Extension of classical binary flutter model using root locus; Stiffness and mass matrices for a triangular element; Helicopter fuselage vibration response analysis using the hybrid computer; Vibration of a class of nonconservative systems with time-dependent boundary conditions; A variational approach to the fluid-shell dynamic interaction problem; Mechanical model of propellant free-surface vibrations in the Saturn s-ivb; The effect of liquid oscillations on the LM propellant quantity gauge system; Derivation of Skylab propellant storage module random vibration environment; The flutter of a hydrofoil.
DE- *Shock(Mechanics); *Vibration; Symposia; Naval research; Stress(Physiology); Acceleration; Damping; Vibration isolators; Test facilities; Instrumentation; Mathematical analysis; Stresses; Ships; Guided missiles; Aircraft; Spacecraft; Weapon systems; Dynamics; Fluid mechanics
ID- Shock isolation systems; Shock spectra; Holographic interferometry; NTISN
SH- 46E (Physics--Structural Mechanics)

AZ- 0270403
AA- <NTIS> AD-723 349/XAB
TI- The Shock and Vibration Bulletin, Part 4. Vibration
CS- Shock and Vibration Information Center (Defense) Washington D C
CS- <CODE> 389004
RN- BULL-41-PT-4
PY- Dec 70
PG- 245p
NT- Symposium on Shock and Vibration (41st) held at the Air Force Academy, Colo., on 27-29 Oct 70. See also Part 3, AD-723 348 and Part 5, AD-723 350.
NT- Paper copy available from Director, Navy Publications and Printing Service Office, Naval District of Washington, Bldg 157-2, Washington Navy Yard, Washington, D. C. 20390 at $15.000/set. No copies furnished by DDC or NTIS.
DT- Conference proceeding
PC- Not available NTIS
JA- GRAI7113
AB- ;Contents: Survey of space vehicle vibration analysis and test techniques; Methods used to realistically simulate vibration environments; Simulation of complex-wave periodic vibration; Rationales applying to vibration for maintenance; Specification of sine vibration test levels using a force-acceleration product technique; Some effects of equalization with a single mass vs an elastic system on accelerations and stresses; A method for predicting structural responses from lower level acoustic tests; Sweep speed effects in resonant systems; The dynamic response of a steel eyebar chain suspension bridge over the Ohio River to various excitations; Dual specifications in random vibration testing, an application of mechanical impedance; Vibration - a diagnostic tool for shock design; The resonant response of a mechanically system subjected to logarithmically swept and notched base excitation, using asymptotic expansion; Effects of flight conditions upon gunfire induced vibration environment; The box car dynamic environment; The noise environment of a deflected-jet VTOL aircraft; Vibration signature analysis of bearings and electronic packages; Outer loop control for vibration testing; Empirical prediction of missile flight random vibration; Structural vibrations in the bell AH-1G helicopter during weapon firing; Characteristics of gunfire induced vibration in helicopters; Inflight vibration and noise study of three helicopters.
DE- *Shock(Mechanics); *Vibration; Symposia; Naval research; Stress(Physiology); Acceleration; Damping; Vibration isolators; Test facilities; Instrumentation; Mathematical analysis; Stresses; Ships; Guided missiles; Aircraft; Spacecraft; Weapon systems; Dynamics; Fluid mechanics
ID- Shock isolation systems; Shock spectra; Holographic interferometry; NTISN
SH- 46E (Physics--Structural Mechanics)

AZ- 0269377
AA- <NTIS> N71-20113/XAB
TI- Effects of Noise and Vibration on Commercial Helicopter Pilots. Results of Phase 1 Research Final Report
AU- Ketchel, J. M. ; Malone, T. B. ; Schweickert, G. A.
CS- Matrix Corp., Alexandria, Va. Human Factors Div.
RN- NASA-CR-117181
CN- NASW-1829
PY- 7 Apr 70
PG- 101p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- GRAI7112; STAR0909
AB- No abstract available.
DE- *Aircraft noise; *Aircraft pilots; *Helicopters; *Vibration effects; Comfort; Human factors engineering; Physiological effects; Pilot performance; Psychological effects
ID- NASA subject code 04
SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0268577
AA- <NTIS> AD-722 827/XAB
TI- High Altitude Evaluation of the Hiller Model 1961 Uh-12E Helicopter
TI- <NOTE> Rept. for 23 Sep-18 Oct 60
AU- Kidwell, J. C. ; Seigler, J. P. ; Armstrong, D.
CS- Aviation Test Office (Army) Edwards AFB Calif
CS- <CODE> 406600
RN- ATO-TR-61-3
PY- Mar 61
PG- 91p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- GRAI7112
AB- The report presents the results of a limited performance and handling qualities evaluation of the Hiller Model 1961 UH-12E helicopter. The tests were conducted by the U.S. Army Aviation Test Office, Edwards Air Force Base, California for the U.S. Forest Service. The purpose of the program was to establish the high altitude hovering and take-off performance of the helicopter. Additional data was obtained during supplemental climb, level flight, autorotation and handling qualities tests. All performance data was quantitative and was obtained from calibrated instrumentation. All handling qualities data resulted from qualitative analysis of tests flown by the military project pilot. (Author) 9
DE- *Helicopters; Performance(Engineering); High altitude; Helicopter rotors; Hovering; Take-off; Climbing; Level flight; Aircraft landings; Helicopter engines; Human engineering
ID- H-12 aircraft; UH-12E aircraft; UH-12E/61 aircraft; NTISA
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0266719
AA- <NTIS> AD-722 202/XAB
TI- Development of Instrumentation for the Study of Pilots' Eye Movements in Army Helicopters
TI- <NOTE> Technical development rept
AU- Farrand, R. E. ; Sunkes, J. A.
CS- Federal Aviation Agency Indianapolis Ind Technical Development Center
CS- <CODE> 404286
RN- FAA-TDR-377
PY- Dec 58
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7111
AB- As part of a program to establish cockpit visibility requirements for Army helicopters, a method of instrumentation was established to record photographically pilots' eye movements in various helicopters during flight in order to determine visual windshield usage. Two methods of recording pilots' eye movements were considered; namely, (1) the use of a camera located behind the pilot which viewed his eyes through a mirror located ahead of him on the instrument panel, and (2) the use of a camera located in front of the pilot. The second method was selected. Accuracy of reading or interpreting the photographic data obtained from the instrumentation was established through the conduct of tests performed in the H-13 and H-21 helicopters, which were selected as being representative of various types of Army helicopters. These tests revealed that it was possible to determine the actual location of the area of the windscreen through which the pilot was looking, within 10 degrees vertically and horizontally during at least 72 per cent of the time for the H-13 helicopter, and 60 per cent of the time for the H-21 helicopter. (Author)
DE- *Pilots; *Vision; *Cockpits; Visibility; Measurement; Instrumentation; Helicopters
ID- H-13 aircraft; H-21 aircraft; NTISFAA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0263986
AA- <NTIS> PB-197 921/XAB
TI- Nebraska's Air Ambulance Project. 'Operation Sky-Aid'
TI- <NOTE> Final rept
AU- Karthauser, C. P. ; German, J. D. ; Sweetman, J. L. ; Haith, P. R.
CS- Nebraska Univ., Omaha. College of Medicine.
CS- <CODE> 401631
RN- DOT-HS-008 478
CN- NHSB-EM68-1-001; NHSB-EM68-1-002
PY- 1 Jul 69
PG- 41p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7109
AB- The objectives of the demonstration project were: To field test under civilian conditions the role a helicopter might play in providing emergency service under the most diversified combination of circumstances possible, and to provide operating data pertinent to helicopter operations, i.e., weather, night flying, safety, communications, and maintenance. (Author)
DE- *Medical services; *Helicopters; *Motor vehicle accidents; Aeronautics; Night; Weather; Safety; Communicating; Maintenance; Nebraska
ID- *Highway emergency medical services; Helicopter ambulances; NTISNHSB

SH- 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0262822
AA- <NTIS> AD-720 563/XAB
TI- Rescue Equipment, Aircraft Crash
TI- <NOTE> Final rept. on materiel test procedure
CS- Army Test and Evaluation Command Aberdeen Proving Ground Md
CS- <CODE> 041750
RN- MTP-7-3-090
CN- AMCR-310-6
PY- 27 Jan 71
PG- 24p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- GRAI7109
AB- Procedures are identified for evaluation of aircraft borne aircraft crash rescue equipment under simulated tactical conditions. Helicopter mounted rescue hoists and accessories are also included. (Author)
DE- *Aircraft equipment; *Test methods; Rescues; Airborne; Hoists; Installation; Maintainability; Safety; Aircraft fires
ID- *Commodity service test procedures; Aircraft crash rescue equipment; NTISA
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0262049
AA- <NTIS> PB-197 753/XAB
TI- Emergency Medical Services for an Urban Area
CS- Michigan Univ., Ann Arbor. Highway Safety Research Inst.
RN- DOT-HS-800 418
CN- FH-11-6901
PY- Jul 70
PG- 474p
NT- See also Summary rept., PB-197 752. Prepared in cooperation with Department of Streets and Traffic, Detroit, Mich.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A20/MF A01
JA- GRAI7108
AB- A report describing the recent study of Detroit's public ambulance service is submitted. The report consists of two volumes: One is a summary while the other contains the complete details, methods and findings of the project. The types of service demonstrated included the police and fire rescue squad emergency response system presently in use, a commercial service which provided data for both a private franchise service and a public ambulance corps as alternatives to the present system, and a helicopter ambulance which supplemented the ground systems. Evaluation was based on the speed of service, the quality of treatment, and the costs of each of the methods.
DE- *Medical services; *Urban areas; Police; Fire departments; Ambulances; Systems analysis; Cost analysis; Accidents; Reaction time; Michigan; Evaluation
ID- *Emergency medical services; *Detroit(Michigan); NTISNHSB
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0260404
AA- <NTIS> AD-719 280/XAB
TI- Evaluation of Fuel Flowmeter Instrumentation
TI- <NOTE> Final rept. 5 Aug-20 Oct 70
AU- Winn, A. L. ; Jefferis, R. P.
CS- Army Aviation Systems Test Activity Edwards AFB Calif
CS- <CODE> 036470
RN- USAAST-70-33
PY- Jan 71
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- GRAI7108
AB- Flight tests on the Flow Technology Inc. standard line turbine flow transducer were conducted between 5 August and 20 October 1970 to determine its acceptability as a test instrument. The evaluation was

conducted at Edwards Air Force Base, California, by the US Army Aviation Systems Test Activity. Ground calibrations showed that the sensor can be used with precision equal to present flow measurement methods. The testing consisted of 2.9 flight hours with the measurement systems mounted in a UH-1C helicopter. The Flow Technology sensor performance was compared to that obtained with standard Potter and Revere flight test systems. Results show that the sensor is acceptable as a flight test instrument. The indicator sensitivity is excellent and there was no degradation of meter performance with variations in engine power or flight conditions. Although the indicator scale range was suitable for this test, the range is not large enough to be operable on all Army aircraft. (Author)

DE- *Test equipment; *Flowmeters; *Aircraft engines; Reliability; Test methods; Fuel systems; Helicopters; Fuel consumption; Measurement; Sensors; Flight testing

ID- H-1 aircraft; UH-1C aircraft; NTISA

SH- 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0258595

AA- <NTIS> AD-718 519/XAB

TI- Development of Remote Methods for Obtaining Soil Information and Location of Construction Materials Using Gamma Ray Signatures for Project Themis

TI- <NOTE> Semi-annual rept

AU- Adams, J. A. S. ; Clark, H. C. ; Clark, R. B. ; Cook, B. G. ; Duval, J. S.

CS- Rice Univ Houston Tex Dept of Geology

CS- <CODE> 406440

CN- DACA39-69-C-0048

PY- 15 Dec 70

PG- 275p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A12/MF A01

JA- GRAI7107

AB- A major emphasis in recent years has been the development, calibration, and field testing of airborne gamma-ray spectrometer systems, particularly with the low levels and slow speeds attainable with helicopters. The research described in the following pages is directed toward three main end uses: terraine analysis, including the characterization of soils and rocks on the basis of their thorium, uranium, and potassium contents; trafficability; building materials, e.g. limestone with optimum clay content for cement; soil moisture; direct exploration for economic deposits of thorium and uranium; indirect mineral exploration for minerals associated with radioactive minerals, e.g. placer gold, or with potassium alteration, e.g. copper; rapid location and assessment of fission product contamination of the environment. (Author)

DE- *Geophysical prospecting; *Soils; *Nuclear radiation spectrometers; *Construction materials; Gamma-ray spectroscopy; Gamma-ray spectra; Design; Sources; Thorium compounds; Uranium compounds; Potassium compounds; Terrain; Geochemistry; Airborne; Gamma counters; Spectrum signatures; Helicopters; Computer programs; Rock(Geology); Limestone; Economic geology; Puerto Rico; Texas

ID- *Remote sensing; Themis project; Gamma spectrometers; Computerized simulation; NTISA

SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 0258447

AA- <NTIS> AD-718 371/XAB

TI- Skyhook Churchill 1970

TI- <NOTE> Final rept

AU- Cravaack, C. H. ; Pappas, T.

CS- Raven Industries Inc Sioux Falls S Dak Flight Operations Dept

CS- <CODE> 405675

RN- R-1270032

CN- N00014-70-C-0231

PY- 28 Dec 70

PG- 190p

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A09/MF A01

JA- GRAI7107

AB- The program was funded for a period of forty-five days in the field at Fort Churchill, Manitoba. Raven provided a field crew, suspension and rigging hardware, aircraft and helicopter tracking as well as gondola recovery, parachutes, balloon telemetry and control instrumentation, down-range tracking station, and reports and documentation as necessary. Of the nineteen balloons used, sixteen were successful flights. The report describes individual flights, equipment used,

flight data, and various program summary information. (Author)
DE- *Meteorological balloons; *Cosmic rays; *Stratosphere; Performance(Engineering); Measurement; Meteorological parameters; Launching; Radar tracking; Recovery; Balloon equipment; Telemeter systems; Gondolas; Cordage; Helicopters; Malfunctions; Flight paths; High altitude; Synchronous satellites; Research satellites; Climatology

ID- Fort Churchill (Canada); Skyhook Program; Skyhook balloons; OGO 6 satellite; NTISA
SH- 55A (Atmospheric Sciences--Aeronomy); 54D (Astronomy and Astrophysics--Cosmic Ray Research)

AZ- 0254261
AA- <NTIS> AD-716 768/XAB
TI- The Effect of Earplugs on Passenger Speech Reception in Rotary-Wing Aircraft
AU- Williams, C. E. ; Forstall, J. R. ; Parsons, W. C.
CS- Naval Aerospace Medical Research Lab Pensacola Fla
CS- <CODE> 406061
RN- NAMRL-1121
CN- MF12.524.005; A3405314/561-B/1F1252-44-02
PY- 27 Oct 70
PG- 14p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR7105
AB- Direct person-to-person speech communication is sometimes required in rotary-wing aircraft where high levels of noise make the use of hearing protective devices desirable. The question arises as to what effect earplugs would have on the intelligibility of speech in rotary-wing aircraft. Intelligibility test data obtained in flight as well as in a simulated flight situation indicate that the use of earplugs in rotary-wing aircraft will improve the reception of direct person-to-person speech communication. Moreover, their use will afford protection against the deafening, fatigue, and annoyance effects of the hazardous noise present in rotary-wing aircraft. (Author)
DE- *Ear protectors; *Voice communication systems; Airplane noise; Helicopters; Intelligibility; Feasibility studies; Performance tests; Flight simulators; Flight testing; Human engineering; Test methods; Test equipment
ID- Ear plugs; NTISN
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0253039
AA- <NTIS> AD-867 067/XAB
TI- Integrated Aircraft Instrumentation
TI- <NOTE> Final rept. on materiel test procedure
CS- Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
CS- <CODE> 041750
RN- MTP-6-2-140
CN- AMCR-310-6
PY- 16 Jan 70
PG- 11p
NT- Distribution Limitation now Removed.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR7104
AB- The report describes test methods and techniques for evaluating the technical performance and characteristics of integrated aircraft instrumentation and flight control of army tactical aircraft (fixed wing, rotary wing, and compound types). The evaluation is related to criteria prescribed in applicable qualitative materiel requirements, small development requirements, technical characteristics, or other applicable design requirements and specifications. (Author)
DE- *Army aircraft; *Flight instruments; *Flight control systems; Test methods; Compatibility; Performance(Engineering); Military requirements

ID- Commodity engineering test procedures; NTISA
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51C (Aeronautics and Aerodynamics--Aircraft); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0251927
AA- <NTIS> PB-196 014/XAB
TI- Visual Factors in Transportation Systems
CS- National Academy of Sciences-National Research Council, Washington, D.C.
CS- <CODE> 240150

PY- 1969
PG- 135p
NT- Proceedings of Spring Meeting, 1969, NAS-NRC Committee on Vision.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A07/MF A01
JA- USGRDR7103
AB- Contents: Visual problems of truck and bus drivers; Visual problems in automobile driving; Factors in visibility and legibility of highway signs and markings; Requirements for automobile exterior lighting; Factors in highway lighting; Selected visual problems of an air line pilot; Visual problems of the air traffic controller; Some display concepts in air traffic control; The helicopter in high density traffic; Measurement of height and distance information provided pilots by the extra-cockpit visual scene; Visual illusions in aircraft accidents.
DE- *Highway transportation; *Visibility; *Air transportation; *Visual perception; Human factors engineering; Automobiles; Buses(Vehicles); Trucks; Motor vehicle operators; Lamps; Highway lighting; Pilots(Personnel); Air traffic controllers; Air traffic control; Helicopters; Illusions; Meetings
ID- Highway signs; NTISNAS
SH- 85D (Transportation--Transportation Safety); 85A (Transportation--Air Transportation)

AZ- 0247382
AA- <NTIS> AD-714 670/XAB
TI- Suitability Flight Test of the Kaiser Fp-50A Display Unit in the Ah-1G(COBRA) Helicopter
TI- <NOTE> Technical note
AU- Stowell, H. R. ; Foster, M.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-9-70
PY- Sep 70
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR7101
AB- The Kaiser FP-50A display unit is modified to provide tactical information to the pilot. Inputs are received from the gunner's sight to present steering information for the pilot to maneuver the aircraft into position to fire rockets at a target being tracked by the gunner. The report presents work performed to support the SEA NITEOPS Program. Human factors engineering guidance is provided to the program by the Human Engineering Laboratories. This phase of the program involved making a human factors evaluation of the Kaiser FP-50A flight display integrated with the AH-1G (COBRA) weapon system (XM-28). (Author)
DE- *Aircraft fire control systems; *Helicopters; Display systems; Flight testing; Steering; Aerial gunnery; Human engineering
ID- AH-1G aircraft; H-1 aircraft; Huey Cobra; NTISA
SH- 79F (Ordnance--Fire Control and Bombing Systems)

AZ- 0234739
AA- <NTIS> N70-29618/XAB
TI- Problems of the Cockpit Environment
CS- Advisory Group for Aerospace Research and Development, Paris (France).
RN- AGARD-CP-55
PY- Mar 70
PG- 396p
NT- Lang- Mostly in English, Partly in French Conf- Presented At 16th Avionics Panel Tech. Symp., Amsterdam, Nov. 1968
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A17/MF A01
JA- USGRDR7018; STAR0815
AB- No abstract available.
DE- *Aircraft instruments; *Cockpit simulators; *Conferences; *Display devices; *Man machine systems; *Pilot performance; Aircraft design; All-weather air navigation; Anthropometry; Crews; Engine monitoring instruments; Helicopters; Navigation aids; V/stol aircraft; Vertical takeoff aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0234237
AA- <NTIS> AD-709 460/XAB

TI- Integrated Vertical Display Research
TI- <NOTE> Final technical rept
AU- Wooding, H. C. ; Simpson, J. A. ; Harper, H. ; Sweetnam, R.
CS- United Aircraft Corp Norwalk Conn Norden Div
CS- <CODE> 258550
RN- 1161-R-0037; JANAIR-680611
CN- NONR-4489(00); NR-213-036
PY- Jul 70
PG- 158p
NT- Sponsored in part by Naval Air Systems Command, Washington, D. C., and Army Electronics Command, Fort Monmouth, N. J.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- USGRDR7018
AB- Simulation studies were conducted with eight civilian and military pilot subjects. A series of flight maneuvers were performed using a hypothetical tilt-wing vehicle, and the integrated electronic vertical display (IEVD) with a set of conventional instruments. Comprehensive data acquisition, computation and online printout of error scores were utilized. Data reduction and statistical analysis ensued to determine the efficacy of performance to the criteria model and to the set of conventional instruments. (Author)
DE- *Flight instruments; Display systems; Problem solving; Systems engineering; Experimental design; Specifications; Models(Simulations); Data processing systems; Human engineering; Mission profiles; Performance(Human); Statistical analysis; Helicopters; Jet planes; Performance(Engineering)
ID- Integrated electronic vertical display systems; Criteria; Evaluation
SH- 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0232776
AA- <NTIS> AD-709 124/XAB
TI- Geographic Orientation in Air Operations, Proceedings of a Symposium Held at Washington, D. C. On 18-20 November 1969
AU- McGarth, J. J.
CS- Anacapa Sciences Inc Santa Barbara Calif
CS- <CODE> 405951
RN- 101-1
CN- N00014-70-C-0066; NR-213-028
PY- Apr 70
PG- 321p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A14/MF A01
JA- USGRDR7017
AB- The document records the proceedings of a symposium on geographic orientation of aircraft pilots during various phases of air operations. The meeting was attended by experts in the fields of technology related to the development and use of aeronautical charts and map-display systems for manned aircraft. The principal topics of the symposium were user requirements, cartographic developments, map-display design, CRT/map displays, human factors and systems analysis studies, cartographic support of map displays, and field evaluations of map displays. The recorded proceedings include the manuscripts of a keynote address and 30 technical papers, edited transcripts of the discussions that followed the papers, summary reports of five special discussion groups, a special report of JANAIR research in this field, an overview of the symposium proceedings, and a directory of the participants. (Author)
DE- *Navigational aids; *Cockpits; Symposia; Display systems; Management planning; Pilots; Television display systems; Maps; Navigation charts; Radar equipment; Cathode ray tube screens; Human engineering; Color film; Helicopters; Questionnaires; Terrain models
ID- *Geographic orientation; Management information systems
SH- 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 0228642
AA- <NTIS> AD-707 372/XAB
TI- U. S. Army Primary Helicopter School Training Program Performance Norms
TI- <NOTE> Technical memo
AU- Barnes, J. A. ; Statham, F. D.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-8-70
PY- Apr 70
PG- 93p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR7015
AB- The helicopter pilot training program of the Army differs from those of the other services in concept; it takes nonpilot servicemen and trains them to fly helicopters. The study provides normative performance data for a pilot trainee in an Army light observation helicopter as a first step toward establishing normative data for pilot performance in all Army helicopters. (Author)
DE- *Helicopters; *Army training; *Performance(Human); Standards; Pilots; Programmed instruction; Statistical processes; Analysis of variance; Sequences
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0228641
AA- <NTIS> AD-707 371/XAB
TI- Exploratory Study of Pilot Performance During High Ambient Temperatures/Humidity
TI- <NOTE> Technical memo
AU- Moreland, S. ; Barnes, J. A.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-6-70
PY- Mar 70
PG- 88p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR7015
AB- The purpose of the study was to measure performance changes which may occur when Army personnel, wearing complete operational/combat flight clothing and equipment, fly a light observation helicopter during periods of high ambient temperature and humidity. Important relationships were found between physiological changes and crew station environment. An equation was developed to quantify a hypothetical relationship between performance, environment and physiological changes. (Author)
DE- *Pilots; *Stress(Physiology); Weather; Helicopters; Solar radiation; Temperature; Humidity; Performance(Human); Flight clothing; Survival kits; Compatibility; Factor analysis; Fatigue(Physiology); Human engineering; Psychometrics
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0225204
AA- <NTIS> AD-706 001/XAB
TI- Effects of Varying Levels of Autopilot Assistance and Workload on Pilot Performance in the Helicopter Formation Flight Mode
TI- <NOTE> Final technical rept. Dec 67-Apr 68
AU- Anderson, P. A. ; Toivanen, M. L.
CS- Honeywell Inc Minneapolis Minn Systems and Research Center
CS- <CODE> 402349
RN- 12543-FR4; JANAIR-680610
CN- N00014-66-C-0362; NR-213-054
PY- Mar 70
PG- 237p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A11/MF A01
JA- USGRDR7013
AB- The objective of the study was to evaluate pilot performance in manual IFR formation flight with varying levels of autopilot assistance and pilot workload. The study was conducted for a conventional helicopter, i.e., the UH-1 Iroquois, and an advanced vehicle, the AH-56 Cheyenne. Man-in-the-loop simulations of these vehicles were conducted to evaluate pilot performance under six levels of autopilot assistance, ranging in sophistication from the free vehicle to outer loop hold modes in heading and altitude, and under three levels of pilot workload, consisting of a forced-pace, secondary concomitant task. Results of the study, within the constraints imposed by the simulation, indicated that increasing the level of autopilot assistance resulted in a less demanding task for the pilot and provided greater system stability. This was borne out in terms of both quantitative performance data and pilot opinion. However, position errors were not consistently reduced beyond the levels obtained during manual flight control modes where the highly quickened display was used. Only at the highest workload level tested did autopilot assistance serve to reduce the position errors from what was experienced under the manual control conditions. (Author)
DE- *Helicopters; *Formation flight; *Pilots; Performance(Human); Automatic pilots; Job analysis; Operations research; Statistical data
ID- UH-1 aircraft; H-1 aircraft; AH-56 aircraft; H-56 aircraft

SH- 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0224798
AA- <NTIS> AD-705 594/XAB
TI- Tactical Utility Helicopter Information Transfer Study
TI- <NOTE> Technical memo
AU- Barnes, J. A.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-7-70
PY- Mar 70
PG- 100p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR7013
AB- The task requirements of the Tactical Utility Helicopter Mission were enumerated and experienced pilots have indicated the instrumentation they feel is necessary to perform these tasks. Film of eye movement was taken for two of the pilots while they were flying missions that encorporated these tasks. The film and the pilot replies were analyzed to provide the information transfer requirements for the Tactical Utility Helicopter flight instrumentation. (Author)
DE- *Helicopters; *Flight instruments; *Human engineering; Information retrieval; Display systems; Military requirements; Utility planes; Job analysis; Visual perception; Control systems
ID- Information transfer; H-1 aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0224463
AA- <NTIS> AD-705 256/XAB
TI- A Doppler Inertial Investigation
TI- <NOTE> Technical rept
AU- Galanti, C. J. ; Levine, I.
CS- Army Electronics Command Fort Monmouth N J
CS- <CODE> 037620
RN- ECOM-3247
CN- DA-1-H-162202-A-219; 1-H-162202-A-21901
PY- Mar 70
PG- 58p
NT- Supersedes AD-690 789.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR7013
AB- An error analysis of a hybrid doppler-inertial system (second order) was performed with an without noise error sources. From this analysis it was determined that the doppler is the key contributor to the velocity error of the system. Also, a procedure for selecting the parameters of a doppler-inertial system for minimum cost and maximum performance was derived. (Author)
DE- *Doppler navigation; *Inertial navigation; Helicopters; Instrumentation ; Errors; Analysis; Noise(Radio)
SH- 76D (Navigation, Guidance, and Control--Navigation Systems)

AZ- 0222997
AA- <NTIS> AD-704 349/XAB
TI- Correction of Hover Flight Test Results Taken in Wind
AU- McIntyre, W. ; Begley, R. ; Brown, M.
CS- Serendipity Inc Sherman Oaks Calif
CS- <CODE> 405715
RN- TR-70-2
CN- DAAJ01-69-C-0215
PY- Mar 70
PG- 126p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- USGRDR7011
AB- This report presents a procedure for analytically correcting for the effect of wind (dewinding) on a hovering helicopter. This procedure will be much more cost effective than the current method which requires lengthy delays until the wind speed drops below two knots. Dewinding is accomplished by application of the equations of motion and consideration of control changes to flight test data recorded on an incremental digital recording system. An experimental program is outlined to determine first the effective wind acting on a hovering

helicopter and second the effect this wind has on the helicopter. (Author)
DE- *Helicopters; *Hovering; Mathematical models; Meteorological parameters ; Gust loads; Helicopter rotors; Predictions; Instrumentation; Computer logic; Computer programs; Flow charting; Subroutines; Cost effectiveness
ID- Dewinding; Computerized simulation; Computer analysis
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 51C (Aeronautics and Aerodynamics--Aircraft); 62A (Computers, Control, and Information Theory--Computer Hardware)

AZ- 0214303
AA- <NTIS> N70-12825/XAB
TI- Flight Assessment of a Variable-Stability Helicopter for STOL Simulations and Evaluation of the Influence of Several Lateral-Directional Stability Derivatives
AU- Mc Gregor, D. M.
CS- National Research Council of Canada, Ottawa (Ontario). National Aeronautical Establishment.
RN- NRC-NAE-LR-524; NRC-10953
PY- Jun 69
PG- 29p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR7006; STAR0803
AB- No abstract available.
DE- *Controllability; *Flight simulators; *Helicopter performance; *Short takeoff aircraft; *Stability derivatives; Flight characteristics; Maneuverability; Pilot performance
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0213748
AA- <NTIS> AD-699 934/XAB
TI- Measurement of Aircrew Performance: The Flight Deck Workload and Its Relation to Pilot Performance
TI- <NOTE> Conference proceedings
AU- Lauschner, E. A.
CS- Advisory Group for Aerospace Research and Development Paris (France)
CS- <CODE> 400043
RN- AGARD-CP-56
PY- Dec 69
PG- 108p
NT- NATO furnished. Papers presented at symposium held by the Aerospace Medical Panel of AGARD, at USAF School of Aerospace Medicine, Brooks AFB, Tex., 14-15 May 69.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A06/MF A01
JA- USGRDR7006
AB- Contents: Flight-deck workload studies in civil transport aircraft; Energy cost of piloting fixed and rotary wing army aircraft; Psychomotor performance under thermal stress-A critical appraisal; Operational measures of pilot performance during final approach to carrier landing; Aircrew task loading in the Boeing multimission simulator; Physiological assessment of pilot stress during landing; Exploratory study of pilot performance during high ambient temperatures/humidity.
DE- *Flight crews; *Medical research; *Symposia; Performance(Human); Civil aviation; Army aircraft; Stress(Physiology); Carrier landings; Simulators; Physiology; Test methods; Night landings; Environment; Job analysis
ID- NATO; Flight deck workloads
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0209071
AA- <NTIS> AD-698 194/XAB
TI- Effects of Vibration on Navy and Marine Corps Helicopter Flight Crews
TI- <NOTE> Final rept. 1 Feb-31 Jul 69
AU- Ketchel, J. M. ; Danaher, J. W. ; Morrissey, C. J.
CS- Matrix Research Co Alexandria Va
CS- <CODE> 405407
CN- N00014-69-C-0289; NR-145-251
PY- 1 Aug 69
PG- 180p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- USGRDR7003
AB- Identifiable vibration characteristics of contemporary military helicopters are described. These provide a basis for analyzing and interpreting the literature on vibration research. Emphasis is given to experimental results which relate to frequencies and acceleration amplitudes falling within the helicopter main rotor effects region. The spectrum of military helicopters is tabulated briefly and six representative Navy/Marine Corps helicopters, missions and associated flightcrew tasks are described in more detail. Perceptual-motor behaviors comprising crew tasks in the six missions are identified. These are used to relate vibration analysis results to the helicopter situation. (Author)
DE- *Helicopters; *Vibration; Flight crews; Performance(Human); Motor reactions; Fatigue(Physiology); Tolerances(Physiology); Aircraft seats; Aircraft equipment; Helmets; Display systems; Antisubmarine aircraft; Rescues; Close support; Noise; Carbon monoxide; Visibility; Vertigo
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 57W (Medicine and Biology--Stress Physiology)

AZ- 0207719
AA- <NTIS> AD-697 785/XAB
TI- Armor Systems Development/Evaluation Guideline
TI- <NOTE> Technical memo
AU- Golden, M. G.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TM-18-69
CN- DA-1-F-141812-D-154; ORD-67-83; 1-F-141812-D-15401
PY- Sep 69
PG- 185p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- USGRDR7002
AB- This guide was developed to establish a systematic approach to the design of aircrew armor systems. It provides an integrated investigation of the feasibility of adding armor to an aircraft based on the aircraft's systems, mission and performance requirements; and the assessment of the aircrew's 'protection need' based on the aircraft's mission, environment, required aircrew functions, and inherent ballistic protection provided the crew by the aircraft components. The data derived from these analyses are synthesized into an Armor Design/Evaluation Methodology which utilizes a complex computer-graphics technique as a design tool. To illustrate this computer technique, several sample armor configurations modeled on the UH-1C aircraft are developed and evaluated. The effectiveness of this method, however, depends upon the accuracy of the input data generated and upon the application of human factors design principles. (Author)
DE- *Helicopters; *Armor; Human engineering; Pilots; Mission profiles; Body armor; Configuration; Design; Flow charting; Mathematical models; Graphics; Aircraft equipment
ID- Computer analysis; Configuration management; H-1 aircraft; UH-1C aircraft
SH- 74I (Military Sciences--Passive Defense Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0201118
AA- <NTIS> N69-36558/XAB
TI- Evaluation of Used Inflatable Life Boats of Sikorsky Helicopters
TI- <NOTE> Beoordeling Van Gebruikte Drijverlichamen Van de Hoofdwielen Van Sikorsky Helicopters
CS- Rubber Research Inst. TNO, Delft (Netherlands).
RN- REPT-257/'69
PY- 29 May 69
PG- 6p
NT- Lang- in Dutch
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6924; STAR0721
AB- No abstract available.
DE- *Inflatable structures; *Life rafts; *Materials tests; *Service life; Leakage; Lifeboats; Mechanical properties; Wear tests
SH- 47A (Ocean Technology and Engineering--Marine Engineering); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning)

AZ- 0190814
AA- <NTIS> AD-691 299/XAB
TI- An Experimental Study of Pilot Visibility from a VTOL Aircraft in Overwater Hover
TI- <NOTE> Final rept. 22 Jun 67-1 Apr 69
AU- Kurylowich, G. ; Ritter, A.
CS- Cornell Aeronautical Lab Inc Buffalo N Y
CS- <CODE> 098300
RN- CAL-171
CN- N00014-68-C-0241
PY- Apr 69
PG- 58p
NT- Prepared in cooperation with Therm Advanced Research, Inc., Ithaca, N. Y., contract N00014-66-C-0320.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6919
AB- A test program which investigated in small scale the phenomenon of spray generation and the resulting impairment to pilot vision when an in-line VTOL configuration, such as the LTV XC-142A, is in low-altitude overwater hover is described. Also given are the improvements to pilot vision when deflectors are used to divert the spray from principal regions of interest to a pilot. A device in close proximity to the fuselage is, at best, only locally effective. The major conclusion is that a deflector positioned at the water surface cavity produced by the slipstreams of the propellers can be very effective in reducing spray. The use of such a deflector, however, may present potential problems affecting hover performance and spray ingestion through the propeller plane. (Author)
DE- *Vertical take-off planes; *Downwash; *Pilots; *Visibility; Sprays; Sea water; Low altitude; Deflection; Effectiveness; Hovering; Model tests
ID- *Air sea craft; XC-142A aircraft; C-142 aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0187756
AA- <NTIS> AD-688 200/XAB
TI- Effects of Variations in System Data Rates and Measurement Accuracies on Pilot Performance in the Helicopter Ifr Formation Flight Mode
TI- <NOTE> Final technical rept. Dec 67-Apr 68
AU- Anderson, P. A. ; Toivanen, M. L.
CS- Honeywell Inc Minneapolis Minn Systems and Research Center
CS- <CODE> 402349
RN- 12543-FR3; JANAIR-680408
CN- N00014-66-C-0362; NR-213-054
PY- Apr 69
PG- 174p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- USGRDR6915
AB- Since system data rate and accuracy requirements depend on the system's raw data filtering model and its display quickening sensitivity, these two additional parameters and their interactions with the data rate and accuracy parameters were also investigated. Systematic man-in-the-loop simulations were conducted to select ranges of individual parameter variation and to examine relationships between the parameters within the ranges selected. Pilot performance was evaluated for the various combinations of four data update rates, four levels of data accuracy, and three levels of display quickening sensitivity. One specific filtering model was found to be appropriate for the ranges of the other parameters selected during the preliminary phase of the study and was used throughout the formal parameter interaction experiment. Performance measures recorded during the simulations included indices of proficiency in maintaining an assigned formation position, indices of control-input/aircraft-response activity, frequency of collisions with other formation aircraft, and frequency of other control losses. Results showed: (1) that pilot performance degrades approximately linearly with the decrease in data accuracy; (2) that a data rate as low as 4 updates/second yields adequate performance in the helicopter formation flight mode simulated for the study, with no improvement in performance resulting from higher rates; (3) that the optimal quickening model and the data filtering model for a specific helicopter formation flight system is a function of that system's data rate and accuracy. (Author)
DE- *Helicopters; *Display systems; *Formation flight; Pilots; Performance(Human); Analysis of variance; Accuracy; Simulation; Sensitivity; Flight control systems; Measurement
ID- IFR(Instrument Flight Rules); Instrument Flight Rules
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0186948
AA- <NTIS> AD-687 383/XAB
TI- Handbook of Inadequate Aircraft Design
CS- Army Board for Aviation Accident Research Fort Rucker Ala
CS- <CODE> 036600
PY- Jul 64
PG- 35p
NT- PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE. SEE INTRODUCTION SECTION OF
THIS ANNOUNCEMENT JOURNAL FOR CFSTI ORDERING INSTRUCTIONS. Order this
product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6914
AB- The publication contains descriptions, photographs, and drawings of Army aircraft design and engineering inadequacies. This information is intended solely to impress engineers and designers with Army aircraft design inadequacies and to illustrate the cause factor role these inadequacies play in Army aircraft accident frequency and severity. Safety engineering with its emphasis on human factors must be introduced in the design stage and not on the flight line after production has been initiated. As shown in the report, numerous Army aircraft accidents have been caused by a combination of design inadequacies, improper military specifications, and human error. (Author)
DE- *Army aircraft; Design; Errors; Aviation accidents; Military requirements; Performance(Human); Assembling; Handbooks; Helicopters; Vertical take-off planes
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0186722
AA- <NTIS> AD-687 154/XAB
TI- The Shock and Vibration Digest. Volume I No. I 1969
CS- Office of the Director of Defense Research and Engineering Washington D C
CS- <CODE> 266200
PY- 1969
PG- 45p
NT- Availability: Paper copy available from Shock and Vibration Information Center, Code 6020, Naval Research Lab., Washington, D. C. 20390. Price $10.00 Annual Subscription.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- MF A01
JA- USGRDR6913
AB- The report presents abstracts of papers and reports on the general subjects of shock and vibration. Stress and vibration effects are discussed for shipborne, spaceborne and ground vehicles.
DE- *Shock(Mechanics); *Symposia; *Vibration; *Reports; Reviews; Acoustic properties; Design; Predictions; Stability; Turbines; Vibration isolators; Instrumentation; Viscoelasticity; Structural properties; Aeroelasticity; Traffic; Safety; Abstracts; Helicopter rotors; Human engineering
SH- 46E (Physics--Structural Mechanics)

AZ- 0183956
AA- <NTIS> PB-182 180/XAB
TI- Environmental Engineering Abstracts
AU- Wagoner, W. J.
CS- Sandia Corp., Albuquerque, N. Mex.
CS- <CODE> 315250
RN- SC-R-68-1656
PY- Jul 68
PG- 19p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6907
AB- No abstract available.
DE- *Engineering; *Environment; Simulation; Motion; Acoustics; Meteorology; Electrical properties; Mechanical properties; Blast; Helicopters; Thermodynamics; Force(Mechanics); Instrumentation; Mathematics; Spacecraft; Electronics; Computers; Fluid mechanics
ID- *Environmental engineering
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0182500
AA- <NTIS> N69-21707/XAB
TI- On Thermal Comfort Wearing Aviation Helmets, Especially in Helicopters
TI- <NOTE> Over Thermisch Comfort Bij Het Dragen Van Vlieghelmen, in Het Bijzonder in Helicopters
AU- Valk, N. J. ; Varkevisser, J. ; Vos, J. J.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
RN- TDCK-52198-III; IZF-1968-19
PY- 1968
PG- 9p
NT- Lang- in Dutch, English Summary
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6912; STAR0710
AB- No abstract available.
DE- *Flight clothing; *Heat measurement; *Helmets; *Wave dispersion; Color; Heat transfer; Optical properties; Physical properties; Protective clothing; Surface properties
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0172309
AA- <NTIS> AD-682 498/XAB
TI- Increasing ASW Helicopter Effectiveness Through Communications Training
TI- <NOTE> Final rept. Feb 66-May 68
AU- Siegel, A. I. ; Federman, P. J.
CS- Applied Psychological Services Inc Wayne Pa Science Center
CS- <CODE> 402774
RN- NAVTRADEVCEN-66-C-0045-1
CN- N61339-66-C-0045
PY- Oct 68
PG- 204p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A10/MF A01
JA- USGRDR6908
AB- The verification of a prior factor analysis of communications, as a component of effective ASW helicopter performance, is described. Three of four previously isolated communications factors were found 'congruent' with factors which emerged from the present study. A course, emphasizing the employment of the verified factors (as well as one additional factor) was developed, administered, and evaluated. The results indicated that participants in the course were significantly superior to a control group from the point of view of several operational criteria. These results are interpreted to suggest the utility and power of the course. Suggestions for fuller implementation of the course are presented. (Author)
DE- *Antisubmarine aircraft; *Voice communication systems; Flight simulators; Performance(Human); Helicopters; Training devices; Naval training; Antisubmarine warfare; Pilots; Sonar personnel; Learning curves; Analysis of variance; Miss distance; Flight crews; Questionnaires; Group dynamics; Projective techniques; Teaching methods

ID- Evaluation
SH- 92B (Behavior and Society--Psychology); 45C (Communication--Common Carrier and Satellite); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0171063
AA- <NTIS> AD-681 239/XAB
TI- A Study of Factors That Affect the Performance of Army Flight Crew Personnel
CS- Federation of American Societies for Experimental Biology Bethesda Md Life Sciences Research Office
CS- <CODE> 401196
CN- DAHC19-68-C-0001
PY- Jan 69
PG- 44p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6906
AB- The study was conducted as a portion of a comprehensive review of the biomedical aspects of human performance, to provide the Office of the Chief of Research and Development with the most current information on the performance of the soldier. The report identifies the need for performance requirements and reviews the factors that influence the

performance proficiency of Army flight crew personnel. (Author)
DE- *Flight crews; Performance(Human); Stress(Physiology); Army personnel; Helicopters; Pilots; Environment; Psychometrics; Aging(Physiology); Nutrition; Sleep; Vibration
SH- 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology); 57E (Medicine and Biology--Clinical Medicine)

AZ- 0171057
AA- <NTIS> AD-681 233/XAB
TI- A Preliminary Study of Slant Range Estimation for Observers on Elevated Platforms
TI- <NOTE> Technical note
AU- Fried, C. ; Meadows, J. A.
CS- Human Engineering Labs Aberdeen Proving Ground Md
CS- <CODE> 172850
RN- HEL-TN-3-61
PY- Jul 61
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6906
AB- A preliminary investigation of aerial estimation of slant range-to-ground targets was conducted on fixed platforms of approximately 25.5, 71, and 105-foot elevations. In addition to the three altitudes, the study compared the effects of increasing observation time from 10 to 20 seconds and extending the ground range of targets from 50 to 1,102 yards. (Author)
DE- *Helicopters; *Aerial gunnery; *Surface targets; Target angle; Flight crews; Visual acuity; Ranges(Distance); Altitude; Simulation; Performance tests; Accuracy; Time; Terrain
ID- *Slant range estimation; Fire towers; Comparison
SH- 79F (Ordnance--Fire Control and Bombing Systems); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0165884
AA- <NTIS> PB-179 848/XAB
TI- Emergency Care Systems Demonstration Projects. Volume 2: The Emergency Care System
TI- <NOTE> Final rept
AU- Bordner, K. R. ; Burkhart, C. ; Howard, J. M. ; Levy, A. G. D.
CS- Franklin Inst. Research Labs., Philadelphia, Pa.
CS- <CODE> 142925
RN- TR-1-214-VOL-2; HS-800 007
CN- FH-1106596
PY- Jun 68
PG- 100p
NT- See also Volume 3, PB-179 849.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR6824
AB- The document, the second in a four-volume series, covers the program for illustrating the use of improved techniques in emergency care systems (ECS) and means for measurement and evaluation of these techniques. The program results are presented in this report, which discusses the basic problem and the background of the study program, outlines the emergency care subsystems, presents a set of operational plans for demonstration projects, and lists FIRL's conclusions and recommendations. Specific items of unusual volume or significance are included as appendicdes to this report. (Author)
DE- *Motor vehicle accidents; *Crash injuries; Rescues; Feasibility studies ; Ambulances; Cargo vehicles; Helicopters; Personnel; Short take-off planes; Control systems; Communication systems; Documentation; Costs; Hospitals; Transportation; Standards
ID- *Emergency care systems
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering)

AZ- 0165883
AA- <NTIS> PB-179 847/XAB
TI- Emergency Care Systems Demonstration Projects. Volume 1: Summary, Conclusions, and Recommendations
TI- <NOTE> Final rept
AU- Bordner, K. R. ; Burkhart, C. ; Howard, J. M. ; Levy, A. G. D.
CS- Franklin Inst. Research Labs., Philadelphia, Pa.

CS- <CODE> 142925
RN- TR-1-214-VOL-1; HS-800 006
CN- FH-11-6596
PY- Jun 68
PG- 43p
NT- See also Volume 2, PB-179 848.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6824
AB- This summarization is the first of a four volume series. It describes the nature and scope of a study performed to provide a complete description of the emergency care system (ECS), in terms of its functional components (subsystems), and to determine the subsystem design required to obtain an effective operational system. In addition, operational plans for emergency care demonstration projects were developed. The operational plans are designed to illuminate improved emergency care techniques required after highway accidents and to provide a means of evaluating measurable system improvements. The results of experimental testing conducted during the course of this study, have been included in the appendices to this report. (Author)
DE- *Motor vehicle accidents; *Rescues; Crash injuries; Management planning ; Feasibility studies; Systems engineering; Ambulances; Short take-off planes; Helicopters; Documentation; Communication systems; Flow charting; Control systems; Public relations; Site selection; Communications central; Roads; Law; Hospitals; Transportation
ID- *Emergency care systems
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 94H (Industrial and Mechanical Engineering--Industrial Safety Engineering)

AZ- 0161181
AA- <NTIS> N68-32733/XAB
TI- Instrumentation for Measurement of Vestibular-Significant Forces in Helicopters
AU- Hixson, W. C. ; Niven, J. I.
CS- Naval School of Aviation Medicine, Pensacola, Fla.
RN- NASA-CR-96296; NAMI-1043
CN- NASA ORDER R-93
PY- 21 May 68
PG- 17p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6822; STAR0620
AB- No abstract available.
DE- *Acceleration stresses (physiology); *Accelerometers; *Helicopters; *Physiological acceleration; *Pilots (personnel); Aerospace medicine; Airborne equipment; Aircraft instruments; Bioinstrumentation; Human body; Vestibules
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering); 57W (Medicine and Biology--Stress Physiology)

AZ- 0160447
AA- <NTIS> N68-30189/XAB
TI- New Techniques in Investigating Handling Qualities
AU- Frohlich, H. ; Kreil, W. ; Schweizer, G. ; Stopfkuchen, K.
CS- National Aeronautics and Space Administration, Washington, D. C.
RN- NASA-TT-F-11844
PY- Jul 68
PG- 35p
NT- Tran- Transl. Into English From Aerospace Proc. 1966, Roy. Aeron. Soc., Centenary Congr. and Intern. Council of the Aeron. Sci., 5th Congr., London, V. 2, 12-16 Sep. 1966 P 931-962
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A03
JA- USGRDR6820; STAR0618
AB- No abstract available.
DE- *Dynamic models; *Pilot performance; *Vertical takeoff aircraft; Aircraft control; Flight simulation; Free flight; Helicopters; Stochastic processes
ID- Translations
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0159492
AA- <NTIS> N68-27445/XAB
TI- V/STOL Terminal Area Instrument Flight Research
AU- Reeder, J. P.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TM-X-60456
PY- 1967
PG- 37p
NT- Conf- Presented At the Air Transport Session of the 11th Ann. Meeting of the Soc. of Exptl. Test Pilots, Beverly Hills, Calif., 28-30 Sep. 1967
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6818; STAR0616
AB- No abstract available.
DE- *Controllability; *Pilot performance; *Terminal guidance; *V/stol aircraft; Display devices; Flight control; Flight instruments; Flight simulators; Helicopter performance; Research projects
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0157105
AA- <NTIS> N68-19325/XAB
TI- Aeromedical Aspects of Helicopter Operations in the Tactical Situation
CS- Advisory Group for Aerospace Research and Development, Paris (France).
RN- AGARD-CP-24
PY- May 67
PG- 279p
NT- Lang- in English and French Conf- Proc. of Agard Aerospace Med. Panel Symp., Paris, 22-24 May 1967
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A13/MF A01
JA- USGRDR6810; STAR0609
AB- No abstract available.
DE- *Helicopters; *Medical services; *Rescue operations; Casualties; Conferences; Evacuating (transportation); Helicopter performance; Human factors engineering; Ice formation; Medical personnel; Safety factors
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 91I (Urban and Regional Technology and Development--Emergency Services and Planning); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0157045
AA- <NTIS> N68-19184/XAB
TI- Flight Investigation to Determine the Effect of Longitudinal Characteristics on Low-Speed Instrument Operation
AU- Di Carlo, D. J. ; Kelly, J. R. ; Sommer, R. W.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TN-D-4364
CN- 721-06-00-03-23
PY- Mar 68
PG- 22p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6810; STAR0609
AB- No abstract available.
DE- *Aircraft stability; *Controllability; *Flight tests; *Longitudinal stability; *V/stol aircraft; Aerodynamic characteristics; Aircraft performance; Angle of attack; Attitude control; Flight control; Helicopters; Instrument flight rules; Pilot performance
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0156301
AA- <NTIS> N68-16594/XAB
TI- Evaluation of a Closed-Circuit Television Display in Landing Operations with a Helicopter
AU- Gracey, W. ; Sommer, R. W. ; Tibbs, D. F.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TN-D-4313
CN- 721-05-00-01-23

PY- Feb 68
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6808; STAR0607
AB- No abstract available.
DE- *Closed circuit television; *Display devices; *Helicopters; *Landing aids; Flight instruments; Flight tests; Performance tests
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0155616
AA- <NTIS> N68-13496/XAB
TI- Problems of Vision in Low Level Flight
TI- <NOTE> les Problemes Visuels Du Vol A Basse Altitude
AU- Mercier, A. ; Perdriel, G. ; Whiteside, T. C.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
RN- AGARDOGRAPH-107; AD-661164
PY- 1967
PG- 85p
NT- Lang- in French and English
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR6805; STAR0604
AB- No abstract available.
DE- *Flight altitude; *Pilot performance; *Visual acuity; Acceleration stresses (physiology); Aerospace medicine; Environments; Flight training; Helicopters; Human factors engineering; Psychophysiology; Selection; Vertical takeoff aircraft; Visual flight rules; Visual perception
SH- 57W (Medicine and Biology--Stress Physiology)

AZ- 0151138
AA- <NTIS> AD-675 337/XAB
TI- Ppdr Handbook: Use of Pilot Performance Description Record in Flight Training Quality Control
AU- Greer, G. D. ; Smith, W. D. ; Hatfield, J. L. ; Colgan, C. M. ; Duffy, J. O.
CS- George Washington Univ Alexandria Va Human Resources Research Office
CS- <CODE> 173200
CN- DA-44-188-ARO-2; DA-2-J-024701-A-712; 2-J-024701-A-71201
PY- Dec 63
PG- 59p
NT- Rept. on HUMRRO Task LIFT.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6822
AB- The handbook provides a description of the Pilot Performance Description Record (PPDR), its characteristics, and general instructions for its use. It also offers a description of the check-pilot training program. An appendix contains a description of the Primary and Basic PPDR performance scales as used in helicopter flight evaluation. (Author)
DE- *Pilots; *Military training; Psychometrics; Performance(Human); Flight; Handbooks; Quality control; Scale; Records; Selection; Helicopters
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0150000
AA- <NTIS> AD-674 188/XAB
TI- Wind Tunnel Tests of Full-Scale Rotors Operating at High Advancing Tip Mach Numbers and Advance Ratios
TI- <NOTE> Final technical rept
AU- Tanner, W. H. ; Van Wyckhouse, J. F.
CS- Bell Helicopter Co Fort Worth Tex
CS- <CODE> 054200
RN- BELL-576-099-001; USAAVLABS-TR-68-44
CN- DA-44-177-AMC-291(T); DAAJ02-67-C-0018; DA-1F125901A142; 1F125901A142-31
PY- Jul 68
PG- 150p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01

JA- USGRDR6821
AB- Tested were: (1) production UH-1D (NACA 0012 profile) 48-foot-diameter blades, (2) modified UH-1D blades reduced in thickness at the tip, and (3) UH-1D blades reduced in diameter to 34 feet. The production blades were evaluated at Mach numbers up to 0.95, the thin-tipped blades to Mach 1.025, and the 34-foot rotor to advance ratios of 0.79. The production and thin-tipped blades are compared to show the compressibility effects. At higher tip Mach numbers, a significant reduction in power required was obtained with the thin-tipped blades. Additionally, the state of the art of calculating rotorcraft performance at high tip speeds and advance ratio is reviewed, and limited experimental data obtained with special boundary layer instrumentation installed at the 3/4 radius and surface pressure instrumentation installed near the blade tip are presented. (Author)
DE- *Helicopters; *Rotor blades(Rotary wings); Loading(Mechanics); Helicopter rotors; Mach number; Thickness; Performance(Engineering); Compressible flow; Supersonic characteristics; Boundary layer; Pressure ; Distribution; Wind tunnel models; Model tests
ID- *Blade tips; UH-1D aircraft; H-1 aircraft; Pressure distribution
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 46B (Physics--Fluid Mechanics)

AZ- 0149250
AA- <NTIS> AD-673 429/XAB
TI- Experimental Evaluation of a Formation Flight System
TI- <NOTE> Technical rept. 15 May-15 Sep 67
AU- Wingert, J. W. ; Nicholson, R. M.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12543-IR5; JANAIR-TR-6804002
CN- N00014-66-C-0362; NR-213-054
PY- Jul 68
PG- 124p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- USGRDR6820
AB- The program objective was to investigate the performance obtainable from a helicopter IFR formation flight system in the manual mode, within the realistic constraints imposed by current systems technology. The program was conducted by first defining and optimizing several sets of quickening signals for a proposed display and then measuring pilot performance at several different system update rates, using various filter time constants of the digital filters to smooth the data. The system model used was that of the helicopter formation flight system being developed by the TRG Company. The performance data was obtained through a fixed-base hybrid computer simulation of the system. It was found that the formation flight mission phases could be flown, but with considerably more difficulty and with less precision than the earlier noise-free and idealized high-update-rate systems which had been simulated. The chief impact of the state-of-the-art technology was felt in the degradation of the usefulness of the quickening information, since this information enables both stable and precise control of the helicopter in the IFR formation flight mode. The parameters contributing to these difficulties are relatively easy to identify, being system update rate, system noise, and the display reference frame. (Author)
DE- *Helicopters; *Formation flight; *Flight control systems; Display systems; Simulation; Human engineering; Analog-digital computers; Computer programs; Optimization; Pilots; Performance(Human); Noise(Radio); Sampling
ID- Digital filters
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0148098
AA- <NTIS> AD-672 272/XAB
TI- An Optimal Control Method for Predicting Control Characteristics and Display Requirements of Manned-Vehicle Systems
TI- <NOTE> Final rept. 1 Jul 66-31 Aug 67
AU- Elkind, J. I. ; Falb, P. L. ; Kleinman, D. ; Levison, W. H.
CS- Bolt Beranek and Newman Inc Cambridge Mass
CS- <CODE> 060100
RN- BBN-1559; AFFDL-TR-67-187
CN- AF 33(615)-5160; AF-8219; 821910
PY- Jun 68
PG- 173p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- USGRDR6818
AB- An analytic procedure for determining information display requirements and human control and instrument monitoring characteristics for complex

multivariable vehicular control systems is developed. The method is based upon the assumption that the human controller will act in a near optimal manner. Optimal control theory and its associated state-space representation is used as the basis for the analytic procedure. A model for the human controller is developed in which the controller's inherent limitations are approximated by a time delay. The model includes a predictor for compensating for this time delay, a controller for producing the control inputs to the vehicle and a cost functional that is to be minimimized. The controller is assumed to be optimal. Several suboptimal predictors are investigated. Only quadratic cost functionals are considered. The analytic procedure assumes that the human operator's control characteristics can be represented by a set of gains operating on the delayed state variables of the system. These gains are predicted from the gains of optimal controller and from the characteristics of the predictor. It is further postulated that the information display requirements and instrument monitoring behavior can be determined from the sensitivity of the cost to changes in gain of the controller. (Author)

DE- *Vertical take-off planes; *Flight control systems; Short take-off planes; Man-machine systems; Display systems; Analysis; Mathematical models; Optimization; Time; Hovering; Gain; Mathematical prediction; Pilots; Performance(Human)

ID- XV-5A aircraft; Optimal control theory; V-5 aircraft

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0147495

AA- <NTIS> AD-671 664/XAB

TI- In-Flight Measurement of Rotor Blade Airloads, Bending Moments, and Motions, Together with Rotor Shaft Loads and Fuselage Vibration, on a Tandem Rotor Helicopter. Volume IV. Summary and Evaluation of Results

TI- <NOTE> Final rept

AU- Pruyn, R. R.

CS- Boeing Co Morton Pa Vertol Div

CS- <CODE> 365150

RN- D8-0382-4; USAAVLABS-TR-67-9D

CN- DA-44-177-AMC-124(T)

PY- Nov 67

PG- 285p

NT- See also Volume 3, AD-671 662 and Volume 5, AD-671 665.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

PC- PC A13/MF A01

JA- USGRDR6817

AB- The report describes and evaluates the results of an extensive program to measure the dynamic effects of flight on a tandem rotor helicopter. The flight test results are reviewed and then compared with theoretical predictions and with other flight test data. The airloads measurements from this program are similar to those of other flight test programs, with one major exception: single lifting-rotor helicopter data differ from the forward rotor data of a tandem. The aft rotor apparently produces an upwash which gives an increase in the airloads on the inboard region of the forward rotor. This effect results in an airload distribution that is similar to that which would be obtained with an increased blade twist of the forward rotor. For most longitudinal cyclic trim settings, the oscillations of the airloads of both tandem rotors tend to be similar to those of a single rotor, with intrarotor tip vortex intersections causing the predominant disturbances. Longitudinal cyclic trim settings can be obtained experimentally with the tandem helicopter which cause large airload pressure oscillations due to the intersection of forward rotor blade vortexes by the aft rotor blades. These pressure oscillations occur rapidly and do not appear to increase blade stresses, rotor shaft loads, or airframe vibration. (Author)

DE- *Helicopter rotors; *Aerodynamic loading; Flight testing; Rotor blades(Rotary wings); Helicopters; Bending; Moments; Aeroelasticity; Fuselages; Vibration; Data processing systems; Instrumentation; Calibration

ID- Tandem rotor helicopters; CH-47A aircraft; H-47 aircraft

SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0147493

AA- <NTIS> AD-671 662/XAB

TI- In-Flight Measurement of Rotor Blade Airloads, Bending Moments, and Motions, Together with Rotor Shaft Loads and Fuselage Vibration, on a Tandem Rotor Helicopter. Volume III. Data Processing and Analysis System

TI- <NOTE> Final rept

AU- Obbard, J. W.

CS- Boeing Co Morton Pa Vertol Div

CS- <CODE> 365150

RN- D8-0382-3; USAAVLABS-TR-67-9C

CN- DA-44-177-AMC-124(T); DA-1F125901A146; 1F125901A146-04

PY- Nov 67
PG- 119p
NT- See also Volume 2, AD-671 661 and Volume 4, AD-671 664.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- USGRDR6817
AB- An extensively instrumented tandem rotor helicopter was flight-tested to measure the rotor blade airloads and the resulting rotor blade motions and bending moments, rotor shaft loads and moments, and fuselage vibration. The voluminous output of this extensive instrumentation was processed by a fully automated data system which is described in the volume. Data were tape-recorded in sequenced-multiplexed, frequency-modulated (FM) form during flight testing. The FM signals were discriminated to analog form and were digitized by using a high-speed analog-to-digital converter. Digital data were calibrated, corrected for temperature and load interactions, and harmonically analyzed by using a series of digital computer programs. Airloads pressure data were numerically integrated to determine instantaneous blade section lift and pitching moment and the lift and pitching moment of the entire rotor blade. Data were also prepared for other analyses. The data system also included various data checks which are discussed. Substantiating tests and analyses that were performed to ensure the proper operation of this system are also presented. Data output from this program is available on a computer tape (nine-track, IBM System 360) in fully identified form for utilization in further analyses. (Author)
DE- *Helicopter rotors; *Aerodynamic loading; Data processing systems; Flight testing; Rotor blades(Rotary wings); Helicopters; Bending; Moments; Aeroelasticity; Fuselages; Vibration; Analog-to-digital converters; Digital computers; Magnetic recording systems
ID- Tandem rotor helicopters
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 62A (Computers, Control, and Information Theory--Computer Hardware)

AZ- 0147492
AA- <NTIS> AD-671 661/XAB
TI- In-Flight Measurement of Rotor Blade Airloads, Bending Moments, and Motions, Together with Rotor Shaft Loads and Fuselage Vibration, on a Tandem Rotor Helicopter. Volume II. Calibrations and Instrumented Component Testing
TI- <NOTE> Final rept
AU- Grant, W. J. ; Pruyn, R. R.
CS- Boeing Co Morton Pa Vertol Div
CS- <CODE> 365150
RN- D8-0382-2; USAAVLABS-TR-67-9B
CN- DA-44-177-AMC-124(T); DA-1F125901A146; 1F125901A146-04
PY- May 67
PG- 134p
NT- See also Volume 1, AD-670 952 and Volume 3, AD-671 662.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07/MF A01
JA- USGRDR6817
AB- Calibration and instrumented component testing were performed to provide reliable instrumentation for the measurement of dynamic airloads on a large tandem rotor helicopter. All equipment underwent single-load calibration and much of it was calibrated for combined loads. Blade tension instrumentation was calibrated by whirl testing. The combined-loads calibrations represent an extension of the state of the art, especially for elastic structures such as rotor blades. All calibrations were evaluated qualitatively and a summary of the quality of all calibrations is presented. The general error in all calibrations is less than 3 percent. Component testing consisted of whirl tests and dynamic response tests of the rotor blades, and functional testing of the airloads pressure transducers. These tests determined the structural itegrity of the blade instrumentation and provided references for isolating the effects of such factors as blade bending, acceleration, and temperature. (Author)
DE- *Helicopter rotors; *Aerodynamic loading; Test equipment; Calibration; Flight testing; Helicopters; Rotor blades(Rotary wings); Bending; Moments; Aeroelasticity; Transducers; Fuselages; Vibration; Tables
ID- Tandem rotor helicopters; CH-47A aircraft; H-47 aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 94K (Industrial and Mechanical Engineering--Laboratory and Test Facility Design and Operation)

AZ- 0146788
AA- <NTIS> AD-670 952/XAB
TI- In-Flight Measurement of Rotor Blade Airloads, Bending Moments, and Motions, Together with Rotor Shaft Loads and Fuselage Vibration, on a

Tandem Rotor Helicopter. Volume I. Instrumentation and in-Flight Recording System
TI- <NOTE> Technical rept. (Final)
AU- Golub, R. ; McLachlan, W.
CS- Boeing Co Morton Pa Vertol Div
CS- <CODE> 365150
RN- D8-0382-1; USAAVLABS-TR-67-9A
CN- DA-44-177-AMC-124(T); 1P125901A14604
PY- May 67
PG- 170p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A08/MF A01
JA- USGRDR6816
AB- An extensively instrumented tandem rotor helicopter was developed to measure the rotor blade airloads and the resulting rotor blade motions and bending moments, rotor shaft loads and moments, and fuselage vibration. The report details the design, assembly, and testing of the instrumentation system and documents the capability of the system for fulfilling the requirements of the program. The selection and testing of the system components are described in detail, along with the integration of these components into the overall instrumentation and recording system. The exhaustive tests of the system, both on the ground and in flight, are described in step-by-step sequence. The capacities and capabilities of the system are delineated and illustrated. Four technical appendixes, giving precise engineering data and statistical records, are included in the report. (Author)
DE- *Helicopter rotors; *Aerodynamic loading; *Recording systems; Helicopters; Airborne; Measurement; Rotor blades(Rotary wings); Bending ; Moments; Vibration; Fuselages; Instrumentation; Aeroelasticity; Transducers; Data processing systems; Pressure gages
ID- *Flight recorders; CH-47A aircraft; H-47 aircraft; Tandem rotor helicopters
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51A (Aeronautics and Aerodynamics--Aerodynamics); 82C (Photography and Recording Devices--Recording Devices)

AZ- 0145676
AA- <NTIS> AD-669 834/XAB
TI- Dynamics Report for Helicopter Instrument Trainer Device 2B10A
TI- <NOTE> Revised ed
AU- Lindgren, P. W.
CS- Melpar Inc Falls Church Va
CS- <CODE> 225450
RN- NAVTRADEVCEN-1438-9-REV-1
CN- N61339-1438
PY- 26 Mar 65
PG- 194p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A09/MF A01
JA- USGRDR6815
AB- The detail specifications require that the 2B10A meet the performance of Devices 2B10 and 2F75; and that the math models which were mechanized in those devices be mechanized in the 2B10A, except that the specific implementation of the math model will be altered to facilitate digital solution where significant savings could be made in time and storage. The performance and flying qualities in the test criteria reports for Devices 2B10 and 2F75 were treated as the basic design data for Device 2B10A. The math models were adopted directly. (Author)
DE- *Helicopters; *Instrument flight; Training devices; Mathematical models ; Equations of motion; Aerodynamic characteristics; Rotary wings; Tail helicopter rotors; Airframes; Aircraft landings; Atmosphere; Aerodynamic loading; Instrumentation; Navigation; Communication systems ; Aircraft engines; Fuel systems; Flight control systems; Vibration; Stabilization systems
ID- Graphs(Charts)
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51B (Aeronautics and Aerodynamics--Aeronautics); 72GE (Mathematical Sciences--General)

AZ- 0144678
AA- <NTIS> AD-668 832/XAB
TI- A System Concept for Hysurch (Hydrographic Survey and Charting System)
AU- Blood, B. E.
CS- Massachusetts Inst of Tech Cambridge Experimental Astronomy Lab
CS- <CODE> 387140
RN- RE-39
CN- N62306-67-C-0122; DSR-70320
PY- Feb 68
PG- 515p
NT- Original contains color; reproducible in black/white only after original supply is exhausted.

NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A22/MF A01
JA- USGRDR6813
AB- A preliminary design for a new hydrographic survey and charting system is presented. The new design is characterized by the use of high-speed components and application of automation wherever practicable. The report represents a one-year study of hydrographic survey sensors, navigation, sounding vehicles, and hydrographic-chart production techniques as well as a study of coastal survey strategy. Detailed analyses are presented on all of the subsystems. Since a survey ship is required to carry and support these subsystems, a discussion of the design requirements for such a ship is included. The report concludes with a procurement schedule for a 1971 prototype. (Author)
DE- *Hydrographic surveying; Systems engineering; Accelerated testing; Sensors; Data storage systems; Data transmission systems; Inertial navigation; Scanning sonar; Costs; Automation; Aerial photography; Shallow water; Helicopters; Buoys; Tides; Ocean currents; Ocean waves; Mapping; Radio transmission; Boats; Deep water; Instrumentation; Tables ; Programming(Computers); Personnel; Meteorological balloons; Lasers; Procurement; Mathematical analysis
ID- *HYSURCH(Hydrographic Survey and Charting System); *Hydrographic survey and charting systems; Sounding craft; Graphs(Charts)
SH- 48I (Natural Resources and Earth Sciences--Cartography); 47B (Ocean Technology and Engineering--Dynamic Oceanography)

AZ- 0144371
AA- <NTIS> AD-668 521/XAB
TI- Icing of Aircraft and the Means of Preventing It
AU- Trunov, O. K.
CS- Foreign Technology Div Wright-Patterson AFB Ohio
CS- <CODE> 141600
RN- FTD-MT-65-490
PY- 29 Aug 67
PG- 241p
NT- Edited machine trans. of mono. Obledenenie Samoletov i Sredstva Borby s Nim, Moscow, 1965 p1-247.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A11/MF A01
JA- USGRDR6813
AB- The book acquaints the reader with the physical and theoretical bases of process of icing, the meteorological conditions provoking this phenomenon in flight, and the contemporary thermal and chemical means of the struggle with icing (deicing systems) used on passenger aircraft and helicopters. Also examined in the book are methods of the selection of basic parameters and calculation of the deicing electrical and air-thermal systems, the influence of the degree and form of icing on flying characteristics of the aircraft and the technique of its piloting, and methods of testing aircraft in flight in conditions of icing and peculiarities of icing when the aircraft are on land. (Author)
DE- *Aircraft; Ice prevention; Textbooks; Atmospheric condensation; Water impingement; Supercooling; Drops; Thermal analysis; Meteorological parameters; Subsonic characteristics; Supersonic flight; Configuration; Instruction manuals; Diagrams; De-icing systems; De-icing materials; Protective treatments; Airplanes; Helicopters; USSR
ID- *Protective coatings; Graphs(Charts); Translations
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0143815
AA- <NTIS> AD-667 960/XAB
TI- Tinted Windscreens in U. S. Army Aircraft
AU- Crosley, J. K.
CS- Army Aeromedical Research Unit Fort Rucker Ala
CS- <CODE> 035550
RN- USAARU-68-7
CN- DA-3A025601A819; 3A025601A81901
PY- Mar 68
PG- 18p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6812
AB- A spectrophotometric analysis was performed on the tinted windscreen of the U. S. Army AH-1G helicopter. The results of this test, considered in conjunction with the conclusions of other researchers working with both aircraft and automobile tinted windshields, have led to the

recommendation that no tinted media should be positioned between the pilot and his normal field of view during heavy overcast days, at twilight, or at night. (Author)
DE- *Helicopters; *Windshields; Colors; Vision; Adaptation(Physiology); Light transmission; Visibility; Pilots; Performance(Engineering); Human engineering; Aviation safety; Army aircraft
ID- AH-1G aircraft; H-1 aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0141315
AA- <NTIS> AD-665 425/XAB
TI- V/STOL Ground-Based Simulation Techniques
TI- <NOTE> Final rept. 27 Jun 66-27 May 67
AU- Sinacori, J. B.
CS- Northrop Corp Hawthorne Calif Norair Div
CS- <CODE> 258470
RN- NOR-67-85; USAAVLABS-TR-67-55
CN- DA-44-177-AMC-462(T); DA-1F125901A14233
PY- Nov 67
PG- 73p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6808
AB- A study of various kinds of simulators has been made to determine their capability to produce data representative of visual flight. Four simulations of a jet-lift V/STOL aircraft were conducted using the same pilot. Control characteristics and airframe parameters were maintained constant (as closely as possible), and the same tasks were used by the pilot in each evaluation. The resulting data were compared with flight results from the same aircraft. The simulators used different displays, motion modes, and instrumentation, and the results are discussed in the light of the characteristics of each simulator. The results show clearly that in order to produce quantitative data representative of flight results, the display must have a quality level compatible with the task being performed. Specifically, a precision hovering task requires a high resolution display, while a translation (or transition task) can be performed with a display of much less resolution. The display content is important, particularly for the precision hovering task where height holding is required. For flight simulation of large translational movements, cockpit motion did not appear to affect the results; however, for precision hover and small, quick position changes, cockpit motion appears to be important in that it assists the pilot in detecting small drift and improves his ability to control vehicle attitude. The absence of cockpit motion when using a point source visual display for the presentation of visual information can cause vertigo and loss of performance. (Author)
DE- *Vertical take-off planes; *Research planes; *Short take-off planes; Flight simulators; Jet planes; Pilots; Lift; Visual perception; Display systems; Hovering; Roll; Cockpits; Performance(Human); Performance(Engineering); Flight testing; Motion; Flight control systems; Vertigo
ID- X-14 aircraft; X-14A aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0141167
AA- <NTIS> AD-665 277/XAB
TI- Display Requirements Study for Helicopter Ifr Formation Flight
TI- <NOTE> Technical rept. 27 Jun 66-15 Jul 67
AU- Nicholson, R. M. ; Wolf, J. D. ; Clifford, R. R.
CS- Honeywell Inc Minneapolis Minn Systems and Research Div
CS- <CODE> 170184
RN- 12543-FRI
CN- N00014-66-C-0362; NR-213-054
PY- Jan 68
PG- 285p
NT- Report on JANAIR, Joint Army-Navy Aircraft Instrumentation Research.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A13/MF A01
JA- USGRDR6807
AB- The objective of the program was to define and to demonstrate display formats appropriate for helicopter IFR formation flight. The report describes the human factors analysis which led to the development of three alternative display designs. A program of closed-loop computer simulations is also described in which pilots' performance on the alternative displays was evaluated during simulated IFR formation flights. Evaluations were made of pilot performance under various levels of simulated turbulence, under different levels of pilot workload on a concomitant task and under four conditions of simulated system failures. The results of the study indicate that, within the

constraints of the simulation program, manual IFR formation flight is feasible. The comparison of the alternative display formats indicated that the quickened plan-position display format yielded the best performance data under nearly all of the conditions that were tested. A display feasibility analysis was performed which indicated that the technology required to develop the selected display formats is within the present state-of-the-art. (Author)
DE- *Helicopters; *Formation flight; Instrument flight; Display systems; Night flight; Design; Pilots; Performance(Human); Malfunctions; Feasibility studies; Instrument panels; Plan position indicators; Night warfare; Navigational aids; Landing aids
ID- Stationkeeping; Closed-loop control systems; Computer simulation
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0140555
AA- <NTIS> AD-664 662/XAB
TI- Observations on Stethoscope Efficiency
TI- <NOTE> Progress rept
AU- Mendelson, E. S.
CS- Naval Air Development Center Johnsville Pa Aerospace Crew Equipment Dept
CS- <CODE> 403012
RN- NADC-AC-6710
CN- NAVMED-MF022.03.02-6004
PY- 25 Jan 68
PG- 16p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6807
AB- Experimental models of acoustic stethoscopes were designed, constructed, and compared with conventional models in an attempt to combat background noise interference. Selected prototypes were evaluated by flight surgeons on aircraft carriers and in helicopters. None of the instruments were useful for auscultation in helicopter noise. In carrier noise, several of the new patterns appeared more effective than the standard stethoscopes procured by the Federal services. Promising lines of further development are being pursued. (Author)
DE- *Medical equipment; Efficiency; Background; Noise; Aircraft carriers; Evacuation; Helicopters; Medical examination; Signal-to-noise ratio; Design; Military medicine
ID- Stethoscopes
SH- 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

AZ- 0140085
AA- <NTIS> AD-664 187/XAB
TI- Feasibility of Measuring Vertical Electric Fields in Cumulus Clouds Using a Hot-Air Balloon and a Helicopter
TI- <NOTE> Final rept. 3 Jan 66-30 Sep 67
AU- Handman, A. L.
CS- Litton Systems Inc Minneapolis Minn Applied Science Div
CS- <CODE> 209365
RN- ASD-3143; ECOM-01834-F
CN- DA-28-043-AMC-01834(E); IVO-14501-B5-3A-06
PY- Dec 67
PG- 30p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6806
AB- A hot-air balloon was used but rejected; a helicopter was also used for measuring electric fields in clouds. Dynamic variations of electric field were detected within growing cumulus clouds; these variations are caused by internal advective and convective motions. Because the magnitudes of the field changes are small, a constant redistribution of space charge carried aloft in the updraft is suggested. A recommendation is made that complete electrical evaluation of cumulus clouds be made: from nucleation to cumulo-nimbus development. A high-performance helicopter should be utilized. (Author)
DE- *Electrostatic fields; Cumulus clouds; Measurement; Balloons; Balloon equipment; Helicopters; Instrumentation; Atmospheric motion; Voltage; Measuring devices(Electrical + electronic); Electrometers; Air mass analysis
SH- 46GE (Physics--General); 55C (Atmospheric Sciences--Meteorological Data Collection, Analysis, and Weather Forecasting)

AZ- 0140046
AA- <NTIS> AD-664 147/XAB
TI- U.S. Army H-25 Helicopter Drop Test, 22 October 1960

TI- <NOTE> Technical rept
CS- Aviation Safety Engineering and Research Phoenix Ariz
CS- <CODE> 049050
RN- TRECOM-TR-60-75
CN- DA-44-177-TC-624
PY- 30 Dec 60
PG- 106p
NT- Preliminary rept. on Experimental Research.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- USGRDR6806
AB- The report presents the results of analytical study to establish methods of conducting the first exploratory tests, followed by a presentation of the methods used in the first experimental crash test. A Piasecki Model H-25A helicopter was employed in recreating a typical accident approximating an unsuccessful attempt to attain autorotation from a low altitude power failure. The instrumentation and research techniques used in (1) the measurement of the impact forces and accelerations, (2) the determination of the feasibility of the utilization of on-board recorders, and (3) the evaluation of certain problems inherent in the dynamic crash testing of full-scale VTOL aircraft are presented. Tentative results and the technical problems encountered are discussed and recommendations for subsequent testing are made. (Author)
DE- *Helicopters; *Crash injuries; Drop testing; Impact tests; Acceleration ; Test methods; Instrumentation; Airborne; Army aircraft; Aircraft seats; Aviation safety; Aviation accidents
ID- H-25 aircraft; Crashworthiness
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0138919
AA- <NTIS> AD-663 016/XAB
TI- Avionics Systems for Rotary Wing Aircraft
AU- Callahan, L. G.
CS- Army Electronics Command Fort Monmouth N J Avionics Lab
CS- <CODE> 387890
PY- 1967
PG- 9p
NT- Published in unidentified journal 9p n.d.
DT- Journal article
PC- Not available NTIS
JA- USGRDR6804
AB- The paper provides the background material which justifies the treatment of rotary wing avionics as a unique and separate technological entity. The history of avionics development is discussed, key problem areas are identified and the concept of an Integrated Ground Airborne Avionics System (IGAAS) is presented as a potential solution. (Author)
DE- *Electronic equipment; *Helicopters; Army operations; Army aircraft; Instrument landings; Air traffic control systems; Instrumentation; Display systems; Reprints
ID- Avionics systems
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 76GE (Navigation, Guidance, and Control--General); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0138917
AA- <NTIS> AD-663 014/XAB
TI- Helicopter Landing Systems
AU- Litchford, G. B. ; Saganowich, J. T.
CS- Army Electronics Command Fort Monmouth N J Avionics Lab
CS- <CODE> 387890
PY- 1967
PG- 11p
NT- Published in unidentified journal 11p n.d.
DT- Journal article
PC- Not available NTIS
JA- USGRDR6804
AB- The general nature of the helicopter IFR landing problem is discussed and the landing system characteristics which, it is believed, should be achieved if the helicopter is to be served adequately by the system design are reviewed. Added difficulties brought about by operations in the Army tactical environment are also discussed. (Author)
DE- *Helicopters; *Instrument landings; Instrumentation; Air traffic control systems; Guidance; Aircraft landings; Army aircraft; Reprints
SH- 76GE (Navigation, Guidance, and Control--General); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0138900
AA- <NTIS> AD-662 997/XAB
TI- Rotary Wing Cockpit Instrumentation
AU- Yingling, G. ; Rowland, G. ; Domeshek, S.

CS- Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
CS- <CODE> 012070
PY- 1967
PG- 7p
NT- Published in IEEE International Convention Record pt4 p35-41 1967.
DT- Journal article
PC- Not available NTIS
JA- USGRDR6804
AB- The problem of rotary wing cockpit instrumentation is shown to be one involving both control and display. Valuable techniques can be drawn from fixed-wing instrument analyses and developments. For aviator training and operations under VFR as well as transition and IFR conditions, today's helicopter cockpits are handicapped by fixed wing instruments in configurations that do not take full advantage of research of 20 years. The special value of the helicopter for the missions it performs as aerial truck, ambulance and armored car combine with unique performance to create cockpit instrumentation problems that must be addressed anew. The paper discusses solutions toward improved instrumentation systems, predicated on an aviator-oriented, integrated-function, modal display approach to ease training and operations in the helicopter's low-altitude, low-speed, steep-slope world under all visibility conditions. (Author)
DE- *Helicopters; *Cockpits; Instrumentation; Control systems; Display systems; Human engineering; Training; All-weather aviation; Flight instruments; Reprints
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 51E (Aeronautics and Aerodynamics--Avionics)

AZ- 0137079
AA- <NTIS> AD-661 165/XAB
TI- Assessment of Skill and Performance in Flying
TI- <NOTE> Conference proceedings
CS- Advisory Group for Aerospace Research and Development Paris (France)
CS- <CODE> 400043
RN- AGARD-CP-14
PY- Sep 66
PG- 130p
NT- NATO furnished. Proceedings of the Annual Meeting (23rd) of the AGARD Aerospace Medical Panel, Toronto (Canada) 7 Sep 66.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A07/MF A01
JA- USGRDR6801
AB- Contents: Human error research and analysis program; The analysis of human performance within the operational flight environment; Sustained pilot performance requires more than skill; Sleep rhythms in transatlantic civil flying; Navigation of helicopters in slow and very low flight: a comparison of solo and dual pilot performance; Development of the spatial orientation trainer; Measurement of performance in F-86K simulator; Measuring the pilot's contribution in the aircraft control loop; Prior learning and age in relation to pilot performance; Plasma phospholipid composition as a biochemical index to stress; The electroencephalogram as a physiological criterion of performance; The use of psycho-physiological measures in the assessment of operator effort; Influence of mild hypoxia on visual perception during post-rotatory nystagmus.
DE- *Pilots; *Aviation medicine; Performance(Human); Psychophysiology; Flight; Errors; Symposia; Psychometrics; Sleep; Helicopters; Navigation ; Flight simulators; Learning; Stress(Physiology); Electroencephalography; Hypoxia; Visual perception
SH- 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0136982
AA- <NTIS> AD-661 067/XAB
TI- Improving Helicopter Conspicuity Through the Use of Painted Main Rotor Blades
AU- Crosley, J. K. ; Bailey, R. W. ; Nix, M. S.
CS- Army Aeromedical Research Unit Fort Rucker Ala
CS- <CODE> 035550
RN- USAARU-68-2
CN- DA 3A0 2560 1A819; 032
PY- Oct 67
PG- 15p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6801
AB- An in-flight study was conducted to determine the effect of four paint

schemes, applied to the main rotor blades of UH-1D helicopters, upon helicopter conspicuity. Twenty-three observers made a total of 138 comparisons of paired aircraft. The preferred scheme incorporated white, red-orange fluorescent, and black paints. (Author)
DE- *Helicopters; *Aviation safety; *Rotor blades(Rotary wings); *Paints; Visibility; Colors; Visual perception; Helicopter rotors; Human engineering
ID- H-1 aircraft
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51C (Aeronautics and Aerodynamics--Aircraft); 71E (Materials Sciences--Coatings, Colorants, and Finishes)

AZ- 0136238
AA- <NTIS> AD-461 017/XAB
TI- Lift Fan Flight Research Aircraft
TI- <NOTE> Quarterly Technical Progress rept. no. 10, 17 Feb-15 May 64
CS- General Electric Co., Cincinnati, Ohio.
CS- <CODE> 148250
CN- DA-44-177-TC-715
PY- Jul 64
PG- 94p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05
JA- USGRDR6810
AB- Propulsion system deliveries were completed with acceptance of the last spare lift fan. Fan speed VTOL and CTOL flight clearance was requested and granted for A/C number two. Lift fan and J85 spare parts were shipped to Edwards Air Force Base. Number one A/C completed modification and ground tests at NASA-Ames prior to full scale wind tunnel tests. Engineering design and analysis was completed for the higher loading in the exit louver actuation system. Both aircraft completed systems functional tests at San Diego. A/C number two was shipped to Edwards AFB to begin flight tests and A/C number one was shipped to NASA-Ames for wind tunnel testing. Nose wheel shimmy encountered during taxi tests causing aircraft damage. Nose gear redesign and successful dynamic and static tests were completed. A systems failure evaluation was conducted on the flight simulator to establish emergency procedures. A/C damage as a result of nose gear failure was corrected.
DE- *Vertical take-off planes; *Research planes; Research program administration; Short take-off planes; Turbojet engines; Ducted fans; Spare parts; Modification kits; Captive tests; Wind tunnel models; Design; Loading(Mechanics); Actuators; Flight testing; Nose wheels; Taxiing; Landing gear; Malfunctions; Lift; Corrections; Ejection seats; Resonance; Instrumentation; Maintenance; Stability; Flight control systems; Structural properties; Temperature; Reliability; Hovering; Simulation; Weight; Flutter
ID- V-5 aircraft; J-85 engines; Louvers; Lift engines
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 70B (Administration and Management--Management Practice)

AZ- 0136127
AA- <NTIS> AD-432 801/XAB
TI- Proceedings of the Third Annual Conference on Environmental Effects on Aircraft and Propulsion Systems, September 19-20, 1963
CS- Naval Air Turbine Test Station, Trenton, N. J. Aeronautical Turbine Lab.
CS- <CODE> 246960
RN- NATTS-ATL-SP-4
PY- Sep 63
PG- 395p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A17/MF A01
JA- USGRDR6809
AB- Contents: Free water at high altitudes; Meteorological variables measured by USAF jet aircraft in support of the 1963 national severe storm project; Techniques and equipment for simulating high velocity passage of a vehicle through rain; Raindrop-size studies; Effect of water ingestion on J79-GE-8 altitude performance; Water ingestion capabilities of Lycoming T53 and T-55 gas turbine engines; Turboshaft engine icing test at AEL; Further remarks on the use of the Ko correlation in icing preliminary design; Ice detection and control system for turbine engines and airframe systems; Tests of the united control ice detection and control system at the U. S. Naval Air Turbine Test Station (NATTS); Some experiences in artificial icing; A summary of aircraft icing criteria; VTOL operational problems due to downwash effects; and Environmental experiments for electric propulsion systems in outer space.

DE- *Gas turbines; *Turbojet engines; *Turboprop engines; Symposia; Jet fighters; De-icing systems; High altitude; Water; Storms; Ingestion(Engines); Instrumentation; Radar reflections; Vertical take-off planes; Velocity; Raindrops; Rainfall; Test equipment; Flameout; Aviation safety; Sprays; Sea water; Ice; Helicopter engines; Airfoils; Jet engine inlets; Downwash
ID- F-100 aircraft; J-79 engines; T-53 engines; T-55 engines; Inertia; Gas turbine inlets
SH- 81D (Combustion, Engines, and Propellants--Jet and Gas Turbine Engines)

AZ- 0134634
AA- <NTIS> PB-175 001/XAB
TI- Project Mohole, Naval Architecture, Marine Engineering and Instrumentation Section, Scientific and Technical Progress for the Period Ending November 15, 1963
CS- Brown and Root Inc., Houston, Tex.
CN- NSF-C-260
PY- 30 Nov 63
PG- 55p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6720
AB- Contents: Platform design; Structural analysis; Hydrodynamics and aerodynamics; Model test program; Platform positioning; Power generation; Communications; Supply ship and helicopters.
DE- *Well logging; *Floating bodies; *Ships; Feasibility studies; Drilling machines; Design; Marine engineering; Stability; Damage; Structural properties; Fluid dynamic properties; Model tests; Position finding; Marine propulsion; Electric power production; Communication systems; Logistics
ID- Mohole project
SH- 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

AZ- 0134633
AA- <NTIS> PB-175 000/XAB
TI- Project Mohole, Science Section, Scientific and Technical Progress for the Period Ending November 15, 1963
CS- Brown and Root, Inc., Houston, Tex.
CN- NSF-C-260
PY- 30 Nov 63
PG- 37p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6720
AB- Contents: Oceanographic studies; Logging program; Site selection; Platform design; Structural analysis; Hydrodynamics and aerodynamics; Model test program; Platform positioning; Power generation; Communications; Supply ship and helicopters; Derrick and substructure; Pipe handling system; Hoisting system; Rotating equipment; Hydraulic and pneumatic power; Mud pumps and requirements; Drilling fluids program; Drill pipe; Riser system; Base and connections; Hole re-entry instrumentation; Down-hole drills; Logistics; Critical path method of scheduling Project Mohole; Project schedule.
DE- *Well logging; *Geophysical prospecting; *Site selection; Feasibility studies; Oceanology; Marine engineering; Instrumentation; Marine geology; Design; Ships; Hydrodynamics; Aerodynamics; Model tests; Position finding; Power supplies; Communication systems; Helicopters; Logistics; Hoists; Pumps; Scheduling
ID- Mohole project
SH- 48F (Natural Resources and Earth Sciences--Geology and Geophysics)

AZ- 0130504
AA- <NTIS> N67-26599/XAB
TI- Measurement of Low Frequency Vibrations in Big Helicopters and Their Transmission to the Pilot
TI- <NOTE> Mesure des Vibrations de Basse Frequence Sur Helicoptere Lourd Et Leur Transmission Au Pilote
AU- Auffret, R. ; Seris, H.
CS- National Aeronautics and Space Administration, Washington, D. C.
RN- NASA-TT-F-471
PY- May 67
PG- 16p
NT- Transl. Into English From the Book "agard Collected Papers Presented At the 22nd Meeting of the Agard Aerospace Medical Panel" Sep. 1965 P 245-257
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal

Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A02/MF A01
JA- USGRDR6715; STAR0514
AB- No abstract available.
DE- *Human tolerance; *Low frequency; *Pilot performance; *Vibration effect ; Atmospheric; Cockpit; Cranium; Damping; Effect; Helicopter; Human; Measurement; Mechanical; Performance; Pilot; Resonance; Rotation; Rotor ; Seat; Sternum; Tolerance; Turbulence; Vibration
ID- Translations
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0129221
AA- <NTIS> N67-21775/XAB
TI- An Air-Borne Scintillometer
AU- Neisig, K. E.
CS- Atomic Energy Commission Research Establishment, Riso (Denmark). Dept. of Electronics.
RN- RISO-36
PY- Apr 62
PG- 20p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6711; STAR0510
AB- No abstract available.
DE- *Gamma radiation; *Scintillation counter; Airborne; Altimeter; Camera; Control; Counter; Detector; Gamma; Helicopter; Photomultiplier; Plotter ; Radiation; Radio; Recorder; Scintillation; Scintillometer; Transistor
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation)

AZ- 0129107
AA- <NTIS> N67-21198/XAB
TI- Comparison of Helicopter and Aeroplane Vertical Accelerations in Turbulence
AU- Webber, D. A.
CS- Aeronautical Research Council (Gt. Brit.)
RN- ARC-CP-878; RAE-TR-65190
PY- 1966
PG- 32p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6711; STAR0510
AB- No abstract available.
DE- *Gust; *Helicopter; *Turbulent air current; Acceleration; Aerodynamics; Air; Aircraft; Current; Instrumentation; Speed; Turbulent; Vertical
SH- 51A (Aeronautics and Aerodynamics--Aerodynamics)

AZ- 0127542
AA- <NTIS> COO-1471-7/XAB
TI- Helicopter Close-Order Formation Keeping System
TI- <NOTE> Final rept
AU- Hahn, L. K. ; Krause, C. E. ; Utt, O. L.
CS- Industrial Nucleonics Corp., Columbus, Ohio.
CS- <CODE> 177370
CN- AT(11-1)-1471
PY- 11 Aug 66
PG- 110p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A06/MF A01
JA- USGRDR6705; NSA2102
AB- No abstract available.
DE- *Helicopters; *Formation flight; Nuclear radiation
SH- 77E (Nuclear Science and Technology--Nuclear Instrumentation); 77B (Nuclear Science and Technology--Isotopes)

AZ- 0126891
AA- <NTIS> AD-660 359/XAB
TI- Development Study for a Helipad Standard Marking Pattern
TI- <NOTE> Technical rept
AU- Morrow, T. H.
CS- Ohio River Div Labs Cincinnati
CS- <CODE> 267050
RN- ORDL-EC-TR-4-67
PY- Sep 67

PG- 86p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR6724
AB- The report presents the results in the development of a recommended marking pattern for helipads. The objective of the study was to determine the marking pattern which would best fulfill requirements which were established on the basis of current practices, discussions with helicopter pilots, and helicopter operational observations. Field tests were conducted following laboratory observations and scale-model studies. Those requirements which most influenced final selection of the marking pattern were (1) Visual Flight Rules conditions (daytime), (2) recognition of the pattern from one mile, and (3) a five-degree minimum approach angle. Elements of pattern size and contrast gained significance as a result of field test evaluation. In order that the selected pattern most effectively meet the requirements, minimum overall pattern size and line width were recommended. Also, to emphasize the importance of good contrast, it was recommended that the marking pattern be white, edged with a black border unless the surface is sufficiently dark that the border is not needed for good contrast. The selected pattern was recommended as an Army standard for helipad marking and, in addition, is being considered as a national and international standard. (Author)
DE- *Heliports; *Landing aids; Human engineering; Configuration; Visual signals; Visibility; Standardization; Effectiveness
SH- 85A (Transportation--Air Transportation); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0124624
AA- <NTIS> AD-658 079/XAB
TI- Injury Experience in Army Helicopter Accidents
AU- Mattox, K. L.
CS- Army Board for Aviation Accident Research Fort Rucker Ala
CS- <CODE> 036600
RN- HF-68-1
PY- 1967
PG- 8p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6721
AB- The gross pattern of injury--site, frequency and seriousness--in U. S. Army helicopter accidents is shown. Although 95 percent of the major helicopter accidents are survivable, 22 percent of the deaths in all helicopter accidents occur in survivable conditions. The mechanisms of these avoidable deaths are discussed as well as the steps that should be taken to reduce the morbidity and mortality rate. (Author)
DE- *Helicopters; *Aviation accidents; Crash injuries; Human engineering; Aviation safety; Helmets; Head; Wounds + injuries; Spinal column; Mortality rates
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 57E (Medicine and Biology--Clinical Medicine); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0123519
AA- <NTIS> AD-656 971/XAB
TI- Human Factors in Aviation: Some Recurrent Problems and New Approaches
AU- Prophet, W. W.
CS- George Washington Univ Alexandria Va Human Resources Research Office
CS- <CODE> 173200
RN- PROFESSIONAL PAPER 30-67
CN- DA-44-188-ARO-2; DA-2J024701A712-01
PY- Jun 67
PG- 23p
NT- Presented at the Alabama Psychological Association Annual Meeting, Mobile, May 1967.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6720
AB- Three areas of human factors concern in aviation--performance assessment, prediction of performance, and simulation in training--are discussed. Emphasis is placed on the necessity for providing objective and standardized evaluation of flight trainees, rather than using the unreliable subjective evaluation methods. Methods for predicting trainees' performance, particularly in combat situations, are being sought. Use of simulation in training helicopter pilots has been minimal, but recently two devices were developed to provide better transfer of training from the device to the actual helicopter

situation. (Author)
DE- *Aviation personnel; *Training; Performance(Human); Aeronautics; Flight simulators; Predictions; Simulation; Performance tests; Pilots
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 51B (Aeronautics and Aerodynamics--Aeronautics)

AZ- 0121686
AA- <NTIS> AD-655 126/XAB
TI- Human Factors Research in Support of Army Aviation
AU- Thomas, F. H. ; Caro, P. W. ; Boyles, W. R.
CS- George Washington Univ Alexandria Va Human Resources Research Office
CS- <CODE> 173200
RN- PROFESSIONAL PAPER-27-67
CN- DA-44-188-ARO-2; DA-2J024701A71201
PY- Jun 67
PG- 21p
NT- Presented at the Annual Meeting of the Southeastern Psychological Association (13th), Atlanta, Georgia, April 1967.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6717
AB- Three papers were presented as part of a symposium concerned with human factors implications in Army aviation performance and training. The first paper deals with human factor problems in complex systems, particularly problems encountered in the aerial reconnaissance and surveillance subsystem of the Combat Intelligence System. The initial concern has been to improve human effectiveness in collecting battle area information through new training methods and techniques. The second paper deals with the effectiveness of the synthetic helicopter flight training devices and their usefulness for transfer of training from a rotary-wing instrument flight qualification course to performance on the actual helicopter. The third paper concerns research on aviator stresses during combat missions. The research objectives were to provide the Army with readily usable information to variables that affect aviator performance, and to integrate this information into a system of performance prediction. (Author)
DE- *Army personnel; *Army training; *Aerial reconnaissance; Performance(Human); Helicopters; Combat surveillance; Air intelligence; Effectiveness; Training devices; Transfer of training; Pilots; Predictions; Stress(Physiology)
SH- 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies); 92B (Behavior and Society--Psychology); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 74F (Military Sciences--Military Intelligence); 51B (Aeronautics and Aerodynamics--Aeronautics); 74G (Military Sciences--Military Operations, Strategy, and Tactics)

AZ- 0120606
AA- <NTIS> AD-654 045/XAB
TI- Studies of Pilot Performance in Helicopters
TI- <NOTE> Progress rept
AU- Billings, C. E.
CS- Ohio State Univ Research Foundation Columbus
CS- <CODE> 267360
CN- DA-49-193-MD-2615
PY- Jun 67
PG- 64p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6716
AB- The report describes changes in piloting performance observed during four hours of very low altitude flight in helicopters. In the course of these missions, designed to produce fatigue, pilots tended to allow rotor RPM to vary within wider limits as flight time increased. Control movements of relatively large amplitude increased considerably during the later hours of flight. These changes were evident both during flight in immediate proximity to obstructions and during flight of a less stressful nature. Significant differences among the four pilots studied appeared to be related both to previous helicopter flight experience and to the type of equipment flown prior to the experiment. A validation study was made of the measurement techniques developed in the first phase of the project. Using modified data collection techniques, fixed wing pilots are being studied during 25 hours of flight instruction in helicopters. Both psychological (performance) variables and physiological functions are being monitored with the hope of observing correlations between them. Improvements in data acquisition and processing techniques are described. (Author)

DE- *Pilots; *Helicopters; Performance(Human); Stress(Physiology); Stress(Psychology); Flight; Low altitude; Fatigue(Physiology); Psychophysiology; Training
SH- 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology)

AZ- 0119492
AA- <NTIS> AD-652 927/XAB
TI- Some Notes on United Kingdom Experience in the Testing of VTOL Aircraft
AU- Shields, R. T.
CS- Advisory Group for Aeronautical Research and Development Paris (France)

CS- <CODE> 005850
RN- AGARD-318; N62-14805
PY- Apr 61
PG- 17p
NT- NATO Furnished.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6715
AB- Experience to date in the flight testing of VTOL aircraft in the United Kingdom is reviewed. Methods employed in the testing of three aircraft, the Rolls-Royce 'Flying Bedstead', Short SC.1., and Hawker P 1127 are considered. Special ground facilities, in particular gantries and perforated platforms, evolved for the testing of these aircraft are briefly described and experience with them is discussed. Instrumentation methods which have been employed are briefly discussed and some special aspects of the flight programmes adopted are noted. It is generally concluded on the basis of this experience that, for the testing of a future similar type of aircraft, a perforated platform with ground tethering would be the primary additional facility needed and that data recording requirements are mainly similar to those for conventional aircraft. (Author)
DE- *Vertical take-off planes; Flight testing; Test methods; Great Britain; Instrumentation; Captive tests; Hovering; Flight paths; France
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0117845
AA- <NTIS> AD-651 279/XAB
TI- Effects of Vibration, Noise and Task Complexity on Performance in Rotary Wing and Fixed Wing Aircraft
TI- <NOTE> Progress rept., 1 Jun 64-31 May 66
AU- Billings, C. E.
CS- Ohio State Univ Research Foundation Columbus Aviation Medicine Research Lab
CS- <CODE> 048950
CN- DA-49-193-MD-2615; RF-1857
PY- 31 May 66
PG- 66p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A04/MF A01
JA- USGRDR6713
AB- Section one describes theoretical considerations underlying studies of pilot performance. It discusses some of the difficulties inherent in measurement of pilot performance and describes criteria used in these studies for systems of measurement. Section two contains a description of an objective method for assessment of pilot performance in rotary wing aircraft. It describes an experiment based on this method and presents initial analyses of the data. The method is discussed and suggestions are made for further studies. Section three describes an objective method of assessing pilot performance in fixed wing aircraft. The instrumentation necessary to assess this method is presented and the implications of the technique are discussed. Section four briefly describes revised instrumentation designed to provide both psychomotor and physiological data in rotary wing aircraft. A number of appendices provide information regarding the analytical and computer techniques used in the study, and present summaries of the data obtained to date. (Author)
DE- *Pilots; Performance(Human); Vibration; Noise; Psychometrics; Aircraft; Rotary wings; Psychophysiology
SH- 57W (Medicine and Biology--Stress Physiology); 92B (Behavior and Society--Psychology)

AZ- 0112092
AA- <NTIS> AD-645 492/XAB
TI- Final Technical Report, Janair Contract 4429(00)
AU- Dougherty, D. J.
CS- Bell Helicopter Co., Fort Worth, Tex.
CS- <CODE> 054200

RN- JANAIR-TR-D228-100-011
CN- NONR-4429(00)
PY- Feb 66
PG- 41p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A03/MF A01
JA- USGRDR6705
AB- The simulator studies were oriented about improvement and information augmentation of the contact analog. They were performed in the JANAIR/Bell Dynamic Flight Simulator and examined pilot performance as a function of: (1) the use of director symbols and changes in grid texture, (2) presentation of flight information on vertical tapes, (3) the use of digital readout of flight information. Flight studies examined the Spectocom Head-Up Display and television in flight situations in the JANAIR research helicopter. Recommendations for solution to these problems are presented in the correspondingly appropriate technical reports. Technical reports of all researches performed under the contract have been issued and are reviewed in this document. (Author)
DE- *Helicopters; *Flight simulators; Instrumentation; Display systems; Pilots; Performance(Human); Analog systems

AZ- 0108793
AA- <NTIS> AD-642 178/XAB
TI- Soviet High Altitude Equipment for Aircrew Protection
AU- Umanskii, S. P. ; Rebrov, M. F. ; Rabkin, I. G. ; Belskii, B. L. ; Sofronov, E. V.
CS- Library of Congress, Washington, D. C. Aerospace Technology Div.
CS- <CODE> 009980
RN- ATD-66-67; TT-67-60028
PY- 9 Jun 66
PG- 82p
NT- Rept. on Surveys of Foreign Scientific and Technical Literature. Special Extended Abstract and Translations.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A05/MF A01
JA- USGRDR6701; D6701
AB- The report consists of abstracts of the following topics: The pilot endurance barrier; Protective equipment for high-altitude flights; Functions of automatic equipment on aircraft; Flight safety; Construction of aircraft: airplanes, rockets, and helicopters; Aircraft equipment.
DE- *Aerospace craft; *Flight clothing; Aviation safety; High altitude; Flight crews; Pressure suits; Helmets; Parachutes; Ejection seats; Jettisonable equipment; Spacecraft cabins; Environment; Oxygen masks; Acceleration; USSR
ID- Translations
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment); 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0106667
AA- <NTIS> AD-640 891/XAB
TI- Human Factors Requirements for the Design of Helicopter Aircrewmen's Seat and Groin Protective Units
TI- <NOTE> Technical rept
AU- Burse, R. L.
CS- Army Natick Labs Mass Pioneering Research Div
CS- <CODE> 400933
RN- EPR-11; USA-NLABS-TR-67-28-PR
CN- DA-1C024701A121-02
PY- Sep 66
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6623
AB- The most important human factors requirements for the design of rigidly armored seat and groin protective units for the seated helicopter aircrewmen are discussed. Included are requirements for preventing interference with mission performance, reducing fatigue and providing a compatible, safe and somewhat comfortable working environment for the fully-equipped aircrewman. Quantitative design criteria for dimensions, contours, cushioning and location of the seat and groin protective units are specified. (Author)
DE- *Aircraft seats; *Helicopters; Human engineering; Flight crews; Body armor; Design; Fatigue(Physiology); Aviation safety
SH- 51C (Aeronautics and Aerodynamics--Aircraft); 92D (Behavior and

Society--Education, Law, and Humanities)

AZ- 0103268
AA- <NTIS> AD-637 466/XAB
TI- Helicopter-Borne Radiometeorograph
TI- <NOTE> Research translation
AU- Dovgalyuk, Y. S. ; Myukhkyura, V. I. ; Tyulkova, G. A.
CS- American Meteorological Society Boston Mass
CS- <CODE> 025000
RN- T-R-611; TT-66-62120
CN- AF 19(628)-3880
PY- Jun 66
PG- 2p
NT- Vertoletnyi Radiometeorograft, Trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n140(202) p65-70 1963.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A02/MF A01
JA- USGRDR6619
AB- The construction of a helicopter-borne radiometeorograph developed from the A-22 radiosonde at the Main Geophysical Observatory is analyzed. The electronic circuitry and the results of field and laboratory testing of the instruments are described. (Author)
DE- *Meteorological instruments; *Helicopters; Radiosondes; Barometric pressure; Atmospheric temperature; Humidity; Measurement; Instrumentation; Circuits; USSR
ID- Translations
SH- 55A (Atmospheric Sciences--Aeronomy)

AZ- 0102388
AA- <NTIS> AD-636 579/XAB
TI- A Review of the Analysis of Visual Discriminations in Helicopter Control
AU- Thielges, J. R. ; Matheny, W. G.
CS- Human Resources Research Office George Washington Univ Alexandria V
CS- <CODE> 173200
RN- PROFESSIONAL PAPER-4-66
CN- DA 44-188-ARO-2
PY- Jun 66
PG- 2p
NT- Prepared in cooperation with Life Sciences, Inc., Fort Worth, Tex. Prepared for presentation at the Southwestern Psychological Association, Arlington, Tex., 21-23 Apr 66.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6618
AB- The paper describes research performed under HumRRO Task ROTOR, Design of Rotary Wing Training Devices. An analysis was conducted of the necessary and sufficient cues for maintaining vehicle stability in pitch, roll, yaw, altitude, range, and latitude, and a model was developed which expresses the relationship between the cue sources and the information they provide about the vehicle stability in flight. The paper discusses the portion of the analysis which deals with the cue structure of the pilot's visual environment and the development of the model. (Author)
DE- *Visual perception; *Pilots; Helicopters; Training devices; Rotary wings; Stability; Performance(Human)
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering); 70D (Administration and Management--Personnel Management, Labor Relations, and Manpower Studies)

AZ- 0102380
AA- <NTIS> AD-636 571/XAB
TI- Feasibility Study for a Mobile Laboratory to Evaluate Environmental Radiation Contamination
CS- Edgerton Germeshausen and Grier Inc Santa Barbara Calif
CS- <CODE> 121850
RN- EGG-S-253-R; AFRRI-CR66-1
CN- DA-49-146-XZ-257
PY- Jan 66
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6618
AB- A study of the laboratory requirements necessary for evaluating radioactive contamination of food, water and biological specimens has

been completed. From the information obtained, a mobile laboratory facility with the capability of qualitative and quantitative analyses of millimicrocurie amounts of alpha, beta and gamma emitting radioisotope contaminants was designed. The laboratory utilizes sufficient shielding so all analyses can be performed in a two milliroentgen per hour gamma radiation field and where the average gamma energy is one mev. The entire laboratory including all electronics, detectors, shielding, power supplies, motor generator, laboratory structure and hardware, and transport container weighs less than two thousand pounds and has a total power requirement (115 volts a.c. - 60 cycle) of four kilowatts. (Power is furnished by a self-contained gasoline driven motor generator.) The laboratory in its cubic transport container, six feet on a side, is thus readily transportable either by helicopter or truck. (Author)
DE- *Radiological contamination; *Laboratories; Food; Water; Mobile; Feasibility studies; Gamma rays; Environment; Health physics
SH- 95G (Biomedical Technology and Human Factors Engineering--Protective Equipment)

AZ- 0100812
AA- <NTIS> AD-634 985/XAB
TI- Contact Analog Simulator Evaluations: Unusual Attitude Maneuvers
TI- <NOTE> Technical rept
AU- Koch, C. ; Dougherty, D. J.
CS- Bell Helicopter C Fort Worth Tex
CS- <CODE> 054200
RN- JANAIR-TR-D228-421-504
CN- NONR-1670(00)
PY- Dec 65
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6616
AB- The study was performed to determine the pilot's ability to recover from unusual attitude and to handle emergency maneuvers using the contact analog display. Five recoveries from unusual attitudes and two autorotation maneuvers were investigated. Four subjects performed each maneuver under two experimental conditions. Two display conditions were tested to determine the pilot's ability to reorient himself following the maneuver. One display condition employed the contact analog with the pathway and the other display condition employed same without the pathway. Performance measures included heading, pitch, yaw and impact G. Analysis of the findings indicates that (1) the pictorial qualities of the contact analog permit easy and positive recovery from unusual and emergency maneuvers; (2) the pathway had no significant effect on the pilot's ability to recover; (3) the pathway permitted reorientation with the original flight path; and (4) any disorientation effects of unusual maneuvers with respect to attitudes seem to be eliminated with the contact analog display. (Author)
DE- *Flight simulators; *Pilots; Analog systems; Performance tests; Flight; Attitude control systems; Helicopters; Maneuverability; Flight paths; Display systems; Analysis
ID- JANAIR project; Evaluation
SH- 51E (Aeronautics and Aerodynamics--Avionics); 51B (Aeronautics and Aerodynamics--Aeronautics); 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0096389
AA- <NTIS> AD-620 247/XAB
TI- UH-2 Jet-Augmented High-Speed Research Helicopter Maneuverability and Dynamic Stability Evaluation
TI- <NOTE> Final rept
AU- Blackburn, W. E. ; Whitfield, A. A.
CS- Kaman Aircraft Corp Bloomfield Conn
CS- <CODE> 888888888
RN- R-553A; USAAVLABS-TR-65-23
CN- DA44 177AMC151T; 1D121401A14311
PY- Jul 65
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02/MF A01
JA- USGRDR6520
AB- The results of a flight research program conducted to determine the effect of horizontal thrust augmentation on the maneuverability and dynamic stability characteristics of the UH-2 high-speed jet-augmented research helicopter are presented. The research aircraft, instrumentation, and test program are described. A standard Kaman UH-2 helicopter was modified by the addition of a General Electric YJ85 jet engine mounted on the right side of the fuselage for horizontal thrust augmentation. Transient and steady-state load factor maneuvers were

examined at various airspeeds and levels of jet augmentation. The maneuver envelope is shown to be expanded by unloading the main rotor through the application of horizontal thrust augmentation. The dynamic stability characteristics of the research vehicle are shown to be basically similar to the standard UH-2. The addition of thrust augmentation tends to increase damping in pitch and yaw and reduce control sensitivity. (Author)
DE- *Helicopters; *Thrust; Maneuverability; Dynamics; Stability; Flight testing; Aerodynamic loading; Jet engines; Damping; Pitch(Motion); Yaw; Gust loads; Acceleration
ID- H-2 aircraft

AZ- 0093802
AA- <NTIS> AD-617 602/XAB
TI- 1964 Annual Joint Army-Navy Aircraft Instrumentation Research Progress Report
TI- <NOTE> Technical rept
AU- Upton, H. W. ; Willis, J. M. ; Dougherty, D. J.
CS- Bell Helicopter C Fort Worth Tex
CS- <CODE> 888888888
RN- D288-100-009
CN- NONR167000
PY- Aug 64
PG- 2p
NT- Rept. on Proj. JANAIR. See also AD-435 733.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6516
AB- The report describes work which was accomplished in the areas of engineering and human factors flight tests of the RH-2 (Research Helicopter Number Two), human factors flight simulation evaluations of the contact analog vertical display, and experimentation of map features for the navigation display. The evaluative studies are presented with performance data and brief results and conclusions. (Author)
DE- *Helicopters; *Display systems; Human engineering; Flight simulators; Vertical indicators; Ground position indicators; Flight instruments; Television display systems; Navigation charts; Flight testing; Simulation; Horizontal indicators; Hovering; Landings; Take-off; Navigation aids; Landing aids
ID- JANAIR; RH-2 aircraft

AZ- 0092336
AA- <NTIS> AD-616 104/XAB
TI- UH-2 Helicopter High-Speed Flight Research Program Utilizing Jet Thrust Augmentation
TI- <NOTE> Final rept
AU- Whitfield, A. A. ; Blackburn, W. E.
CS- Kaman Aircraft Corp Bloomfield Conn
CS- <CODE> 888888888
RN- R-527B; TRECOM-TR-65-14
CN- DA44 177AMC105T; 1D121401A152
PY- Mar 65
PG- 2p
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PC- PC A02
JA- USGRDR6514
AB- The results of a flight research program conducted to determine the behavior of a fully articulated, servo-flap controlled rotor system at various power levels in highspeed flight are presented. The research aircraft, instrumentation, and test program are described. A standard Kaman UH-2 helicopter was modified by the addition of a General Electric YJ-85 jet engine, without afterburner, mounted on the right side of the fuselage for horizontal thrust augmentation. Research flights were conducted up to a level-flight true airspeed of 188 knots. Airspeeds limited by retreating blade stall or advancing blade compressibility were established. The effects of density altitude, rotor speed and power, tip speed ratio, thrust augmentation and aircraft gross weight on the limit airspeeds are discussed. It is concluded that the speed envelope for rotary wing aircraft can be substantially expanded by unloading the main rotor through the application of horizontal thrust augmentation. (Author)
DE- *Helicopters; *Jet planes; Thrust; Flight testing; Helicopter rotors; Rotary wings; Vibration; Jet engines; Airspeed; Aerodynamic loading; Stability
ID- H-2 aircraft; Thrust augmentation

AZ- 0089842
AA- <NTIS> AD-613 523/XAB

TI- State of the ART for V/STOL Control Display
TI- <NOTE> Interim rept
CS- Lear Siegler Inc Grand Rapids Mich Instrument Div
CS- <CODE> 888888888
RN- GR-1445; RTD-TDR63-4167
CN- AF33 657 11740; 6190; 619005
PY- Oct 63
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6510
AB- A survey was conducted to establish the 'state-of-theart' in V/STOL control-display development and application. Visitations were made to fifteen United States firms and government agencies actively engaged in V/STOL development and data correlated with reported European V/STOL development. Most research activity to date has been concerned with propulsion feasibility and aircraft aerodynamic characteristics with little emphasis on control-display sub-systems analysis. Some V/STOL simulation has been conducted, primarily in the areas of altitude control during the hover phase. Areas requiring intensive control-display analysis to fully utilize the unique V/STOL capabilities include: engine instrumentation, low air speed sensing and display, wing stall condition and angle of attack during transition phases, visibility requirements, and terminal guidance requirements. (Author)
DE- *VERTICAL TAKE-OFF PLANES; *SHORT TAKE-OFF PLANES; REVIEWS; DISPLAY SYSTEMS; CONTROL SYSTEMS; PROPULSION; FEASIBILITY STUDIES; AERODYNAMIC CHARACTERISTICS; SIMULATION; AIRCRAFT ENGINES; INSTRUMENTATION; HOVERING; FLIGHT TESTING

AZ- 0089659
AA- <NTIS> AD-613 339/XAB
TI- Engine and Whirl Tests, XV-9a Hot Cycle Research Aircraft
TI- <NOTE> Summary rept
AU- Pieper, C. W.
CS- Hughes Tool C Culver City Calif Aircraft Div
CS- <CODE> 888888888
RN- HTC-AD-64-23 (385-T-15); TRECOM-TR-64-67
CN- DA44 177AMC877T; 1D121401 A14403
PY- Feb 65
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6510
AB- A summary of engine and whirl testing of the rotor and power module portion of the XV-9A is presented. The results of engine testing include operation of two gas generators into a common exhaust duct with transient power conditions. Rotor whirl test results of the hot cycle rotor used on the XV-9A are reported and include functional check-out, performance evaluation and structural evaluation. Results of testing of a jet-reaction yaw control valve are included. (Author)
DE- *AIRCRAFT ENGINES; *HELICOPTER ROTORS; TESTS; JET ENGINE VALVES; LUBRICATION; EXHAUST NOZZLES; EXHAUST PIPES; GAS GENERATOR ENGINES; TEST METHODS; INSTRUMENTATION; DATA; PERFORMANCE (ENGINEERING)
ID- XV-9A AIRCRAFT; YT-64 GAS GENERATOR

AZ- 0087936
AA- <NTIS> AD-611 581/XAB
TI- Category II Arctic Evaluation of the Ych-47a Helicopter
TI- <NOTE> Rept. for 10 Dec 63-6 Feb 64
AU- Stanford, R. E. ; Griggs, D. B.
CS- Aeronautical Systems Div Air Force Systems Command Wright-Patterson AFB Ohio
CS- <CODE> 888888888
RN- ASD-TDR-64-86
PY- Dec 64
PG- 2p
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PC- PC A02
JA- USGRDR6501
AB- The YCH-47A helicopter was tested under arctic conditions at Eielson AFB, Alaska during the period 10 December 1963 to 6 February 1964. Testing consisted of flights both at moderately low (+ 10F to -20F) and

very low temperatures (-20F to -30F) as well as ground operation down to -40F. Along with conducting an overall evaluation of the helicopter's effectiveness in a cold environment, a number of improvements to correct earlier low temperature deficiencies were tested and found adequate. This report contains a description of the test procedures, selected instrumentation data, a discussion of the deficiencies uncovered and recommendations for their correction. Problems encountered in the Arctic were instability arising from SAS (Stability Augmentation System) operation, delamination of rotor blade fiberglass skins, and extreme difficulty in ground handling on hard packed snow, ice, or similar slippery surfaces. In order for the helicopter to be suitable for low temperature operation, new or modified rotor blades with assured structural integrity must be incorporated along with other improvements recommended in this report. (Author)

DE- *HELICOPTERS; COLD WEATHER TESTS; PERFORMANCE (ENGINEERING); FLIGHT TESTING; ARCTIC REGIONS; MILITARY REQUIREMENTS; ROTOR BLADES (ROTARY WINGS); DRIVES; HYDRAULIC SYSTEMS; ELECTRICAL EQUIPMENT; FLIGHT CONTROL SYSTEMS; HEATING; MAINTAINABILITY; HANDLING; TAXIING

AZ- 0086994
AA- <NTIS> AD-610 617/XAB
TI- Comparison of Perceptual Work Load in Flying Standard Instrumentation and the Contact Analog Vertical Display
TI- <NOTE> Technical rept
AU- Dougherty, D. J. ; Emery, J. H. ; Curtin, J. C.
CS- Bell Helicopter C Fort Worth Tex
CS- <CODE> 888888888
RN- D228-421-019
CN- NONR167000
PY- Dec 64
PG- 2p
NT- Report on (JANIR) Joint Army Navy Aircraft Instrumentation Research.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6506
AB- The study reported in this document was an experimental approach to the comparison of visual free time that results in the pilot task when flying standard instruments and when flying the contact analog vertical display. The investigation was conducted under the direction of the Joint Army Navy Aircraft Instrumentation Research Program and funded under ONR Contract Nonr1670(00). The standard instrumentation used in the study was an instrument panel composed of an airspeed indicator, an altimeter, a compass, an attitude indicator, a rate of climb meter, and a cross pointer position indicator. The contact analog vertical display investigated was built to BellJANA IR specifications by the Norden Division of United Aircraft Corporation for the JANAIR program. The task, performed in the Bell Helicopter Company dynamic flight simulator, required pilot Ss to fly a command altitude, heading, course, and airspeed. This was performed with both flight display systems. In addition, the pilot was required to read digits which were programed to appear on a separate display at varying rates. An index of the visual time available was obtained by the ability to read these digits in addition to performing the flight task.

DE- *INSTRUMENT FLIGHT; *VISUAL PERCEPTION; PERFORMANCE (HUMAN); THRESHOLDS (PHYSIOLOGY); FLIGHT SIMULATORS; DISPLAY SYSTEMS; PILOTS; INSTRUMENT PANELS; TIME STUDIES; STRESS (PHYSIOLOGY); HELICOPTERS

AZ- 0086629
AA- <NTIS> AD-610 249/XAB
TI- Army-Navy Instrumentation Program Historical Report
CS- Douglas Aircraft C Inc Long Beach Calif
CS- <CODE> 888888888
RN- LB-40641
PY- Jun 62
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6505
AB- Lack of ability to implement instrumentation and display systems which would better fit man's requirements caused ANIP to conduct research in many areas for basic information and for application of information already at hand. These areas included computer theory and implementation, materials, display devices, sensors, feasibility, human factors and systems analysis. Feasibility studies included one

fixed-wind flyable system and two rotary-wing systems. Laboratory facilities are used for human factors and system research, evaluation and demonstration. Results of the program are breakthroughs in human factors requirements for display content, display design and implementation, materials and their relation to electromagnetic phenomena, display devices, computer theory and construction advances, and inertial sensor conceptual evaluation which has produced a new concept having unusually high practical application potential. All other results are overshadowed by proof that the man-machine system and requirements approach coupled with research allocated to problem areas on a priority basis can yield systems of superior performance in minimum cost and time.

DE- *INSTRUMENTATION; *SYSTEMS ENGINEERING; SYSTEM ENGINEERING; ARMED FORCES RESEARCH; DISPLAY SYSTEMS; RESEARCH PROGRAM ADMINISTRATION; FEASIBILITY STUDIES; COMPUTERS; HUMAN ENGINEERING; MATERIALS; CIRCUITS; SIMULATION; FLIGHT INSTRUMENTS; DATA; MINIATURE ELECTRONIC EQUIPMENT; INSTRUMENT PANELS

AZ- 0084501
AA- <NTIS> AD-608 050/XAB
TI- Flight Analysis of Approach and Landing Guidance Elements of Heliport Lighting Patterns
TI- <NOTE> Final rept
AU- Watters, D. L. ; Rollins, W. F. ; Frey, R. B. ; Cavonius, C. R.
CS- Human Sciences Research Inc Mclean V
CS- <CODE> 888888888
RN- HSR-RR-64/7-MKX; FAA-RD64 93
CN- FAA BRD401; 424 2R
PY- Jun 64
PG- 2p
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PC- PC A02
JA- USGRDR6501
AB- The flight phase of a series of tasks directed at the development of preliminary design criteria for approach and landing guidance elements of a heliport lighting configuration is presented. Helicopter pilots flew approaches to 8 experimental lighting and marking patterns. The patterns included a brightly colored panel presented during daylight approaches and 7 night patterns consisting of a single touchdown light or pairs of lights spaced 5, 15, or 80 feet apart oriented along the flight path or transverse to the flight path. Seventy-two measures of aircraft position, aircraft attitude and pilot control movement were analyzed in order to identify measures sensitive to changes in lighting configuration, but insensitive to individual pilot technique. Those measures which successfully discriminated among different lighting conditions were measures of deviation from a generally accepted standard (e. g., a straight flight path during approach) as opposed to measures which reflect individual pilot technique. The vast majority of the recorded measures (particularly pilot control movement) reflected inter-pilot differences in technique, since individual pilots display great consistency when repeating the same pattern.
DE- *HELICOPTERS; *LANDING AIDS; LANDING FIELDS; AIRPORTS; MARKER LIGHTS; APPROACH LIGHTS; FLIGHT PATHS; FLIGHT TESTING; PILOTS; AVIATION SAFETY; HUMAN ENGINEERING; INSTRUMENTATION; PROGRAMMING (COMPUTERS)
ID- HELIPORTS

AZ- 0084500
AA- <NTIS> AD-608 049/XAB
TI- Airport/Heliport Marking and Lighting Systems: A Summary Report on Human Factors Research
TI- <NOTE> Final rept
AU- Whittenburg, J. A. ; Vaughan, W. S. ; Havron, M. D. ; Gavonius, C. R.
CS- Human Sciences Research Inc Mclean V
CS- <CODE> 888888888
RN- HSR-RR-64/2-MKX; FAA-RD64 94
CN- FAA BRD401; 424 2R
PY- Jun 64
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6501
AB- Six recently completed research tasks concerned with human factors considerations in airport/heliport marking and lighting systems are summarized. The research tasks included (1) surveys of prior

operational flight tests, human factors data, and past, present, and proposed marking and lighting components and systems, (2) studies contributing to the development of airport/heliport marking and lighting designs, and (3) studies contributing to the screening and evaluation of proposed airport/heliport marking and lighting systems. For each summary the significance of the study to airport/heliport marking and lighting systems is stated. This is followed, in order, by a brief description of the study procedure, the major study findings, and implications that these findings may have for management and operational personnel as well as for human factors specialists. In addition to the summaries the broader implications of the total research effort are discussed.
DE- *LANDING FIELDS; *MARKER LIGHTS; AIRPORTS; LANDING AIDS; APPROACH LIGHTS; AIRPLANES; HELICOPTERS; JET PLANES; PILOTS; FLIGHT TESTING; FLIGHT SIMULATORS; AVIATION PERSONNEL; AVIATION SAFETY; HUMAN ENGINEERING
ID- HELIPORTS

AZ- 0083819
AA- <NTIS> AD-607 344/XAB
TI- High-Performance Helicopter Program: Phase II
TI- <NOTE> Summary rept
AU- Van Wyckhouse, J. F. ; Cresap, W. L.
CS- Bell Helicopter C Fort Worth Tex
CS- <CODE> 888888888
RN- D-533-099-010; TRECOM-TR64 61
CN- DA44 177TC711; 9R38 13 014 01; 1D121401A14301
PY- Oct 64
PG- 2p
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PC- PC A02
JA- USGRDR6501
AB- The results of a flight research program to investigate high-speed loaded and unloaded rotors are presented. The program is an extension of the high-performance UH-1B flight research program reported in TREC 63-42. The compound flight research helicopter, instrumentation, and test program are described and the test results are discussed. Major modifications to the basic high-performance helicopter involved the addition of two continental J69-T9 jet engines, a controllable incidence wing and controls and elevator-horizontal stabilizer changes. (Author)
DE- *HELICOPTERS; *HELICOPTER ROTORS; DESIGN; AERODYNAMIC CONFIGURATIONS; WINGS; JET ENGINES; FLIGHT TESTING; FLIGHT SPEEDS; HOVERING; LEVEL FLIGHT; THRUST; VIBRATION; TAIL HELICOPTER ROTORS; AERODYNAMIC CHARACTERISTICS
ID- J-69 ENGINES; UH-1B

AZ- 0078914
AA- <NTIS> AD-602 170/XAB
TI- Investigation of the Infrared Emission Spectrum of the Atmosphere and Earth
TI- <NOTE> Final rept
AU- Bolle, H. J. ; Kuers, G. ; Moller, F. ; Quenzel, H.
CS- Munich Univ (West Germany) Meteorologisches Institut
CS- <CODE> 888888888
CN- AF61 052 488
PY- 15 Mar 64
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A02
JA- USGRDR6501
AB- A detailed theory and estimation of errors of an optical method to determine the total water vapor content of the atmosphere with an interference-filter actinograph is presented. A radiometer-instrumentation to determine the haze by infrared radiation measurements in the 2-3.5 micrometer-region from a helicopter is described.
DE- *SPECTRA (INFRARED); MEASUREMENT; INFRARED RADIATION; SOLAR RADIATION; WATER VAPOR; ABSORPTION; ATMOSPHERE; EARTH; RADIOMETERS; HELICOPTERS; WEST GERMANY
ID- ACTINOMETRY; Translations

AZ- 0078870

AA- <NTIS> AD-602 125/XAB
TI- Helicopter Shaft Force Measurement System
AU- Deazley, W. R.
CS- Cornell Aeronautical Lab Inc Buffalo N Y
CS- <CODE> 888888888
RN- TG-1476F1; TRECOM-TR61 58
CN- 9R38 13 014 01
PY- Apr 64
PG- 2p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A02
JA- USGRDR6501
AB- The development of instrumentation to measure shaft shear and tension forces was undertaken to aid in the measurement of the rotor shaft forces on an HU-1 helicopter to be tested in the 40 foot by 80 foot wind tunnel at the NASA Ames Research Center. Since it is not possible to measure the rotor-fuselage interaction forces on the wind tunnel balances, it was necessary to measure the main rotor shaft forces. These forces are the only direct measurement of the interaction between the fuselage and rotor system. Strain gages were mounted on the rotor shaft to measure directly the strains resulting from shear and tension forces.
DE- *DRIVE SHAFTS; *HELICOPTER ROTORS; SHEAR STRESSES; TENSILE PROPERTIES;
SHAFTS; TENSIOMETERS; AZIMUTH; MEASUREMENT; FUSELAGES
ID- H-1 AIRCRAFT

AZ- 0071272
AA- <NTIS> PB-167 270/XAB
TI- Experimental Study of the Aerodynamic Characteristics of a Model of an Air Cushion Vehicle in Hovering Flight
AU- Gowans, B. W.
CS- Institute for Aerospace Studies, Univ. of Toronto (Ontario).
CS- <CODE> 178920
RN- UTIAS-TN-74; AD-446 189
CN- AF33 657 8451
PY- Feb 64
PG- 78p
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PC- PC A05/MF A01
JA- USGRDR6401
AB- A self-propelled model of an Air Cushion Vehicle has been built and flight tested on the UTIAS Circular Track Facility. A detailed study of the flow through the model has been made, and the jet mass and momentum fluxes have been measured. An augmentation curve and the basic static and dynamic stability characteristics in pitch have been obtained for the model while in hovering flight. (Author)
DE- *Ground effect machines; Model tests; Aerodynamic characteristics; Hovering; Flight testing; Construction; Instrumentation; Calibration; Pitch(Motion); Ground effect; Ducted fans; Shrouded propellers; Gas flow; Pressure; Thrust; Lift; Performance (Engineering); Three-dimensional flow; Mathematical analysis
SH- 51B (Aeronautics and Aerodynamics--Aeronautics); 85H (Transportation--Road Transportation)

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AZ- 0066099
AA- <NTIS> N67-13399/XAB
TI- Pilot Behaviour in VTOL Aircraft
AU- Schweizer, G.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
RN- AGARD-521
PY- Oct 65
PG- 100p
NT- Presented At the 27th Meeting of the Agard Flight Mech. Panel, Rome, 11-12 Oct. 1966
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A05/MF A01
JA- USGRDR6705; STAR0504
AB- No abstract available.
DE- *Dornier do-31 aircraft; *Flight test; *Human behavior; *Pilot performance; *Vtol aircraft; Aircraft; Behavior; Control; Flight; Function; Handling; Hovering; Human; Performance; Pilot; Quality; Rig; Stabilization; Test; Transfer; Vtol
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors

Engineering)

AZ- 0064961
AA- <NTIS> N66-38413/XAB
TI- Fixed-Base Visual-Simulation Study of Manually Controlled Translation and Hover Maneuvers over the Lunar Surface
AU- Miller, G. K.
CS- National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
RN- NASA-TN-D-3653
PY- Oct 66
PG- 26p
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Translation
PC- PC A03/MF A01
JA- USGRDR6401; STAR0423
AB- No abstract available.
DE- *Landing simulation; *Lunar surface; *Maneuver; *Manual control; Approach; Attitude; Base; Control; Crater; Fixed; Hovering; Landing; Orbit; Site; Spacecraft; Study
ID- Translations
SH- 95D (Biomedical Technology and Human Factors Engineering--Human Factors Engineering)

AZ- 0060843
AA- <NTIS> N66-19933/XAB
TI- Air Flight Technology - Survey of Literature
TI- <NOTE> Luchtvaarttechniek Literatuuroverzicht
CS- Technisch Documentatie en Informatie Centrum Voor de Krijgsmacht, the Hague (Netherlands).
PY- 26 Jan 66
PG- 23p
NT- in Dutch, French, English, and German Its Vol. 14, No. L-290
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Bibliography
PC- PC A02/MF A01
JA- USGRDR6401; STAR0410
AB- No abstract available.
DE- *Abstract; *Air traffic control; *Aircraft; *Bibliography; *Ground effect machine; *Helicopter; Aerodynamics; Air; Bird; Characteristic; Control; Impact; Instrumentation; Navigation; Propulsion; Traffic

AZ- 0052193
AA- <NTIS> AD-461 455/XAB
TI- Xv-5A Lift Fan Flight Research Aircraft
TI- <NOTE> Quarterly technical progress rept. no. 11, 16 May-15 Aug 64
CS- General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
CS- <CODE> 148265
CN- DA-44-177-TC-715
PY- Oct 64
PG- 133p
NT- See also AD-437 623.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PC- PC A07
JA- USGRDR6606
AB- The lateral control investigation was completed with the static load test successfully completed at San Diego, the necessary hardware manufactured and modification to aircraft number 2 completed, with Edwards vertical thrust stand plus flight testing verification of the increased lateral control power. Full scale wind tunnel testing was completed with aircraft number 1, and the aircraft returned to Edwards for preparation for flight test. Lift fan inlet vane failures were experienced during the wind tunnel tests, modifications designed, manufactured, and tested to establish a flight envelope. Potential longitudinal trim problems were seen during the wind tunnel, a horizontal tail slat and instrumentation boom for measuring tail angle of attack were designed and installed on aircraft number 2. The nose wheel shimmy investigation was completed and modifications accomplished to the aircraft which allowed successful conventional flights to commence May 25, 1964. Initial hover flights began on July 16, 1964. A J85 stall investigation was conducted as a result of several compressor stalls experienced during flight. At the end of this reporting period, two hover flights were successfully accomplished without stalls utilizing J85's in a 'stall-free' configuration. (Author)
DE- *Vertical take-off planes; *Research planes; Lift; Flight testing; Wind

tunnel models; Model tests; Take-off; Flutter; Vibration; Jet engines; Hovering
ID- V-5 aircraft
SH- 51C (Aeronautics and Aerodynamics--Aircraft)

AZ- 0051009
AA- <NTIS> AD-420 338/XAB
TI- Cal/Trecom Symposium. Proceedings Vol. II. Dynamic Load Problems Associated with Helicopters and V/STOL Aircraft, June 26-28, Statler Hilton, Buffalo, n. Y
CS- Cornell Aeronautical Lab., Inc., Buffalo, N.Y.
CS- <CODE> 098300
PY- 1963
PG- 299p
NT- Prepared in cooperation with Army Transportation Research Command, Fort Eustis, Va. See also AD-420 337.
NT- Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
DT- Conference proceeding
PC- PC A13
JA- USGRDR6401
AB- Contents: A review of the structural dynamic characteristics of the XC-142A aircraft, by Mr. A. L. Head, Jr.; Propeller whirl flutter considerations for V/STOL aircraft, by Wilmer H. Reed III, and Robert M. Bennett; High-speed shafting for power transmission in aircraft, by J. E. Vorhees, J. B. Day, and R. G. Dubensky; Dynamic torsional problems in VTOL drive trains with universal joints, by R. Bossler, W. G. Flannelly; Recent work at the royal aircraft establishment on helicopter dynamic loads, with particular reference to high blade incidence problems, by A. E. Clarke; Some results from the army low altitude, high-speed flight program (manmachine), by John E. Yeates; Human factor problems associated with low altitude high-speed (LAHS) flight, by H. E. Rawson, and B. Schohan; Effect of gust alleviation system on dynamic airloads, by J. D. Balducci, F. L. Adams, and M. A. Schwartzberg; An analytical investigation of aircraft loads induced by rough terrain landings, by Fred C. Allen, and Lane B. Mosby.
DE- *Helicopters; *Short take-off planes; *Vertical take-off planes; Aerodynamic loading; Propeller blades; Gust loads; Low altitude; Shafts ; Flutter; Landings; Terrain; Human engineering; Mathematical analysis; Design; Convertible planes; Symposia
ID- C-142 aircraft

AN- <DIALOG> 02569369
AN- <AEROSPACE> A01-27377
TI- Helicopter recovery to a moving platform using a GPS relative positioning system
AU- Belton, David; Butcher, Simon; Ffoulkes-Jones, Geraint; Blanda, Joseph (Symmetricom, Ltd., Northamton, United Kingdom)
SO- In: ION GPS-99; Proceedings of the 12th International Technical Meeting of the Satellite Division of the Institute of Navigation, Nashville, TN, Sept. 14-17, 1999 (A01-27218 06-32), Alexandria, VA, Institute of Navigation, 1999, p. 1769-1776.
PY- 1999
PD- 199900
RF- 5
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0106
AB- Existing TACAN (TACtical Air Navigation system) instrumentation systems installed on helicopters are used as a navigation aid to allow the pilot to return back to a moving platform such as a ship. These instruments give an accuracy of approximately half a mile and cannot be used within the last 400 yards of approach. Consequently, with poor visibility it is very difficult for the pilot to establish the exact whereabouts of the vessel. By using a method of differential GPS where both the reference and host receivers are moving, the relative position between the two moving platforms can be established to better than 20 cm. This provides the pilot with a navigation aid for precision approach and landing onto a recovery ship even in poor visibility. This paper discusses the practical implementation of a relative positioning system for use as a precision approach navigation aid and its potential as a replacement for existing instrumentation. Initial trials with vehicles on the ground were used as a proof of concept. This was followed by extensive field trials in an operational helicopter and a recovery ship. The tests highlighted improvements that can be made to the system to aid in its usability, but overall the trials were a success and proved that the GPS relative positioning system is both a more accurate and a cost-effective method for the recovery of helicopters to a moving platform and improves landing safety. (Author)
DE- <MAJOR> *DIFFERENTIAL GLOBAL POSITIONING SYSTEM; *HELICOPTER CONTROL;

*FLYING PLATFORMS; *TACAN; *POSITION (LOCATION); *SAFETY FACTORS
DE- AIRCRAFT INSTRUMENTS; LOW VISIBILITY; AIR NAVIGATION; COST EFFECTIVENESS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 02566689
AN- <AEROSPACE> A01-24697
TI- Innovation for integrated command environments
AU- Smith, M. I.; Rood, G. (DERA, Farnborough, United Kingdom)
SO- In: Integrated command environments; Proceedings of the Conference, San Diego, CA, 31 July 2000 (A01-24676 05-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 4126), 190, p. 186-197.
PY- 2000
PD- 200000
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0105
AB- To extend the operational envelope of helicopters, the benefits obtained from the usage of different sensors (and combination of sensors) on the one platform are being extensively assessed. Critical to the success of such approaches are image interpretability and resultant pilot workload. The particular case addressed by this paper is that where two sensor inputs are available: one from the visible (image intensified) band and one from the IR band. An adaptive image fusion processing scheme is proposed in which scene metrics are used to provide feedback control data. The use of scene metrics which are derivatives of the image fusion process is proposed in order to maximize system performance. (Author)
DE- <MAJOR> *SYSTEMS INTEGRATION; *COMMAND AND CONTROL; *MILITARY PERSONNEL
; *MAN MACHINE SYSTEMS; *HUMAN FACTORS ENGINEERING
DE- TECHNOLOGY ASSESSMENT; TASKS; USER REQUIREMENTS
SH- 7563 Cybernetics (1975-)

AN- <DIALOG> 02565592
AN- <AEROSPACE> A01-23600
TI- Too much too soon
TI- <EXTENSION> pilot information overload in military helicopters
AU- Marsh, George
SO- Defence Helicopter (ISSN 0963-116X), vol. 20, no. 1, Mar. 191, p. 32, 34-36.
PY- 2001
PD- 200103
SN- 0963-116X
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0105
AB- Too much information can be as bad for the combat-helicopter pilot as too little. This article describes how European suppliers are trying to strike a balance. A possible solution is to combine information in a single display in such a way that everything can be readily assimilated by the pilot. Another approach to preventing visual overload is to extend the use of other human senses, particularly aural and tactile. (AIAA)
DE- <MAJOR> *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *DISPLAY DEVICES
DE- HELICOPTER CONTROL; INFORMATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02565591
AN- <AEROSPACE> A01-23599
TI- Taking the weight
TI- <EXTENSION> pilot-assistant design for military helicopters
AU- Marsh, George; Healey, Andrew
SO- Defence Helicopter (ISSN 0963-116X), vol. 20, no. 1, Mar. 191, p. 17-21.
PY- 2001
PD- 200103
SN- 0963-116X
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0105
AB- Concepts related to the development of an intelligent, synthetic pilot's assistant are described. Assistance is structured in such a way as to mimic human behavior and provides mission support, "visual"

support, and internal situational awareness. Pilots will thus be provided with a digital decision-maker for the mundane tasks, helping them to concentrate on crucial stages of the mission. (AIAA)
DE- <MAJOR> *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS; *PILOT SUPPORT
SYSTEMS
DE- DECISION MAKING; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02565208
AN- <AEROSPACE> A01-23216
TI- The performance of the Standard Rate Turn (SRT) by student naval helicopter pilots
AU- Chapman, Frank (Naval Operational Medicine Inst., Pensacola, FL); Temme, Leonard A. (Naval Aerospace Research Lab., Pensacola, FL); Still, David L. (Inst. of Human and Machine Cognition, Pensacola, FL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 72, no. 4, Apr. 191, p. 343-351.
PY- 2001
PD- 200104
RF- 14
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0105
AB- During flight training, student naval helicopter pilots learn the use of flight instruments through a prescribed series of simulator training events. The training simulator is a six-degree-of-freedom motion-based high-fidelity instrument trainer. From the final basic instrument simulator flights of student pilots, we selected for evaluation and analysis their performance of the Standard Rate Turn (SRT), a routine flight maneuver. The performance of the SRT was scored with air speed, altitude, and heading average error from target values and standard deviations. These average errors and standard deviations were used in a Multiple Analysis of Variance (MANOVA) to evaluate the effects of three independent variables: (1) direction of turn (left vs. right), (2) degree of turn (180 vs. 360 deg), and (3) segment of turn (roll-in, first 30 s, last 30 s, and roll-out of turn). The results show that only the main effects of the three independent variables were significant; there were no significant interactions. This result greatly reduces the number of different conditions that should be scored separately for the evaluation of SRT performance. The results also showed that the magnitude of the heading and altitude errors at the beginning of the SRT correlated with the magnitude of the heading and altitude errors throughout the turn. This result suggests that for the turn to be well executed, it is important for it to begin with little error in these two response parameters. It is concluded that the observations reported here should be considered when establishing SRT performance norms and comparing student scores. Furthermore, it seems easier for pilots to maintain good performance than to correct poor performance. (Author)
DE- <MAJOR> *HELICOPTER PERFORMANCE; *AIRCRAFT PILOTS; *FLIGHT TRAINING;
*TRAINING SIMULATORS; *PILOT TRAINING; *PILOT ERROR
DE- NAVY; STUDENTS; STANDARDS; PILOT PERFORMANCE; FLIGHT ALTITUDE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02564760
AN- <AEROSPACE> A01-22768
TI- Aiding Navy helicopter aircrews in handling mechanical fault emergencies
AU- Glenn, Floyd; Deaton, John; Barba, Charles; Popp, Ed (CHI Systems, Inc., Lower Gwynedd, PA)
SO- In: Entering the second century of powered flight; Proceedings of the 19th Digital Avionics System Conference (DASC), Philadelphia, PA, Oct. 7-13, 2000. Vol. 2 (A01-27744 05-01), Piscataway, NJ, Institute of Electrical and Electronic Engineers, 190, p. 5.E.5-1 to 5.E.5-9.
PY- 2000
PD- 200000
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0105
AB- This paper presents an overview of a research program which is investigating how to generate and present information to Navy helicopter aircrews to help them handle mechanical problems in-flight. This work seeks to provide a mechanism for alerting aircrews to problems that are identified and potentially diagnosed by a Health and Usage Monitoring System (HUMS). HUMS alerting is combined with a concept for an interactive, electronic flight manual to produce a

complete aircrew aiding system. Since the basis for the flight manual information is the Navy's NATOPS, the system is designated as Interactive Electronic NATOPS (IE-NATOPS). A prototype design, which is presented, is planned for implementation on an electronic kneeboard device with aircraft 1553 bus connection to the Warning Caution and Advisory (WCA) cockpit alerting display and HUMS. Aircrew information requirements for HUMS-based aiding have been investigated through two studies that were conducted in a Navy H-46 simulator. The first study addressed aircrew performance in a baseline aircraft with no aiding. The second study examined performance with a hypothetical (scripted) aid which provided information in the categories of problem identification, diagnosis, confirmation, and action recommendation. Aircrew performance and preferences in using these various categories of information were studied. Results of both of these studies are summarized. Human factors design issues are discussed, focusing primarily on the cognitive issues of information characteristics. (Author)

DE- <MAJOR> *MILITARY AVIATION; *EMERGENCIES; *AIRCRAFT SAFETY; *FLIGHT CREWS; *AIRCRAFT MAINTENANCE; *HEALTH MONITORING (ENGINEERING); *HELICOPTER PERFORMANCE

DE- AIRCRAFT ACCIDENTS; NAVY; MILITARY HELICOPTERS; FAULT DETECTION; IN-FLIGHT MONITORING

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02564753

AN- <AEROSPACE> A01-22761

TI- Identifying mode confusion potential in software design

TI- <EXTENSION> for flight management system

AU- Rodriguez, Mario; Zimmerman, Marc; Katahira, Masafumi; de Villepin, Maxime; Ingram, Benjamin; Leveson, Nancy (MIT, Cambridge, MA)

SO- In: Entering the second century of powered flight; Proceedings of the 19th Digital Avionics System Conference (DASC), Philadelphia, PA, Oct. 7-13, 2000. Vol. 2 (A01-27744 05-01), Piscataway, NJ, Institute of Electrical and Electronic Engineers, 190, p. 5.D.2-1 to 5.D.2-8.

PY- 2000

PD- 200000

RF- 14

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA0105

AB- While automation has eliminated many types of operator error, it has also created new types of technology-induced human errors. Many of these new errors are the result of what has been labeled technology-centered automation, where designers focus most of their attention on the mapping from software inputs to outputs, on mathematical models of required functionality, and on the technical details and problems internal to the computer. The goal of our research is to create and evaluate a methodology for integrated design of complex systems, including design of the automation and the human tasks, that minimizes human error through appropriate system and operator task design. The methodology is based on formal modeling, simulation, and analysis techniques for the software behavior, the user model of the system, and the operator tasks. This paper describes the human factors aspects of our approach using as an example the vertical flight control logic for a realistic aircraft flight management system FMS. Although the MD-I1 FMS was used to derive the example for our case study, we made up much of the information due to our lack of knowledge about the design and the rationale of the real MD-11 design. (Author)

DE- <MAJOR> *SOFTWARE ENGINEERING; *HUMAN ERROR; *HUMAN FACTORS ENGINEERING

; *FLIGHT MANAGEMENT SYSTEMS; *AIRCRAFT CONTROL

DE- SYSTEMS INTEGRATION; COMPLEX SYSTEMS; AUTOMATIC CONTROL

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02562880

AN- <AEROSPACE> A01-20888

TI- Future field of view and resolution requirements for helicopter night vision systems - Human factors and technological tradeoffs

AU- Leger, Alain; Valery, Philippe; Bignolles, Laurent (Thomson-CSF Sextant, Valence, France)

SO- In: European Rotorcraft Forum, 26th, The Hague, Netherlands, Sept. 26-29, 2000, Proceedings. Vol. 2 (A01-20808 04-05), Amsterdam, Netherlands, National Aerospace Laboratory, 190, p. 95.1-95.8.

PY- 2000

PD- 200000

RF- 20

LA- English

GL- France

CP- Netherlands

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA0104

AB- As a result of early tradeoffs, most current night vision systems (NVS)

including NVG and HMD are offered with a 40-deg FOV for the intensified image. Significant progress in I-squared-tube resolution and sensitivity has only been achieved during the past 10 years. Taking that into account, the time may be ripe to reconsider the tradeoffs made between resolution and FOV. Basic physiological and psychological considerations on focal and ambient vision system show that focal vision is implicated in discrimination tasks and requires attentional and cognitive resources, while ambient vision is involved in spatial perception, requiring no attentional process and being unaffected by lowered illumination. Recent studies have shown that high workload and attentional demand found while flying under NVG may be improved with an increase in system FOV. On the other hand, visor projection HMD with unchanged intensified image size (40 deg) has been shown in flight to provide enhanced spatial awareness relatively to NVG. Human factors and technological considerations are used to investigate some of the various tradeoffs which could be made between solutions preserving a good peripheral unaided vision (typically visor projection techniques) to wide intensified FOV with limited side vision. (Author)

DE- <MAJOR> *NIGHT VISION; *HELICOPTER PERFORMANCE; *HUMAN FACTORS ENGINEERING; *TRADEOFFS; *RESOLUTION; *FIELD OF VIEW

DE- DISPLAY DEVICES; FEASIBILITY ANALYSIS; TECHNOLOGY ASSESSMENT; GOGGLES

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02562877

AN- <AEROSPACE> A01-20885

TI- Simulation of pilot control activity for the prediction of workload ratings in helicopter/ship operations

AU- Turner, Graham (Defence Research Agency, Bedford, United Kingdom); Brindley, Garry; Bradley, Roy (Glasgow Caledonian Univ., United Kingdom)

SO- In: European Rotorcraft Forum, 26th, The Hague, Netherlands, Sept. 26-29, 2000, Proceedings. Vol. 2 (A01-20808 04-05), Amsterdam, Netherlands, National Aerospace Laboratory, 190, p. 91.1-91.12.

PY- 2000

PD- 200000

RF- 10

LA- English

GL- United Kingdom

CP- Netherlands

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA0104

AB- This paper describes a generic pilot model called SyCoS (Synthesis through Constrained Simulation) that is capable of flying a helicopter along a prescribed flight path. It is based on the crossover model of McRuer and Krendel, where the actions of the operator (here, the pilot) correct errors between the actual outputs and the desired references. Examples of the application of the SyCoS pilot to a FLIGHTLAB implementation of a Lynx helicopter carrying out basic maneuvers, such as side-step and accel/decel, are presented. The paper then describes the application of the SyCoS pilot model to a simulated deck landing task as performed for establishing limits for helicopter/ship operations. Comparison with data from piloted simulation conducted on the Advanced Flight Simulation facility at DERA Bedford confirms that the SyCoS pilot can successfully emulate this task and replicate key aspects of the pilot strategy in guidance and response to environmental disturbances. Some enhancements to the basic SyCoS model have been incorporated to achieve a more realistic representation of the hysteresis and threshold effects that can be identified in the data from piloted simulation. This authentic simulation of the control activity allows the application of predictive techniques for quantifying pilot workload. (Author)

DE- <MAJOR> *COMPUTERIZED SIMULATION; *PILOT PERFORMANCE; *HELICOPTER CONTROL; *SHIPS; *FLIGHT SIMULATION; *AIRCRAFT LANDING; *WORKLOADS (PSYCHOPHYSIOLOGY)

DE- MATHEMATICAL MODELS; MAN MACHINE SYSTEMS; PREDICTION ANALYSIS TECHNIQUES

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02562875

AN- <AEROSPACE> A01-20883

TI- A helicopter pilot assitant system for inflight mission planning

AU- Rataj, J.; Bender, K.; Kohrs, R. (DLR, Inst. of Flight Guidance, Braunschweig, Germany)

SO- In: European Rotorcraft Forum, 26th, The Hague, Netherlands, Sept. 26-29, 2000, Proceedings. Vol. 2 (A01-20808 04-05), Amsterdam, Netherlands, National Aerospace Laboratory, 190, p. 89.1-89.10.

PY- 2000

PD- 200000

RF- 5

LA- English

GL- Germany

CP- Netherlands

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0104
AB- The present assistant system will support the helicopter pilot by inflight mission planning and execution to enhance safety and to improve the mission effectiveness using a new approach in the design of the Man Machine System (MMS). In the future, helicopter pilots will be supported by partly complex systems which only take a certain task into account. This kind of support limits the information flow between the systems. To get to an appropriate picture of the actual situation, the pilot has to overcome these limits. He has to merge and prioritize the displayed information to determine the most important and most urgent action. Our assistant system integrates extended, new support functions into one system with a consistent Human Machine Interface (HMI). Therefore, the obtainable onboard data are collected in a data pool. A merge of the data pool with an onboard database forms the central information system which provides the information for the modules of the assistant system. (Author)
DE- <MAJOR> *HELICOPTER CONTROL; *PILOT PERFORMANCE; *MISSION PLANNING; *IN-FLIGHT MONITORING; *FLIGHT SAFETY; *PILOT SUPPORT SYSTEMS
DE- SAFETY MANAGEMENT; AIRCRAFT PILOTS; HELICOPTER PERFORMANCE; MAN MACHINE SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02562861
AN- <AEROSPACE> A01-20869
TI- Tail rotor failures - What can be done? A pilot's view
AU- O'Collard, S. (Scotia Helicopter Services, Ltd., Aberdeen, United Kingdom)
SO- In: European Rotorcraft Forum, 26th, The Hague, Netherlands, Sept. 26-29, 2000, Proceedings. Vol. 2 (A01-20808 04-05), Amsterdam, Netherlands, National Aerospace Laboratory, 190, p. 74.1-74.7.
PY- 2000
PD- 200000
RF- 2
LA- English
GL- United Kingdom
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0104
AB- Tail Rotor Failures (TRFs) are potentially one of the most serious types of malfunction that may occur to a helicopter, yet awareness among pilots of the possible consequences of such a failure is in general very limited. The situation is not helped by the variable standard of advice found in Flight Manuals. Furthermore, training for TRFs is seldom carried out, primarily due to the inability to safely replicate such failures in the aircraft and to the lack of suitable simulation facilities. This paper presents a pilot's view of the simulation work carried out during the TRF study for the U.K. Civil Aviation Authority (CAA) and Ministry of Defense (MOD) and discusses the sort of advice which the author believes should be provided. Design and simulation aspects are also discussed. (Author)
DE- <MAJOR> *TAIL ROTORS; *FAILURE ANALYSIS; *FLIGHT SIMULATION; *AIRCRAFT PILOTS; *PILOT PERFORMANCE
DE- HELICOPTER PERFORMANCE; PILOT TRAINING; AIRCRAFT ACCIDENTS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02559556
AN- <AEROSPACE> A01-17564
TI- New technology + old test + too much confidence = bent egos, aircraft
AU- Coyle, Shawn
SO- In: 2000 report to the aerospace profession; Proceedings of the 44th SETP Symposium, Los Angeles, CA, Sept. 2000 (A01-17551 03-05), Lancaster, CA, Society of Experimental Test Pilots, 190, p. 179-186.
PY- 2000
PD- 200000
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0103
AB- The combination of new technology with an old and established certification test, when combined with too much confidence in past experience resulted m an incident that damaged a prototype helicopter and the pride of two test pilots. This paper outlines how this came to pass and the lessons that might be applied to future tests. (Author)
DE- <MAJOR> *CERTIFICATION; *FLIGHT TESTS; *HELICOPTERS; *AIRCRAFT CONTROL; *PILOT PERFORMANCE
DE- COCKPITS; AIRCRAFT INSTRUMENTS; FUEL CONTROL; PILOT TRAINING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02559555
AN- <AEROSPACE> A01-17563
TI- First of Class Flight Trials - New tools for traditional test techniques
AU- Mathews, Craig; Patch, Shane (Royal Australian Navy, Australia)
SO- In: 2000 report to the aerospace profession; Proceedings of the 44th SETP Symposium, Los Angeles, CA, Sept. 2000 (A01-17551 03-05), Lancaster, CA, Society of Experimental Test Pilots, 190, p. 167-178.
PY- 2000
PD- 200000
RF- 5
LA- English
GL- Australia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0103
AB- The Royal Australian Navy Aircraft Maintenance and Flight Trials Unit (AMAFTU) has been conducting First of Class Flight Trials (FOCFT) or Dynamic Interface Testing for the last 18 years. Flight test techniques used to develop Ship Helicopter Operating Limits (SHOL) have changed little over the years but improvements in aircraft test instrumentation have allowed collection of significantly more data parameters and better presentation of data. While having more data available has led to greater operational capability in the form of increases in SHOL, the effort required in data reduction and data management has spiraled upward, increasing manpower costs and embarked time requirements. A recent joint tasking on AMAFTU and Aircraft Research and Development Unit (ARDU) was the conduct of simultaneous FOCFT of SK50 Sea King and S-70A-9 Black Hawk helicopters on a multi-spot Amphibious Transport ship (LPA). The scope of the tasking was far greater than any trial previously conducted by the unit, necessitating a rethink of the way data were gathered, analyzed, and presented in order to achieve a successful trial in the limited ship time available. This paper presents the challenges faced and the methods developed to cope with the collection and analysis of the vast amount of data required to define LPA/SK50 and S-70A-9 SHOL. (Author)
DE- <MAJOR> *FLIGHT TESTS; *SHIPBORNE AIRCRAFT; *HELICOPTERS; *AUSTRALIA; *NAVY
DE- AIRCRAFT CONTROL; DATA ACQUISITION; FUZZY LOGIC; COMPUTER PROGRAMS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02558646
AN- <AEROSPACE> A01-16654
TI- Tunnel and natural icing tests of a helicopter engine cooling bay inlet
AU- Al-Khalil, Kamel; Irani, Eddie (Cox & Co., Inc., New York, NY); Rowley, Dave (GKN Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- AIAA, Aerospace Sciences Meeting and Exhibit, 39th, Reno, NV, Jan. 8-11, 2001, 14 p..
PY- 2001
PD- 200101
RF- 2
RN- AIAA Paper 2001-0838
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0103
AB- A program was undertaken to design a thermal anti-icing system for engine cooling bay inlets (scoops) of a tri-engine helicopter. The three scoops are located downstream of each engine main air intake. The development of the anti-icing system was conducted mainly during a one-month test program in an indoor icing wind tunnel. Subsequently, flight test units were produced and configured with corresponding heated surfaces and instrumentation for a full winter season test in natural icing conditions. The ice protection system's performance during the flight trials was fully evaporative as designed. Also, very good correlations were obtained between the flight and the tunnel experimental data. (Author)
DE- <MAJOR> *ICING WIND TUNNELS; *AIRCRAFT ICING; *HELICOPTER ENGINES; *DEICING; *COOLING SYSTEMS
DE- SCOOPS; WIND TUNNEL TESTS; FLIGHT TESTS; AIR INTAKES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02556498
AN- <AEROSPACE> A01-14506
TI- Black Hawk modernization to boost performance, cut costs
AU- Kandebo, Stanley W.
SO- Aviation Week & Space Technology (ISSN 0005-2175), vol. 153, no. 16, Oct. 16, 190, p. 48-50.
PY- 2000
PD- 200010

SN- 0005-2175
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0102
AB- The U.S. Army and Sikorsky Aircraft expect to convert some 1,217 aging UH-60A and UH-60L aircraft to the upgraded UH-60M standard, with introduction of the initial prototype aircraft expected in the second quarter of 2001. Conversion of the Black Hawk will improve its high-altitude/hot-day lift capability, reduce pilot workload, and increase flight crew situational awareness. Modernization is expected to save more than $2-billion. (AIAA)
DE- <MAJOR> *H-60 HELICOPTER; *HELICOPTER DESIGN; *HELICOPTER PERFORMANCE; *COST REDUCTION; *UPGRADING
DE- PROTOTYPES; SIKORSKY AIRCRAFT; COST ANALYSIS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02545223
AN- <AEROSPACE> A01-11233
TI- Helicopter midairs underscore 'see and avoid' principle
AU- Phillips, Edward H.
SO- Aviation Week & Space Technology (ISSN 0005-2175), vol. 153, no. 19, Nov. 6, 190, p. 53.
PY- 2000
PD- 200011
SN- 0005-2175
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0101
AB- The results of NTSB's investigations of several midair helicopter collisions are reviewed. The causes of the accidents were pilot failure to see and avoid the other aircraft. (AIAA)
DE- <MAJOR> *MIDAIR COLLISIONS; *HELICOPTERS; *VISUAL PERCEPTION; *SITUATIONAL AWARENESS; *AIRCRAFT ACCIDENT INVESTIGATION; *PILOT ERROR
DE- AIRCRAFT PILOTS; AVOIDANCE; PILOT PERFORMANCE; FLIGHT HAZARDS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02544580
AN- <AEROSPACE> A01-10590
TI- Effects of field-of-view on pilot performance in night vision goggles flight trials - Preliminary findings
AU- Jennings, Sion; Craig, Gregory (National Research Council of Canada, Ottawa)
SO- In: Helmet- and head-mounted displays V; Proceedings of the Conference, Orlando, FL, April 24-25, 2000 (A01-10556 01-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 4021), 190, p. 335-342.
PY- 2000
PD- 200000
RF- 17
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0101
AB- Night vision goggles (NVGs) allow pilots to see and navigate under minimal levels of illumination. While NVGs allow the user to see more than they typically could under these levels of illumination, the visual information provided by NVGs has a limited field-of-view. The size of the field-of-view can diminish the pilot's spatial orientation ability in the night flying environment. We examined pilot performance in low level helicopter flight while the pilots were using NVGs with 40 and 52 deg fields-of-view. The pilots flew a standardized ADS-33D hover maneuver in a Bell 206 helicopter equipped with an accurate position measurement system. The tests were conducted in simulated night conditions and both subjective and objective measures of task performance were obtained. Pilot Cooper-Harper ratings increased from Level 1 baseline ratings to Level 2 ratings when the NVGs were used, indicating worse performance when using the NVGs. Small rating differences were noticed between the 52 and 40 deg field-of-view conditions. Similar trends were noticed in the objective data of altitude and lateral and longitudinal station keeping errors. (Author)
DE- <MAJOR> *NIGHT VISION; *GOGGLES; *PILOT PERFORMANCE; *FIELD OF VIEW; *FLIGHT TESTS
DE- VISUAL PERCEPTION; ORIENTATION; ENVIRONMENT SIMULATION; PERFORMANCE ASSESSMENT

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02544552
AN- <AEROSPACE> A01-10562
TI- Head-mounted, ambient vision display for helicopter pilotage
AU- Sharkey, Thomas J.; Hennessy, Robert T. (Monterey Technologies, Inc., Monterey, CA)
SO- In: Helmet- and head-mounted displays V; Proceedings of the Conference, Orlando, FL, April 24-25, 2000 (A01-10556 01-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 4021), 190, p. 46-57.
PY- 2000
PD- 200000
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0101
AB- The relatively new notion that visual perception is served by two functionally distinct visual systems, the focal and the ambient, is supported by research evidence accumulated over the past thirty years. The focal system provides detailed information about the world, is controlled by attention, and receives input from the fovea. Its performance is highly dependent on image focus and luminance level. The ambient visual system contributes continuously and importantly to spatial orientation, stability of the visual world, and locomotion. It responds to large areas of optical flow in the visual field, and therefore most of its input comes from the peripheral retina. Ambient functions are carried out largely without conscious awareness and are relatively impervious to image defocus and luminance level. The evidence for the ambient visual system is reviewed, and its functional characteristics are described. The head-mounted display (HMD) described here was specifically developed to be compatible with ambient functions. The presentation consists of moving objects that stimulate a large area of the peripheral retina. Data are presented that show the effects of the ambient HMD on pilot performance in a PC-based helicopter simulator. Variables tested include ambient stimulus size, density, flow rate, and control laws governing the movement of the ambient stimuli. (Author)
DE- <MAJOR> *HELICOPTERS; *AIRCRAFT INSTRUMENTS; *HELMET MOUNTED DISPLAYS;
*COMPUTERIZED SIMULATION
DE- VISUAL PERCEPTION; RETINA; PERIPHERAL VISION; FLIGHT TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02544546
AN- <AEROSPACE> A01-10556
TI- Helmet- and head-mounted displays V; Proceedings of the Conference, Orlando, FL, April 24-25, 2000
AU- Lewandowski, Ronald J. (Honeywell, Inc., Minneapolis, MN); Haworth, Loran A. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA) ; Girolamo, Henry J. (U.S. Army, Soldier Systems Command, Natick, MA), EDS.
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings, Vol. 4021), 190, 366 p. (For individual items see A01-10557 to A01-10592).
PY- 2000
PD- 200000
RN- SPIE-4021; ISBN 0-8194-3647-X; ISSN 0277-786X
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA0101
AB- The papers presented in this volume cover a variety of topics related to helmet- and head-mounted displays. In particular, attention is given to noncombat HMD technologies; helicopter HMDs; HMD-related technologies; and night vision and FLIR operation. Other topics include miniature flat panel display technologies; HMD system integration; HMD symbology; and human factors issues. (AIAA)
DE- <MAJOR> *CONFERENCES; *HELMET MOUNTED DISPLAYS; *MAN MACHINE SYSTEMS;
*AIRCRAFT INSTRUMENTS
DE- DIGITAL SYSTEMS; OPTICAL SCANNERS; COMPUTER VISION; LASER APPLICATIONS;
LIQUID CRYSTAL DISPLAYS; ROTARY WING AIRCRAFT; NIGHT VISION; FLIR DETECTORS; FLAT PANEL DISPLAYS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02539272
AN- <AEROSPACE> A00-42781
TI- Tactile situation awareness system - Proprioceptive prostheses for sensory deficiencies

TI- <ORIGINAL> From: International Workshop on Human Factors in Space, Tokyo, Japan, July 7-9, 1999, Proceedings (A00-42751 11-54)
AU- Rupert, Angus H. (NASA, Johnson Space Center, Houston, TX)
SO- Aviation, Space, and Environmental Medicine, Section 2 - Supplement (ISSN 0095-6562), vol. 71, no. 9, Sept. 190, p. A92-A99.
PY- 2000
PD- 200009
RF- 13
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0011
AB- Pilots and astronauts do not experience spatial disorientation in normal day-to-day terrestrial activities. On the ground, the perception of position and motion is determined by central nervous system integration of concordant and redundant information from multiple sensory channels (somatosensory, vestibular, and visual) which collectively yield veridical perceptions. In the acceleration environments experienced by pilots and astronauts, the somatosensory and vestibular senses frequently present false but concordant information concerning the direction of gravity or down. When presented with conflicting sensory stimuli, it is normal for pilots and astronauts to experience episodes of disorientation. Visual instruments and displays developed over the past 70 yr have not solved the problem. A simple solution to maintain spatial orientation is to provide true information using the same sensory channels we use so successfully on Earth. The Tactile Situation Awareness System (TSAS) developed by NASA and the U.S. Navy uses a matrix of mechanical tactile stimulators (tactors) applied on the torso and limbs to convey orientation cues (e.g., gravity vector) in an intuitive fashion to the skin. Results of in-flight experiments to validate and test a variety of tactile displays and concepts, carried out in both helicopters and fixed wing aircraft, are reported. (Author)
DE- <MAJOR> *SITUATIONAL AWARENESS; *SENSORY PERCEPTION; *TOUCH; *DISORIENTATION; *PROSTHETIC DEVICES
DE- VISUAL PERCEPTION; CUES; ASTRONAUT PERFORMANCE; PHYSIOLOGICAL RESPONSES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02539252

AN- <AEROSPACE> A00-42761
TI- Naval aviator with pituitary prolactin secreting microadenorna - Case report and aeromedical concerns
AU- Weiss, David K. (Naval Medical Center, Coronado, CA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 71, no. 9, Section 1, Sept. 190, p. 935-938.
PY- 2000
PD- 200009
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0011
AB- The potential complications of a large anterior pituitary tumor, including tumor mass effect and the effects of abnormal hormonal regulation, can result in sudden incapacitation and are potentially life threatening. Tumor mass effects include visual disturbances due to compression of the optic chiasm and altered hormonal secretion due to compromised portions of the normal anterior pituitary. Additionally, the tumor may outgrow its own blood supply causing infarction or hemorrhage. Bromocryptine is the primary medication used to treat prolactinomas. Potential side effects of bromocryptine include headaches, orthostatic hypotension, gastrointestinal effects, and psychosis. The effects of long-standing untreated hyperprolactinemia are reduced testosterone, frequent headaches, and decreased bone density. This is the case report and discussion concerning a male naval helicopter pilot diagnosed with a relatively small pituitary microadenoma during an evaluation for primary infertility. Detailed discussions of aeromedical concerns, risks, and related cases are presented. This case was reviewed by a Special Board of Flight Surgeons at the Naval Aeromedical and Operational Institute resulting in the first U.S. Navy flight waiver for a patient with a microadenoma to continue on active flight status. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *PITUITARY GLAND; *AEROSPACE MEDICINE; *TUMORS; *HORMONES
DE- NAVY; VISION; HEADACHE; HYPOTENSION; BONE DEMINERALIZATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02537581
AN- <AEROSPACE> A00-41090

TI- Evaluation of algorithms for fusing infrared and synthetic imagery
AU- Simard, Philippe (McGill Univ., Montreal, Canada); Link, Norah K.; Kruk, Ronald V. (CAE Electronics, Ltd., St.-Laurent, Canada)
SO- In: Enhanced and synthetic vision 2000; Proceedings of the Meeting, Orlando, FL, Apr. 24, 25, 2000 (A00-41076 11-35), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 4023), 190, p. 127-138.
PY- 2000
PD- 200000
RF- 7
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0011
AB- Algorithms for image fusion were evaluated as part of the development of an airborne Enhanced/Synthetic Vision System (ESVS) for helicopter Search and Rescue operations. The ESVS will be displayed on a high-resolution, wide field-of-view helmet-mounted display (HMD). The HMD full field-of-view (FOV) will consist of a synthetic image to support navigation and situational awareness, and an infrared image inset will be fused into the center of the FOV to provide real-world feedback and support flight operations at low altitudes. Three fusion algorithms were selected for evaluation against the ESVS requirements. In particular, algorithms were modified and tested against the unique problem of presenting a useful fusion of information from high quality synthetic images with questionable real-world correlation and highly correlated sensor images of varying quality. A pixel-averaging algorithm was selected as the simplest way to fuse two different sources of imagery. Two other algorithms, originally developed for real-time fusion of low-light visible images with infrared images, (one at the TNO Human Factors Institute and the other at the MIT Lincoln Laboratory) were adapted and implemented. To evaluate the algorithms' performance, artificially generated infrared images were fused with synthetic images and viewed in a sequence corresponding to a search and rescue scenario for a descent to hover. Application of all three fusion algorithms improved the raw infrared image, but the MIT-based algorithm generated some undesirable effects such as contrast reversals. This algorithm was also computationally intensive and relatively difficult to tune. The pixel averaging algorithm was simplest in terms of per-pixel operations and provided good results. The TNO-based algorithm was superior in that while it was slightly more complex than pixel averaging, it demonstrated similar results, was more flexible, and had the advantage of predictably preserving certain synthetic features which could be used support obstacle detection. (Author)
DE- <MAJOR> *MULTISENSOR FUSION; *ALGORITHMS; *INFRARED IMAGERY; *ENHANCED VISION; *COMPUTER VISION; *ONBOARD DATA PROCESSING; *HELMET MOUNTED DISPLAYS
DE- FIELD OF VIEW; HUMAN FACTORS ENGINEERING; COMPUTATIONAL EFFICIENCY; COMPARISON
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02537028
AN- <AEROSPACE> A00-40537
TI- Human factors in the design of a glass cockpit for the SH-2G(A)
AU- Hoagland, Michael; Bordett, Harvey; Chicoine, Russell (Kaman Aerospace Corp., Bloomfield, CT); Henschke, Mark
SO- In: AHS International, Annual Forum, 56th, Virginia Beach, VA, May 2-4, 2000, Proceedings. Vol. 1 (A00-40501 11-01), Alexandria, VA, AHS International, 190, p. 479-486.
PY- 2000
PD- 200000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0011
AB- The SH-2G(A) helicopter, produced for the Royal Australian Navy (RAN) by Kaman Aerospace Corp., is a major redesign of the USN SH-2G Super SeaSprite. The SH-2G(A) helicopter upgrade included the removal of a, 'analog gauge' cockpit design and the installation of an integrated multidisplay and multi-input environment - a 'glass cockpit'. Converting from a three-man crew for the USN SH-2G to the two-man crew for the RAN SH-2G(A) presented unique challenges for safe and efficient two-man crew operation. This paper addresses how the human factors process was applied for the two-man crew using existing, modified, and new controls and displays. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *GLASS COCKPITS; *HUMAN FACTORS ENGINEERING ; *DISPLAY DEVICES; *FLIGHT CREWS; *CONTROL SYSTEMS DESIGN
DE- AUSTRALIA; NAVY; HELICOPTER PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02537023
AN- <AEROSPACE> A00-40532
TI- Flight demonstration of an associate system - A Rotorcraft Pilot's Associate example
AU- Robertson, Greta (Boeing Co., Mesa, AZ)
SO- In: AHS International, Annual Forum, 56th, Virginia Beach, VA, May 2-4, 2000, Proceedings. Vol. 1 (A00-40501 11-01), Alexandria, VA, AHS International, 190, p. 431-445.
PY- 2000
PD- 200000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0011
AB- The U.S. Army's Rotorcraft Pilot's Associate (RPA) program has developed an advanced, intelligent associate system for simulation and flight test demonstration in a next-generation attack and scout helicopter. The RPA cockpit provides the pilot-vehicle interface with the Cognitive Decision Aiding System, the Data Fusion software, and the Advanced Mission Equipment Package. These displays and controls provide the pilot-vehicle interface with the RPA software behaviors: automated attack planning, route planning, survivability planning, reconnaissance planning, and data fusion. This paper describes the high-level flight test results for each of the RPA software behaviors, with an emphasis on the pilot's displays and controls. The highly complex test bed aircraft, which recently completed over 12 mo of testing in Mesa and Yuma, Arizona, is described. An outline of the RPA Flight Demonstration Program and the subjective results of pilot questionnaire data collected at the end of each pilot's Yuma flight demonstration experience is presented. A summary of the highly successful RPA flight demonstration, including the key findings, lessons-learned, and conclusions is given. (Author)
DE- <MAJOR> *MILITARY HELICOPTERS; *ROTARY WING AIRCRAFT; *PILOT SUPPORT SYSTEMS; *FLIGHT TESTS; *MAN MACHINE SYSTEMS; *FLIGHT SIMULATION
DE- SOFTWARE DEVELOPMENT TOOLS; MULTISENSOR FUSION; MILITARY OPERATIONS; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02536992
AN- <AEROSPACE> A00-40501
TI- AHS International, Annual Forum, 56th, Virginia Beach, VA, May 2-4, 2000, Proceedings. Vol. 1
SO- Alexandria, VA, AHS International, 190, 760 p. (For individual items see A00-40502 to A00-40557).
PY- 2000
PD- 200000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA0011
AB- The present conference volume on expansion of vertical-STOL roles and missions discusses advanced vertical flight concepts for the next 50 years, aerodynamics, handling qualities, test and evaluation, crew stations and human factors, flight simulation, product support, a health and usage monitoring system, military operations, and acoustics. Attention is given to rotor top-vortex pairing phenomena using a time-marching free-wake method, benefits of advanced control technology, material technologies for a composite helicopter main rotor plade, efficient machining of titanium rotorcraft components, scaled model jettison tests of external stores during helicopter autorotation, and flight validatio of the V-22 structural design approach. Other topics addressed include the application of three-compoonet particle image velocimetry to a hovering rotor wake, comparison of a manned helicopter simulation to a computer-based human performance model, alternate course of action training for helicpter pilots, optimization of rotorcraft flight during engine failure, and a vortex-generated rotor wake model for real-time simulation. (AIAA)
DE- <MAJOR> *CONFERENCES; *HELICOPTER PERFORMANCE; *FLIGHT TESTS; *HELICOPTER DESIGN; *FLIGHT CONTROL
DE- SHORT TAKEOFF AIRCRAFT; VERTICAL TAKEOFF AIRCRAFT; VERTICAL FLIGHT; HELICOPTER CONTROL; AERODYNAMIC CHARACTERISTICS; FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING; SYSTEMS HEALTH MONITORING; MILITARY OPERATIONS; AEROACOUSTICS; TIME MARCHING; AIRCRAFT WAKES; ROTARY WINGS; ROTOR BLADES; AUTOROTATION; PARTICLE IMAGE VELOCIMETRY; AIRCRAFT PILOTS ; AIRCRAFT CONSTRUCTION MATERIALS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02535822
AN- <AEROSPACE> A00-46831
TI- Calibration and characterization of aerial gamma systems
TI- <EXTENSION> aBSTRACT ONLY
AU- Butler, James L.; Eberwein, W. R.; Nicely, Leon J.; Vojtech, Richard J. (Bechtel Nevada, Las Vegas)
SO- In: International Airborne Remote Sensing Conference and Exhibition, 4th/21st Canadian Symposium on Remote Sensing, Ottawa, Canada, June 21-24, 1999. Vol. 2 (A00-46823 13-43), Ann Arbor, MI, ERIM International, Inc., 1999, p. II-54.
PY- 1999
PD- 199900
CN- DE-AC08-96NV-11718
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0013
AB- The U.S. Department of Energy maintains a radiological remote sensing capability called the Aerial Measuring Systems Program (AMS). The AMS radiation detector arrays mounted onboard aircraft (fixed-wing and helicopter) are designed to respond to a wide variety of situations, ranging from nuclear emergencies to routine operations involving high-sensitivity ground mapping. The aircraft platforms typically acquire data by flying preplanned patterns at altitudes of 15-100 m. These detector arrays provide much information about the spatial deposition of radioactive materials in an area as well as exposure rates. Unlike hand-carried health physics instruments, which are calibrated to point sources traceable to the National Institute of Standards and Technology (NIST) according to standards developed by the American National Standards Institute, the AMS detector arrays are calibrated to highly characterized test ranges located near Las Vegas, Nevada, and Annapolis, Maryland. These differences in calibration methods arise primarily because of the aerial system's high sensitivity and large field of view when flying at altitude. The test ranges are characterized to in situ measurements by NIST-traceable instrumentation. The methods of calibration and characterization are discussed. (Abstract only). (Author)
DE- <MAJOR> *REMOTE SENSING; *RADIOLOGY; *AIRBORNE OBSERVATION; *RADIATION DETECTORS; *RADIOACTIVE MATERIALS; *AIRBORNE INSTRUMENTS
DE- SENSOR ARRAYS; CALIBRATING; WINGED VEHICLES; HEALTH
SH- 8743 Earth Resources & Remote Sensing (1987-)

AN- <DIALOG> 02535806
AN- <AEROSPACE> A00-46815
TI- Development of a helicopter-borne laser fluorosensor system for oil spill identification in Kuwait's marine environment
AU- Quinn, M. F.; Qabazard, A. M.; Alameddine, O.; Matrouk, H.; Al-Husseini, K. (Kuwait Inst. for Scientific Research, Safat)
SO- In: International Airborne Remote Sensing Conference and Exhibition, 4th/21st Canadian Symposium on Remote Sensing, Ottawa, Canada, June 21-24, 1999. Vol. 1 (A00-46693 13-43), Ann Arbor, MI, ERIM International, Inc., 1999, p. I-837 to I-844.
PY- 1999
PD- 199900
RF- 8
LA- English
GL- Kuwait
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0013
AB- The possibility of using a laser fluorosensor and relevant data processing and pattern recognition techniques for the identification of oil spills in Kuwait's marine environment was investigated and tested in a series of ground-based studies carried out during the period 1984 to 1990. A final project phase (1996-1998) has recently led to the realization of an airborne remote sensing package comprising a laser fluorosensor, an IR imager, and associated global positioning instrumentation. The remote sensing package successfully passed an airworthiness evaluation and certification process, followed by an intensive flight testing program. The results of the airborne trials and some of the difficult problems encountered are discussed. This includes a description of the fluorosensor, its assembly on the airborne platform, its testing, and final certification for airborne operations. (Author)
DE- <MAJOR> *HELICOPTERS; *LASER INDUCED FLUORESCENCE; *OIL SLICKS; *MARINE ENVIRONMENTS; *INFRARED IMAGERY; *AIRBORNE EQUIPMENT
DE- KUWAIT; CERTIFICATION; SIGNAL TO NOISE RATIOS
SH- 7545 Environment Pollution (1975-)

AN- <DIALOG> 02535741
AN- <AEROSPACE> A00-46750
TI- Enhanced and synthetic vision system for application to search and rescue helicopter missions in poor visibility
AU- Craig, G.; Jennings, S. (National Research Council of Canada, Flight Research Lab., Ottawa); Kruk, R.; Link, N. (CAE Electronics, Ltd., St. Laurent, Canada); Reid, R. D. (Toronto, Univ., Canada); Simard, P. (CAE Electronics, Ltd., St. Laurent, Canada); Swail, C. (National Research Council of Canada, Flight Research Lab., Ottawa)
SO- In: International Airborne Remote Sensing Conference and Exhibition, 4th/21st Canadian Symposium on Remote Sensing, Ottawa, Canada, June 21-24, 1999. Vol. 1 (A00-46693 13-43), Ann Arbor, MI, ERIM International, Inc., 1999, p. I-387 to I-393.
PY- 1999
PD- 199900
RF- 8
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0013
AB- The Flight Research Laboratory (FRL) of the National Research Council (NRC) is involved in a project to bring new technology into the helicopter Search and Rescue (SAR) environment. NRC and partners are building, integrating, and conducting research on an enhanced and synthetic vision system (ESVS) to help SAR helicopter pilots complete their missions in degraded visual environments. The ESVS will provide SAR pilots with a real-time display that mimics visual flight rule (VFR) conditions. NRC plans to integrate and evaluate a prototype system by 2001. The prototype system will include a visually coupled helmet-mounted display (HMD) system, a synthetic image generated from a terrain data base, an advanced sensor and an image fusion system. To understand the usability and human factors issues associated with the use of advanced HM vision systems, a comprehensive research program has been developed. This program encompasses investigations in such diverse fields as human factors, HMD,s and image-fusion technology, and their implications for operational use. The initial investigations included selection of the fusion algorithms, investigation of the effect of sensor FOV on pilot performance, simulation of SAR missions, and determination of allowable computational time delays for image fusion. (Author)
DE- <MAJOR> *COMPUTER VISION; *VISIBILITY; *SEARCH AND RESCUE MISSIONS; *HELICOPTERS; *MULTISENSOR FUSION
DE- HELMET MOUNTED DISPLAYS; VISUAL FLIGHT RULES; FIELD OF VIEW
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02534109
AN- <AEROSPACE> A00-39118
TI- A human factors perspective on helicopter human external loads
AU- Shehab, Eanda L.; Schlegel, Robert E. (Oklahoma, Univ., Norman)
SO- In: Human Factors and Ergonomics Society Annual Meeting, 43rd, Houston, TX, Sept. 27-Oct. 1, 1999, Proceedings. Vol. 2 (A00-39054 10-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1999, p. 931-935.
PY- 1999
PD- 199900
RF- 4
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0010
AB- Human external loads (HEL) refer to operations where humans are transported while suspended below a helicopter. HEL operations are often required to access remote work sites, to access power lines in need of maintenance and repair, and to carry out rescue operations. This paper reports a human factors investigation of HEL operations and the devices used to secure HELs involved in work (nonrescue) activities. The goal of this investigation was to determine if HEL operations pose a significant safety hazard. Specifically, the paper describes the various devices used to secure HELs, the accident history associated with HELs, and human factors recommendations for the regulation of HEL devices and operations. A review of 616 helicopter accident reports revealed that only 1.5 percent of the accidents occurred during HEL operations, and only 0.5 percent were directly attributable to the presence of an HEL. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *HELICOPTERS; *SUSPENDING (HANGING)
; *HUMAN BEINGS
DE- ACCIDENTS; INJURIES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02533664
AN- <AEROSPACE> A00-38673

TI- Evaluation of a motion fidelity criterion with visual scene changes
AU- Schroeder, Jeffery A. (NASA, Ames Research Center, Moffett Field, CA); Chung, William W. Y. (Logicon Information Systems and Services, Moffett Field, CA); Hess, Ronald A. (California, Univ., Davis)
SO- Journal of Aircraft (ISSN 0021-8669), vol. 37, no. 4, Aug. 190, p. 580-587.
PY- 2000
PD- 200008
RF- 26
SN- 0021-8669
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0010
AB- An experiment examined how visual scene and platform motion variations affected a pilot's ability to perform altitude changes. Pilots controlled a helicopter model in the vertical axis and moved between two points 32 ft apart in a specified time. Four factors were varied: visual-scene spatial frequency, visual-scene background, motion-filter gain, and motion-filter natural frequency. Drawing alternating black and white stripes of varying widths between the two extreme altitude points varied visual-scene spatial frequency. The visual-scene background varied by either drawing the stripes to fill the entire FOV or by placing the stripes on a narrow pole with a natural sky and ground plane behind the pole. Both the motion-filter gain and natural frequency were varied in the motion platform command software. Five pilots evaluated all combinations of the visual and motion variations. The results showed that only the motion-filter natural frequency and visual-scene background affected pilot performance and their subjective ratings. No significant effects of spatial frequency or motion system gain were found for the values examined in this tracking task. A previous motion fidelity criterion was found to still be a reasonable predictor of motion fidelity. (Author)
DE- <MAJOR> *SCENE ANALYSIS; *VISUAL OBSERVATION; *PILOT PERFORMANCE; *MOTION PERCEPTION; *SPATIAL FILTERING; *PILOT RATINGS
DE- RESONANT FREQUENCIES; FLYING PLATFORMS; AIRCRAFT PILOTS; SOFTWARE DEVELOPMENT TOOLS; FIELD OF VIEW
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02532280
AN- <AEROSPACE> A00-37289
TI- ACT/FHS - An airborne rotorcraft simulator for technology development and research
AU- Ockier, Carl (German Aerospace Research Establishment, Inst. of Flight Research, Braunschweig, Germany); Butter, Ulrich (Eurocopter Deutschland GmbH, Munich, Germany)
SO- AIAA Modeling and Simulation Technologies Conference, Denver, CO, Aug. 14-17, 2000, 11 p..
PY- 2000
PD- 200008
RF- 7
RN- AIAA Paper 2000-4575
LA- English
GL- Germany
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0010
AB- The German Aerospace Center (DLR), Eurocopter Deutschland and Liebherr Aerospace Lindenberg are currently engaged in a major R&D program aimed at the development of a new airborne rotorcraft simulator. The development of this advanced helicopter, called the Active Control Technology Demonstrator and Flying Helicopter Simulator (ACT/FHS) is funded by the German Ministry of Defense, the DLR and industry (Eurocopter and Liebherr). The objective of the ACT/FHS program is to develop an advanced test vehicle for the development of future control technologies and the research into flying qualities and human factors. ACT/FHS is scheduled to perform its first flight in the summer of 2000 and become operational in 2001. The ACT/FHS airborne simulator is based upon the Eurocopter EC135 helicopter. The EC135 is a light twin-engine helicopter with a bearingless main rotor and a fenestron tail rotor. For the airborne simulation role, the EC135's flight control system is removed and replaced by a fly-by-light control system. The cockpit is modified to accommodate the safety and evaluation pilots and a flight test engineer. A full suite of instrumentation is installed to support the in-flight simulation role. (Author)
DE- <MAJOR> *ROTARY WING AIRCRAFT; *FLIGHT SIMULATORS; *ACTIVE CONTROL; *TECHNOLOGY DEMONSTRATOR; *FLIGHT CHARACTERISTICS; *HELICOPTER ENGINES
DE- TECHNOLOGY ASSESSMENT; RESEARCH AND DEVELOPMENT; BEARINGLESS ROTORS; FLIGHT SAFETY; AIRCRAFT PILOTS

SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02530763
AN- <AEROSPACE> A00-35772
TI- Systems and research in networked tactical training
AU- Kruk, R. V. (CAE Electronics, Ltd., St. Laurent, Canada); Wightman, D. C.; Howse, W. R. (U.S. Army, Research Inst., Fort Rucker, AL)
SO- In: Flight simulation - The next decade; Proceedings of the Conference, London, United Kingdom, May 10-12, 2000 (A00-35751 09-54), London, Royal Aeronautical Society, 190, p. 28.1-28.12.
PY- 2000
PD- 200000
RF- 11
LA- English
GL- Canada
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0009
AB- The Rotary-wing Advanced Networked Training System (RANTS) is the focus of a Cooperative Research and Development Agreement between the U.S. Army Research Institute (ARI) and CAE Electronics to develop low-cost, networked training technologies for tactical training and mission rehearsal. The project will be used to develop and evaluate training approaches, methodologies, for performance assessment in networked training systems, and will also permit evaluation of a broad variety of low-cost technologies for collective training. In this paper, a study that explored the combination of synthetic and live environments for collective training is summarized. A U.S. Army Attack Helicopter Company, given one week of collective task training in a synthetic simulation, improved its rate of completion of collective tasks to 70 percent. This unit and a comparison company were evaluated in a field training exercise two weeks later. The comparison company scored 65 percent collective task completion while the experimental company scored an overall 98 percent. In common with most studies of this type, data collection and analysis aspects of the study were labor intensive. More sophisticated and less costly performance assessment methods must be developed if effective use of networked synthetic environment technology is to become commonplace. The RANTS project will support effective application of synthetic environments in collective training through research into training and assessment as well as technology. (Author)
DE- <MAJOR> *PILOT TRAINING; *TRAINING EVALUATION; *ROTARY WING AIRCRAFT;
*MILITARY HELICOPTERS; *COCKPIT SIMULATORS; *RESEARCH AND DEVELOPMENT;
*TRAINING ANALYSIS
DE- COMBAT; REQUIREMENTS; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02530742
AN- <AEROSPACE> A00-35751
TI- Flight simulation - The next decade; Proceedings of the Conference, London, United Kingdom, May 10-12, 2000
SO- London, Royal Aeronautical Society, 190, 200 p. (For individual items see A00-35752 to A00-35775).
PY- 2000
PD- 200000
RN- ISBN 1-85768-191-6
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA0009
AB- The present volume on flight simulation discusses simulators for fourth-generation fighter aircraft, interaction hybrid environment training, applications and future trends in synthetic environments for military training systems, ab initio flight simulation in the 21st century, and flight crew training needs for the future. Attention is given to the future of the Instructor/Operator Station, flight simulation for enhancement of pilot decision-making skills, the future and technology of remote training, the importance of matching technology advancement with training needs, developments in data communications and their effect on simulation, and predictive models for aerial refueling simulations. Other topics addressed include PC flight simulators, simulator fidelity, an integrated motion cueing algorithm and motion-based design for flight simulators, future visual system technologies, and distributed simulation using commercial-off-the-shelf software and commodity hardware. (AIAA)
DE- <MAJOR> *CONFERENCES; *FLIGHT SIMULATION; *RESEARCH AND DEVELOPMENT;
*FLIGHT SIMULATORS
DE- FLIGHT TRAINING; FIGHTER AIRCRAFT; PILOT TRAINING; FLIGHT CREWS; MILITARY HELICOPTERS; DECISION MAKING; TRAINING EVALUATION; AIR TO AIR

REFUELING; PERSONAL COMPUTERS; ALGORITHMS; SIMULATOR FIDELITY; DISPLAY
DEVICES; COMMERCIAL OFF-THE-SHELF TECHNOLOGY; REGULATORS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02528200
AN- <AEROSPACE> A00-33209
TI- Vertical situation awareness display
AU- Jacobsen, Alan R.; Chen, Sherwin S.; Wiedemann, John (Boeing Co., Seattle, WA)
SO- In: Situational awareness on the flight deck: The current and future contribution by systems and equipment; Proceedings of the Conference, London, United Kingdom, Mar. 23, 2000 (A00-33206 08-54), London, Royal Aeronautical Society, 190, p. 2.1-2.8.
PY- 2000
PD- 200000
RF- 6
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- Of the more than 200 heavy air transport accidents involving hull loss and/or fatalities over the last ten years, more than 50 percent have been associated with either Controlled Flight Into Terrain (CFIT) or the Approach and Landing phases of flight. A large portion of these accidents have resulted from inadequate or loss of vertical situation awareness on the part of the flight crew. Over the past several years, various types of interventions have been investigated in an attempt to address this issue on the flight deck. While many new, and often high-priced, technology items promise to deliver improved situation awareness, cost effective solutions that are relatively easy to retro-fit must be found to significantly enhance safety in the world-wide fleet. Presenting flight crews with a side looking profile of the vertical dimension is one such solution. While not the final answer to overall situation awareness, the vertical situation display (VSD) has been shown to be an effective format for significantly enhanced vertical awareness on the part of the flight crew and can be implemented into today's flight decks in a cost effective manner. It is expected that this type of display concept can significantly reduce the accident rate over the next five to ten years. The VSD complements and enhances the overall effectiveness of other systems like the Terrain Avoidance Warning System. By allowing flight crews to more easily acquire and maintain a stable flight path the VSD also yields other benefits such as decreased occurrences of landing incidents and missed approaches. (Author)
DE- <MAJOR> *DISPLAY DEVICES; *SITUATIONAL AWARENESS; *CONTROLLED FLIGHT
INTO TERRAIN; *FLIGHT CREWS; *VERTICAL FLIGHT
DE- AIRCRAFT LANDING; FLIGHT SAFETY
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02527650
AN- <AEROSPACE> A00-32659
TI- Instrumentation of the Yamaha R-50/RMAX helicopter testbeds for airloads identification and follow-on research
AU- Schrage, D. P.; Yillikci, Y. K.; Liu, S.; Prasad, J. V. R.; Hanagud, S. V. (Georgia Inst. of Technology, Atlanta)
SO- In: European Rotorcraft Forum, 25th, Rome, Italy, Sept. 14-16, 1999, Proceedings. Vol. 2 (A00-32561 08-05), Amsterdam, Netherlands, National Aerospace Laboratory, 14 p., 1999.
PY- 1999
PD- 199900
RF- 9
LA- English
GL- United States
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- The School of Aerospace Engineering of the Georgia Tech has been using two Yamaha R-50 remote controlled helicopters (RPHs) as testbeds for flight controls research in the Center of Excellence in Rotorcraft Technology over the past two years. A larger and more capable version of the Yamaha R-50 RPH, the RMAX, is being purchased by Georgia Tech as a testbed to support the DARPA Software Enabled Control project as well as to serve as a generic testbed for other research being conducted at Georgia Tech. We describe the planned instrumentation for the testbed and how we plan to identify the loads on the baseline RMAX RPH. Instrumentation requirements for the described load identification method include the use of strain, accelerometer, tilt (angle) and position sensors totaling 50 channels of measurements obtained on the rotating rotor system. Data are collected by a microminiature signal conditioner/PCM encoder placed on the helicopter rotor hub. The data are transmitted to the ground by a wideband telemetry microwave

transmitter. The data acquisition system located on the ground consists of a PC-compatible format synchronizer/decommutator and a PC compatible bit synchronizer decoding the data cards connected to a Model S5200 personal telemetry computer. (Author)
DE- <MAJOR> *TEST STANDS; *AERODYNAMIC LOADS; *REMOTE CONTROL; *HELICOPTER CONTROL; *FLIGHT CONTROL
DE- PULSE CODE MODULATION; SIGNAL PROCESSING; PERSONAL COMPUTERS; TELEMETRY

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02527607
AN- <AEROSPACE> A00-32616
TI- Helicopter active noise and vibration reduction
AU- Millott, Thomas A.; Welsh, William A. (Sikorsky Aircraft, Stratford, CT)
SO- In: European Rotorcraft Forum, 25th, Rome, Italy, Sept. 14-16, 1999, Proceedings. Vol. 1 (A00-32561 08-05), Amsterdam, Netherlands, National Aerospace Laboratory, 13 p., 1999.
PY- 1999
PD- 199900
RF- 19
LA- English
GL- United States
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- High levels of noise and vibration continue to hamper the utility of helicopters. The innovative use of active control technology provides the potential to reduce noise and vibration levels below those currently achievable with purely passive approaches, or alternatively, to achieve reductions comparable to passive approaches but with a lower weight penalty. Sikorsky has developed and flight-tested active noise and vibration control systems. A prototype active vibration control (AVC) system has been flight-tested on an UH-60 aircraft and achieved significant reductions in the main rotor 4P vibrations felt inside the helicopter cabin and cockpit. A productionized version of the AVC system is currently undergoing development flight testing on the Sikorsky S-92 Helibus. Also, an active noise control system has been successfully flight-tested on an S-76 aircraft and achieved tonal noise reductions of up to 20 dB in the helicopter cabin. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *VIBRATION DAMPING; *NOISE REDUCTION; *ACTIVE CONTROL
DE- HUMAN FACTORS ENGINEERING; SIKORSKY AIRCRAFT; FLIGHT TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02527578
AN- <AEROSPACE> A00-32587
TI- EC 120 design
AU- Bouvier, Jean-Claude (EUROCOPTER, Marignane, France)
SO- In: European Rotorcraft Forum, 25th, Rome, Italy, Sept. 14-16, 1999, Proceedings. Vol. 1 (A00-32561 08-05), Amsterdam, Netherlands, National Aerospace Laboratory, 12 p., 1999.
PY- 1999
PD- 199900
LA- English
GL- France
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- The background and design process of the EC 120 - the first EUROCOPTER to have incorporated an industrial design process from the time the general specifications were drawn up - are presented. The centerpiece of the design approach was natural balance of volumes, harmonious interaction of shapes, and extreme simplicity of lines. The first reduced-scale model tested in the wind tunnel gave excellent results. (AIAA)
DE- <MAJOR> *HELICOPTER DESIGN; *EUROPEAN AIRCRAFT; *AIRCRAFT MODELS
DE- FUSELAGES; COCKPITS; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02527560
AN- <AEROSPACE> A00-32569
TI- Smart struts - The solution for helicopter interior noise problems
AU- Gembler, W.; Schweitzer, H. (EUROCOPTER Deutschland GmbH, Munich, Germany); Maier, R.; Pucher, M.; Jaenker, P.; Hermle, F. (DaimlerChrysler AG, Munich, Germany)
SO- In: European Rotorcraft Forum, 25th, Rome, Italy, Sept. 14-16, 1999, Proceedings. Vol. 1 (A00-32561 08-05), Amsterdam, Netherlands, National Aerospace Laboratory, 12 p., 1999.
PY- 1999

PD- 199900
RF- 18
LA- English
GL- Germany
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- The noise situation in modern helicopters is still unacceptable compared to modern aircraft cabins. In this paper different possible noise reduction measures to improve the interior noise problem are addressed. The advanced noise reduction capabilities of the smart strut system are demonstrated. The development steps of this innovative active actuator concept are described in detail. Layout and modeling aspects, the latest measurements in the EC135 prototype structure, and the ground tests on a BK117 helicopter are described. The BK117 was equipped with a complete set of smart struts, and the measurements were performed in ground runs. The results of these measurements are reflected for future applications of the smart strut system in a serial production helicopter. A short overview of achievable system data, e.g., weight, power consumption, and efficiency of a production system is presented. (Author)
DE- <MAJOR> *HELICOPTERS; *AIRCRAFT NOISE; *CABINS; *NOISE REDUCTION
DE- HUMAN FACTORS ENGINEERING; ACTIVE CONTROL; ACTUATORS; SMART STRUCTURES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02527559
AN- <AEROSPACE> A00-32568
TI- The ERATO programme - Wind tunnel test results and proof of design for an aeroacoustically optimised rotor
AU- Splettstoesser, Wolf R.; van der Wall, B.; Junker, B.; Schultz, K.-J. (German Aerospace Center, Inst. of Design Aerodynamics, Braunschweig, Germany); Beaumier, P.; Delrieux, Y.; Leconte, P. (ONERA, Chatillon, France); Crozier, P. (ONERA, Modane, France)
SO- In: European Rotorcraft Forum, 25th, Rome, Italy, Sept. 14-16, 1999, Proceedings. Vol. 1 (A00-32561 08-05), Amsterdam, Netherlands, National Aerospace Laboratory, 16 p., 1999.
PY- 1999
PD- 199900
RF- 14
LA- English
GL- Germany
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- The bilateral ERATO project between ONERA and DLR had the ambitious goal of designing, building, and testing a quiet model rotor which is 6 dB less noisy in specific descent and level flight conditions than a reference rotor of current technology (the 7AD ONERA-EC rotor), for a helicopter of the four to six ton class with the constraints of minimum power and vibration level penalties. This cooperative research effort resulted in a novel aeroacoustically optimized rotor blade design, which was built with extensive pressure and strain gauge instrumentation. Both the ERATO and the 7AD rotor have been tested at high speed and at moderate and low speed to prove compliance with the objectives and to verify the design methodology employed. The results of both test campaigns together with a preliminary analysis are presented, and the noise reduction potential for simultaneously improved performance of the ERATO rotor in comparison to the reference rotor is demonstrated. The novel quiet rotor features acoustic gains up to 7 dBA at descent flight and up to 13 dBA at high-speed level flight. Furthermore, significant rotor performance gains (up to 12 percent) were found for high-speed level flight, but limited to moderate blade loadings. In summary, the high quality experimental results globally verify the quiet rotor design methodology applied. (Author)
DE- <MAJOR> *ROTARY WINGS; *AIRCRAFT DESIGN; *DESIGN OPTIMIZATION; *AEROACOUSTICS; *WIND TUNNEL TESTS
DE- ONERA; NOISE REDUCTION; ROTOR BLADES
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 02526005
AN- <AEROSPACE> A00-31014
TI- NASA/Army/Bell XV-15 tiltrotor low noise terminal area operations flight research program
AU- Conner, David A. (U.S. Army, Aeroflightdynamics Directorate, Hampton, VA); Edwards, Bryan D.; Klein, Peter D. (Bell Helicopter Textron, Inc., Fort Worth, TX); Decker, William A. (Army/NASA Rotorcraft Div., Ames Research Center, Moffett Field, CA); Marcolini, Michael A. (NASA, Langley Research Center, Hampton, VA)
SO- AIAA/CEAS, Aeroacoustics Conference and Exhibit, 6th (21st AIAA Aeroacoustics Conference), Lahaina, HI, June 12-14, 2000, 23 p..
PY- 2000
PD- 200006
RF- 28

RN- AIAA Paper 2000-1923
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0008
AB- A series of three XV-15 acoustic flight tests has been conducted over a five-year period by a NASA/Army/Bell Helicopter team to evaluate the noise reduction potential for tiltrotor aircraft during terminal area operations. Lower hemispherical noise characteristics for a wide range of steady-state terminal area type operating conditions were measured during the phase 1 test, and indicated that the takeoff and level flight conditions were not significant contributors to the total noise of tiltrotor operations. Phase 1 results were used to design low noise approach profiles that were tested during the phase 2 and phase 3 tests, which used large area microphone arrays to directly measure the ground noise footprints. Approach profile designs emphasized noise reduction while maintaining handling qualities sufficient for tiltrotor commercial passenger ride comfort and flight safety under Instrument Flight Rules conditions. This paper discusses the weather, aircraft, tracking, guidance, and acoustic instrumentation systems, the approach profile design philosophy, and the overall test program philosophy. Acoustic results are presented documenting the variation in tiltrotor noise due to changes in operating condition, indicating the potential for significant noise reduction using the unique tiltrotor capability of nacelle tilt. (Author)
DE- <MAJOR> *TILT ROTOR AIRCRAFT; *AIRPORTS; *NASA PROGRAMS; *LOW NOISE; *XV-15 AIRCRAFT; *FLIGHT TESTS
DE- RESEARCH PROJECTS; BELL AIRCRAFT; ARMED FORCES (UNITED STATES); NOISE REDUCTION; ACOUSTIC TESTS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02525917
AN- <AEROSPACE> A00-30926
TI- Monitoring and intelligent use of data - 'Turning water into wine'; Proceedings of the Conference, London, United Kingdom, Mar. 28, 2000
SO- London, Royal Aeronautical Society, 190, 77 p. (For individual items see A00-30927 to A00-30934).
PY- 2000
PD- 200000
RN- ISBN 1-85768-182-7
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA0007
AB- Various papers on helicopter engine and flight data monitoring and usage are presented. Individual papers address: data collection and analysis, intelligent management of HUMS data using the FUMSTM framework, intelligent management of engine data, ground station system deployment, lessons learned with the KT-1 mini HUMS of REGA, HUMS for Eurocopter light and medium helicopters, information encompassed by the full-blown VM/BFG system, operational flight data monitoring, trial Helicopter Operations Monitoring Program (HOMP), and analysis and presentation of HOMS data. (AIAA)
DE- <MAJOR> *CONFERENCES; *HELICOPTERS; *RESEARCH AND DEVELOPMENT; *HEALTH MONITORING (ENGINEERING)
DE- PILOT PERFORMANCE; FALSE ALARMS; AVIONICS; DATA PROCESSING; GROUND STATIONS; SYSTEMS ENGINEERING; FLIGHT RECORDERS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02523763
AN- <AEROSPACE> A00-28772
TI- Helicopter Aircrew Integrated Life Support System HAILSS integration
AU- Dolinar, Paul (U.S. Naval Air Warfare Center, Aircraft Div., Patuxent River, MD)
SO- In: SAFE Association, Annual Symposium, 37th, Atlanta, GA, Dec. 6-8, 1999, Proceedings (A00-28723 07-54), Nashville, TN, SAFE Association, 3 p., 1999.
PY- 1999
PD- 199900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0007
AB- There is no approved configuration to provide both chemical/biological (CB) agent and anti-exposure protection to U.S. Navy helicopter aircrew due to the high thermal burden imposed by the impermeable anti-exposure coverall and the additional layers for CB protection. No cooling

technology is currently available to alleviate this thermal burden imposed on the aircrew. The Helicopter Aircrew Integrated Life Support System (HAILSS) Program is a U.S. Navy led effort that began in April 1997 at the Naval Air Warfare Center Aircraft Division (NAWCAD) Patuxent River, MD. The main contractor is Gentex Corporation, Carbondale, PA. (Author)
DE- <MAJOR> *LIFE SUPPORT SYSTEMS; *FLIGHT CREWS; *MILITARY HELICOPTERS; *PROTECTIVE CLOTHING
DE- CHEMICAL WARFARE; BIOLOGICAL WARFARE; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02523760
AN- <AEROSPACE> A00-28769
TI- HAILSS integrated garment (neck-down)
AU- Just, Juergen; Gehse, Hartmut (SD&E System Design & Engineering GmbH, Friedrichshafen, Germany)
SO- In: SAFE Association, Annual Symposium, 37th, Atlanta, GA, Dec. 6-8, 1999, Proceedings (A00-28723 07-54), Nashville, TN, SAFE Association, 10 p., 1999.
PY- 1999
PD- 199900
RF- 6
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0007
AB- The patented SD&E Integrated Full Coverage Protection (GKSA) System Concept developed in Germany has been adopted by the U.S. Navy Helicopter Aircrew Integrated Life Support System HAILSS Program, which has been initiated in 1997. During Phase 1, Part 1 (known as Baseline HAILSS), the state of the art configuration has been introduced, which then continued as Part 2, the Prototype HAILSS, with corresponding redesign, system improvements and modifications. The present Phase 2 configuration shows the most advanced HAILSS design and integration issues. Contributors are the main contractor Gentex Corporation, Carbondale, Pennsylvania, USA, and its subcontractor System Design & Engineering GmbH (SD&E), Friedrichshafen, Germany with its supplier Ballonfabrik BFA, Augsburg. The primary goal of the HAILSS is to develop a single garment for helicopter air crews (male and female) that provides homeostasis for maximum mission performance and survivability against external threats as well as in the case of emergency egress. In order to realize this challenging goal multiple requirements have to be fulfilled and to be integrated into this system, reaching from standard requirements for flight garment to immersion/CB-protection requirements and microclimatization close to the body. (Author)
DE- <MAJOR> *LIFE SUPPORT SYSTEMS; *HELMET MOUNTED DISPLAYS; *MILITARY HELICOPTERS; *NAVY
DE- PROTECTIVE CLOTHING; FLIGHT CREWS; TESTS; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02523759
AN- <AEROSPACE> A00-28768
TI- Helicopter Advanced Integrated Life Support System (HAILSS) - Integrated helmet system
AU- Epperson, W. L. (Gentex Corp., Carbondale, PA)
SO- In: SAFE Association, Annual Symposium, 37th, Atlanta, GA, Dec. 6-8, 1999, Proceedings (A00-28723 07-54), Nashville, TN, SAFE Association, 8 p., 1999.
PY- 1999
PD- 199900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0007
AB- The HAILSS integrated helmet and Chemical Biological Visor/Respirator (CBVR) is based on the modular helmet design developed under the Navy Advanced Integrated Helmet Vision System program. A respirator with a shroud that interfaces with the HAILSS garment and that contains helmet fitting components and communications is integrated into the modular inner helmet. This paper describes the various components of the helmet system and how they interface with one another and the wearer of the helmet. (Author)
DE- <MAJOR> *LIFE SUPPORT SYSTEMS; *HELMETS; *HELICOPTERS; *HELMET MOUNTED DISPLAYS
DE- HUMAN FACTORS ENGINEERING; RESPIRATORS; PROTECTIVE CLOTHING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02523715
AN- <AEROSPACE> A00-28724
TI- Panoramic Night Vision Goggle update
AU- Geiselman, Eric E.; Craig, Jeffrey L. (USAF, Research Lab., Wright-Patterson AFB, OH)
SO- In: SAFE Association, Annual Symposium, 37th, Atlanta, GA, Dec. 6-8, 1999, Proceedings (A00-28723 07-54), Nashville, TN, SAFE Association, 6 p., 1999.
PY- 1999
PD- 199900
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0007
AB- The operational test and evaluation of a first-ever 100-deg field-of-view (FOV) night vision goggle is currently underway at several locations. Testing is being conducted on board F-15C, F-15E, and, more recently, F-117, C-5, C-130, CH-47D, and AH-1 aircraft, as well as with special operations ground personnel. In the near future, testing will include other ejection seat, transport, and rotorcraft platforms. Two configurations of the Panoramic Night Vision Goggle (PNVG) are being evaluated. The first version design (PNVG I) is very low in profile to fit underneath a visor and can be retained by the pilot in the case of an ejection. The second version (PNVG II) resembles the currently fielded 40-deg FOV AN/AVS-6 and F-4949 NVGs and is designed for non-ejection-seat aircraft and ground applications. During flight evaluations, subjective questionnaires are being used to collect pilot ratings in order to compare the capability of the 100-deg FOV PNVG to that of the 40-deg F-4949 across different operational tasks. The SA-SWORD technique is being used in order to produce situational awareness ratings for statistical analysis. This paper discusses the current findings and pilot feedback of the PNVG I system on F-15C and F-15E aircraft only. (Author)
DE- <MAJOR> *NIGHT VISION; *GOGGLES; *FIELD OF VIEW; *FIGHTER AIRCRAFT; *PILOT PERFORMANCE
DE- F-15 AIRCRAFT; F-117A AIRCRAFT; C-5 AIRCRAFT; C-130 AIRCRAFT; AH-1G HELICOPTER; CH-47 HELICOPTER
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02522934
AN- <AEROSPACE> N00-14934
TI- The Feasibility of a Three-Crew Concept for the NFH90: Exploring Workload Bottlenecks (TNO-HFRI Part of Study)
TI- <ORIGINAL> De Haalbaarheid van een Drie-Mans Concept voor de NFH90: Onderzoek Naar Werkbelastingsproblemen (TNO-TM-Deel)
AU- Veltman, J. A. (Institute for Human Factors TNO, Soesterberg, Netherlands)
SO- NASA no. 20000021430.
PY- 1999
PD- 199911
CN- A96/KM/327
RN- NASA no. 20000021430; TD99-0365; TNO-TM-99-A075
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- An experiment was conducted by the TNO Human Factors Research Institute and the National Aerospace Laboratory (NLR) in the tactical trainer of the Orion in order to get insight into the tasks and the workload of tactical coordinators (TACCOs). This report presents the results of the TNO part of the study only. The Lynx helicopter will be replaced by the NFH90 within a few years. To determine the feasibility of a three crew concept, similar to the Lynx helicopter, several studies commissioned by the Royal Netherlands Navy are (and will be) conducted to get insight into the workload of the future crew. The TACCO in the Orion works with a display for tactical information. Because the TACCO in the NFH90 will also work with information displays, the present study focuses on the workload and tasks of an Orion TACCO. During an anti submarine warfare (ASW) and anti surface warfare (ASUW) mission the workload was measured of an experienced and inexperienced TACCO with physiological measures (heart rate, respiration and eye blinks). The missions were recorded on videotape. After the missions the TACCOs analysed the mission by means of a special purpose computer program. They indicated the moments during which tasks were executed and gave ratings of the workload and the amount of routine handling each minute. Together with the physiological recordings, this provided time lines of tasks and workload. The data indicated that the TACCOs had the highest workload before and directly after an attack in an ASW mission. The joining segment of the ASW mission and an ASUW mission were far less demanding. The attack during an ASW mission was demanding because this

situation is always unique and therefore, no standard procedures can be obtained. Further- more, the TACCOs have to interpret a lot of information with a high level of uncertainty. The work of the TACCO in the NFH90 will change from actively controlling instruments and retrieving information to managing large amounts of information. The workload of the TACCO in the NFH90 will depend on the level of equipment automation that can be obtained and the level of management that is required for adequate task performance. Future studies will address these issues.
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PHYSIOLOGY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMPUTER PROGRAMS; TRAINING DEVICES; HUMAN PERFORMANCE; NETHERLANDS; NAVY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02521853
AN- <AEROSPACE> N00-13853
TI- Development, Test, and Integration of the AGM-114 Hellfire Missile System and FLIR/Laser on the H-60 Aircraft
AU- Roberts, David (Naval Air Warfare Center, Air Vehicle Stores Compatibility Div., Patuxent River, MD United States); Capezzuto, Robert (Naval Air Warfare Center, Air Vehicle Stores Compatibility Div., Patuxent River, MD United States)
SO- NASA no. 20000014073.
PY- 1998
PD- 199809
RN- NASA no. 20000014073; AD-A368636
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- The Hellfire Missile System (HMS) and a nose mounted FLIR (Forward Looking Infrared) with laser designator system were selected as integration candidates on H-60 derivatives based on a new fleet weapons requirement. Naval Air Warfare Center Aircraft Division (NAWCAD) Patuxent River conducted ground and flight tests to structurally qualify the HMS and FLIR systems and evaluate their integration into the H-60 airframe. Three ground firings and 45 hours of flight test (including six missile firings and eight launcher jettisons) were conducted in 1995 during the technical feasibility phase and 60 test flight hours were flown in 1997 during the system integration phase. In-flight jettison and missile firing test planning utilized a six degree-of-freedom simulation to develop the minimum number of test points to clear the desired envelope while managing risk. Testing demonstrated the successful "structural integration of the HMS and FLIR systems. Testing then proceeded with integration of the functional FLIR and HMS. The integration test program fired 6 missiles at fixed and moving targets, under day and night conditions over land and water using the FLIR/LASER for tracking and autonomous designation. Integration development and testing utilized specialized U.S. Army Hellfire instrumentation as well as the Laser Designator Weapons System Simulator (LDWSS) modeling tool. LDWSS was used to simulate launch conditions and engagement scenarios, predict missile launch transients and trajectories, and identify launch constraint and laser self-designation issues. The simulation tools and test methods employed minimized test flights and required assets, resulting in an efficient certification of his weapon system for fleet use.
DE- <MAJOR> *FLIR DETECTORS; *H-60 HELICOPTER; *AIR TO AIR MISSILES; *COMPUTERIZED SIMULATION; *SYSTEMS INTEGRATION; *MISSILE TESTS; *MISSILE SYSTEMS
DE- GROUND TESTS; FLIGHT TESTS; JETTISONING; DEGREES OF FREEDOM; LASER WEAPONS; MISSILE LAUNCHERS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02521086
AN- <AEROSPACE> N00-13086
TI- A Methodology for Evaluating the Fidelity of Ground-Based Flight Simulators
AU- Zeyada, Y. (California Univ., Dept. of Mechanical and Aeronautical Engineering, Davis, CA United States); Hess, R. A. (California Univ., Dept. of Mechanical and Aeronautical Engineering, Davis, CA United States)
SO- NASA no. 20000012303.
PY- 1999
PD- 199901
CN- NCC2-5238
RN- NASA no. 20000012303; AIAA Paper 99-4034
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR0001
AB- An analytical and experimental investigation was undertaken to model the manner in which pilots perceive and utilize visual, proprioceptive, and vestibular cues in a ground-based flight simulator. The study was part of a larger research effort which has the creation of a methodology for determining flight simulator fidelity requirements as its ultimate goal. The study utilized a closed-loop feedback structure of the pilot/simulator system which included the pilot, the cockpit inceptor, the dynamics of the simulated vehicle and the motion system. With the exception of time delays which accrued in visual scene production in the simulator, visual scene effects were not included in this study. The NASA Ames Vertical Motion Simulator was used in a simple, single-degree of freedom rotorcraft bob-up/down maneuver. Pilot/vehicle analysis and fuzzy-inference identification were employed to study the changes in fidelity which occurred as the characteristics of the motion system were varied over five configurations i The data from three of the five pilots that participated in the experimental study were analyzed in the fuzzy inference identification. Results indicate that both the analytical pilot/vehicle analysis and the fuzzyinference identification can be used to reflect changes in simulator fidelity for the task examined.
DE- <MAJOR> *FLIGHT SIMULATORS; *GROUND BASED CONTROL; *FEEDBACK CONTROL;
*CUES; *PROPRIOCEPTION; *PILOT PERFORMANCE; *VERTICAL MOTION SIMULATORS
; *MATHEMATICAL MODELS
DE- COOPER-HARPER RATINGS; ROTARY WING AIRCRAFT; COCKPITS; FUZZY SETS;
HUMAN-COMPUTER INTERFACE
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02520890
AN- <AEROSPACE> N00-12890
TI- A Portable Rigid Forced-Air Warming Cover For Pre-Hospital Transport of Cold Patients During Rotary Wing Aircraft Search and Rescue
AU- Giesbrecht, Gordon G. (Manitoba Univ., Lab. for Exercise and Environmental Medicine, Winnipeg, Manitoba Canada); Pachu, Prithpal (Manitoba Univ., Lab. for Exercise and Environmental Medicine, Winnipeg, Manitoba Canada); Xu, Xiao-Jiang (Manitoba Univ., Lab. for Exercise and Environmental Medicine, Winnipeg, Manitoba Canada)
SO- NASA no. 20000011775. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011775
LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- Two rigid forced-air warming covers were designed to direct heat to the torso and thighs of normothermic subjects. Subjects were heated with an AC powered heater and either a commercial soft cover or the rigid covers (with the heat input at the head or abdomen). Compared to the soft cover, the rigid covers provided similar heat delivery but a higher mean skin temperature. This new heat delivery system combination may have practical value during evacuation of cold patients in rotary wing aircraft.
DE- <MAJOR> *ROTARY WING AIRCRAFT; *COVERINGS; *SKIN TEMPERATURE (BIOLOGY);
*RESCUE OPERATIONS; *SEARCHING; *HUMAN FACTORS ENGINEERING; *HEATING
EQUIPMENT
DE- ABDOMEN; THIGH; TORSO; HEAT TRANSFER COEFFICIENTS; HYPOTHERMIA;
RUGGEDNESS; PATIENTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02520885
AN- <AEROSPACE> N00-12885
TI- Helicopter Flight Accidents in the German Federal Armed Forces in the Last 15 years
AU- Marwinski, Hans-D. (German Army Aviation School, Bueckeburg, Germany)
SO- NASA no. 20000011770. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011770
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- This presentation deals with flight accidents made with helicopters of the Bundeswehr in the period of 1 January 1984 until today. Given a

total rate of 0.22 accidents per 10.000 hours, that is 48 accidents in a total of 2.2 million hours, the number of flight accidents can be stated as low; 47 persons were killed and 48 helicopters destroyed. The intensive efforts invested in flight safety within die Bundeswehr are successful. The same applies to the intensive and continuous aeromedical care and control of flying personnel, which are ensured centrally by the Air Force Institute of Aviation Medicine and locally in the flying units and during operations by well trained and experienced flight surgeons. The flight accident rate will probably improve even more of Crew Coordination and Management concepts are implemented and further developed. For this, however, efforts must be made to increase the acceptance of these concepts particularly among senior flying personnel. A closer look at the helicopter flight accidents situation shows that most of the accidents are due to two flight physiological phenomena: spatial disorientation and empty field myopia. Special consideration will be granted to the aerodynamic peculiarities of a hingeless rotor system, the knowledge and respect of which will help to prevent accidents especially when flying in a low-altitude profile.

DE- <MAJOR> *AEROSPACE MEDICINE; *ARMED FORCES (FOREIGN); *AIRCRAFT ACCIDENTS; *PSYCHOLOGICAL EFFECTS; *HUMAN FACTORS ENGINEERING; *BO-105 HELICOPTER; *UH-1 HELICOPTER; *H-53 HELICOPTER

DE- DISORIENTATION; LOW ALTITUDE; MYOPIA; FLIGHT SAFETY; FLYING PERSONNEL

SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02520876

AN- <AEROSPACE> N00-12876

TI- Helmet Mounted Displays for the 21st Century: Technology, Aeromedical and Human Factors Issues

AU- Rood, G. M. (Defence Evaluation Research Agency, Systems Integration Dept., Farnborough, United Kingdom); duRoss, H. (Defence Evaluation Research Agency, Systems Integration Dept., Farnborough, United Kingdom)

SO- NASA no. 20000011761. Current Aeromedical Issues in Rotary Wing Operations.

PY- 1999

PD- 199908

RN- NASA no. 20000011761

LA- English

GL- United Kingdom

CP- United Kingdom

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR0001

AB- The introduction of Helmet Mounted Sights and Display's into operational aircraft, and the increased mass of the helmets due to the incorporation of the additional image source, optical trains, the combiners/projection system as well as the wiring optical supports etc, and the subsequent changes in centre-of-gravity have all conspired to push the biomechanical safety aspects in the wrong direction. Most current work is in minimizing the mass of these components and lowering the CofG of the head mounted mass by a number of clever design fixes, and this is producing some reductions in helmet or head-mounted mass. The average current flight helmets weigh in the region of 1.5kg (3.3lb), whilst the lightest is in the region of 1.1kg (2.5lb). In some cases these lower masses results in a reduction of impact protection and whilst in some cases, this may be acceptable for operational reasons, reduction in impact safety margins is not generally or widely acceptable. To complete the head mounted weight, the mass of an oxygen mask, at some 300g (0.66lb), must be added. Helmets incorporating displays are of course heavier and the current average mass, excluding oxygen mask, is in the region of 1.9kg, (4.2lb) and 2.2kg (4.8lb) with O2 mask gives an indication of the static loads on the head, counterbalanced by the posterior neck muscles. If the mass and balance targets of future Helmet Mounted Displays systems are to be met, then it is likely that new approaches to integrated helmet design need to be initiated, as the current approach with conventional flying helmets has obvious limitations. By the use of new materials and structures technology, lighter weight helmets can be designed and built that provide improved impact protection and stability, whilst reducing the risk of neck and spinal injury. Protection against the helicopter noise environment and improved communications can be accomplished by active noise reduction systems which are an integral part of the helmet design and this type of helmet design has the potential for incorporating fully integrated NBC (Nuclear Biological Chemical) protection.

DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *AEROSPACE MEDICINE; *BIODYNAMICS; *HUMAN FACTORS ENGINEERING; *FLIGHT CLOTHING; *STRUCTURAL ENGINEERING; *MATHEMATICAL MODELS

DE- MASS DISTRIBUTION; SAFETY; IMPACT TESTS; FINITE ELEMENT METHOD; TEMPERATURE DEPENDENCE; AIRCRAFT NOISE

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02520874
AN- <AEROSPACE> N00-12874
TI- Simulator Versus in-Flight Measurement of Pilot Performance
AU- Caldwell, J. A. (Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL United States); Roberts, K. A. (Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL United States); Jones, H. D. (Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL United States)
SO- NASA no. 20000011759. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011759
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- A quasi-experimental approach assessed the comparability of simulator versus in-flight results. Flight data from three sleep deprivation studies were pooled. Twenty aviators were included, 10 who flew a UH-60 helicopter simulator and 10 who flew a UH-60A aircraft under the influence of Dexedrine, or placebo during 40 hours of continuous wakefulness. Performance on straight and levels, right and left turns, climbs and descents, and a left-descending turn (assessed at 0100, 0500, 0900, 1300, and 1700) tended to correspond in the simulator and aircraft. Generally, performance under Dexedrine was better than under placebo. However, only half of the maneuvers showed consistent, statistically significant stimulant/fatigue effects in both flight platforms. Measurement sensitivity was lower in the aircraft, likely because of error variance due to environmental influences (weather, temperature, and turbulence) and other factors (radio traffic and anxieties about safety). Thus, actual in-flight studies, while desirable in terms of face-validity, underestimate the impact of stressors such as fatigue on pilots.
DE- <MAJOR> *PILOT PERFORMANCE; *IN-FLIGHT MONITORING; *COMPUTERIZED SIMULATION; *AEROSPACE MEDICINE; *SLEEP DEPRIVATION; *AIRCRAFT PILOTS;
*HUMAN FACTORS ENGINEERING
DE- ANTIHISTAMINICS; WAKEFULNESS; ANALYSIS OF VARIANCE; AIRCRAFT MANEUVERS;
ERROR ANALYSIS; ANXIETY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02520872
AN- <AEROSPACE> N00-12872
TI- Utilization of Medical Support Equipment on Board Army Rotary-Wing Aircraft
AU- Licina, Joseph R. (Army Aeromedical Research Lab., Fort Rucker, AL United States); Hall, Bruce D. (Universal Energy Systems, Inc., Fort Rucker, AL United States); Murphree, K. Blake (Universal Energy Systems, Inc., Fort Rucker, AL United States)
SO- NASA no. 20000011757. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011757
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- The U.S. Army Airworthiness Certification and Evaluation (ACE) program at the U.S. Army Aeromedical Research Laboratory (USAARL) is designed to evaluate medical life support equipment for compatibility within the rotary-wing aviation or medical evacuation (MEDEVAC environment. The program goes beyond any prior validation of medical equipment for use within the controlled hospital environment, and assesses the equipment in the context of the military environment, from the supply and distribution chain, through storage and use in field conditions. The end product is an assessment that assures the safety of the aircraft and its subsystems, the aircraft crew, the device itself, and ultimately, the patient. Since the program's inception in 1983, standards have evolved to better reflect the actual rotary-wing operational environment. This evolution challenges manufacturers striving to produce viable products to meet both hospital and in-flight requirements in the military and civilian sectors. From July 1992 to August 1998, 24 medical devices including monitor/defibrillators, infusion pumps, vital-signs monitors, and ventilators were tested under specified conditions of temperature, humidity, altitude and vibration (MIL-STD-810D and 810E). Electromagnetic emissions and susceptibility were measured (MIL-STD-461C, 461D), and human factors (MIL-STD-1472D) were evaluated. The devices were flight tested in the USAARL JUH-60A MEDEVAC helicopter. Thirty-two percent of the medical devices failed at

least one environmental test. Ninety-one percent of the devices failed to meet the 461C and 461D standards. Only three devices were tested at the new 200 V/m radiated susceptibility level, but all failed. Failures included excessive conducted and radiated emissions and susceptibility to radiated emissions.
DE- <MAJOR> *AEROSPACE MEDICINE; *MEDICAL EQUIPMENT; *ARMED FORCES (UNITED STATES); *HUMAN FACTORS ENGINEERING; *UH-60A HELICOPTER; *ENVIRONMENTAL TESTS; *MEDICAL SERVICES
DE- ELECTRONIC EQUIPMENT; PATIENTS; MONITORS; VENTILATORS; AIRCRAFT SAFETY; EVACUATING (TRANSPORTATION)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02520865
AN- <AEROSPACE> N00-12865
TI- Fear of Flying in SPAF Helicopter Aircrew
AU- Cruz, Jesus Medialdea (Centro de Instruccion de Medicina Aeroespatial, Madrid, Spain); Tejada, Francisco Rios (Centro de Instruccion de Medicina Aeroespatial, Madrid, Spain)
SO- NASA no. 20000011750. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011750
LA- English
GL- Spain
CP- Spain
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- In this retrospective work have studied Fear of Flying in a group of SPAF Spanish Air Force) helicopter aircrew. We analyze the frequency of phobia to flight, its relation with aircraft accidents and flight motivation, as well as the presence of other psychiatric diseases and therapeutic attitudes.
DE- <MAJOR> *FEAR OF FLYING; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *AEROSPACE MEDICINE; *HELICOPTERS
DE- MOTIVATION; DISORDERS; THERAPY; ANXIETY; AIRCRAFT ACCIDENTS
SH- 7553 Behavioral Science (1975-)

FN- DIALOG(R)File 108:AEROSPACE DATABASE
CZ- (c) 2001 AIAA. All rts. reserv.
AN- <DIALOG> 02520863
AN- <AEROSPACE> N00-12863
TI- Assessment of Simulated Spatial Disorientation Scenarios in Training US Army Aviators
AU- Johnson, P. A. (Army Aeromedical Research Lab., Fort Rucker, AL United States); Estrada, A. (Army Aeromedical Research Lab., Fort Rucker, AL United States); Braithwaite, M. G. (Headquarters Army Aviation, Middle Wallop, United Kingdom); Manning, J. C. (Army Aeromedical Research Lab., Fort Rucker, AL United States)
SO- NASA no. 20000011748. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011748
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- Spatial disorientation (SD) is considered to be present when a pilot fails to perceive the position, motion, or attitude of his/her aircraft with respect to the gravitational vertical or surrounding objects. The results of SD in flight may be disastrous. The limitation of ground based training to raise the aviator's awareness of SD is widely acknowledged. A proposal was therefore raised to develop SD scenarios for presentation in a visual flight simulator. The scenarios were developed using accident summaries from the US Army Safety Center (USASC), Fort Rucker Alabama, which were reviewed for suitable content. These were then presented as a series of scripts from which a trainer could reproduce the situation in a visual flight simulator. The resulting scenarios were presented to 30 experienced aviators who completed questionnaire evaluations after each scenario and an overall evaluation. The results showed a high level of acceptance of this training tool by a group of experienced aviators with differing backgrounds. The scenarios have since been developed as a U.S. Army aviation training tool and are being distributed to units worldwide. The scenarios were developed in a UH-60 (Blackhawk) simulator, but have been refined to make them relevant to other types of helicopter operation, such as the AH64 (Apache) attack helicopter

DE- <MAJOR> *FLIGHT SIMULATORS; *AIRCRAFT PILOTS; *DISORIENTATION; *HUMAN
FACTORS ENGINEERING; *EDUCATION; *AEROSPACE MEDICINE; *ARMED FORCES
(UNITED STATES)
DE- AIRCRAFT ACCIDENTS; VISUAL FLIGHT; AIRCRAFT SAFETY; APACHE ROCKET VEHICLE; H-60 HELICOPTER
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02520862
AN- <AEROSPACE> N00-12862
TI- Rotary-Wing Crew Communication Patterns Across Workload Levels
AU- Katz, Lawrence C. (Army Aeromedical Research Lab., Fort Rucker, AL United States); Fraser, E. Beth (Army Aeromedical Research Lab., Fort Rucker, AL United States); Wagner, Terry L. (Army Aeromedical Research Lab., Fort Rucker, AL United States)
SO- NASA no. 20000011747. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011747
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- Human error has been identified as the primary contributor to aircraft mishaps. A critical implication of this finding for the military rotary-wi'ng community is the need to objectively assess the coordinated behaviors of two-person aircrews. Specifically, there is a current, pressing need to gain an understanding of crew communication patterns and how those patterns are affected by the high stress, high workload environment inherent to this mileu. Two-person aircrews were presented with 402 single-engine emergencies while completing a total of 272 full-mission simulated flights at three Army posts. In addition, 11 aircrews completed a series of 10 simulated training missions requiring incrementally increasing overall workload. We used the Coordination Index Rating of Crew Linguistic Events (CIRCLE) system to analyze paired verbalizations reflecting crew coordination basic qualities across flight phases requiring varying workload levels. We developed a normative template of mean crew communication index workload levels, against which individual crews may be compared. The patterns of each of the crew coordination basic qualities across workload levels are presented. The template of crew communication patterns across workload levels developed in this study may be used to assess the effectiveness of crew communication training efforts in the future. Furthermore, this study demonstrated the ability of CIRCLE to address specific fluctuations in communication patterns, suggesting the potential utility of the system towards analysis of other factors affecting crew communication.
DE- <MAJOR> *WORKLOADS (PSYCHOPHYSIOLOGY); *FLIGHT SIMULATORS; *HUMAN
FACTORS ENGINEERING; *COMMUNICATION; *ROTARY WING AIRCRAFT; *FLIGHT
CREWS
DE- DECISION MAKING; COORDINATION; LINGUISTICS; AIRCRAFT ACCIDENTS; TEMPLATES
SH- 8732 Communications & Radar (1987-)

AN- <DIALOG> 02520860
AN- <AEROSPACE> N00-12860
TI- An Analysis of the Impact of Chemical/Biological Warfare Environments on Aviation Crewmember Cockpit Performance
AU- Taylor, Robert R. (Textron Bell Helicopter, Fort Worth, TX United States)
SO- NASA no. 20000011745. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011745
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- In 1995 and 1996 Bell Helicopter Textron conducted studies to determine the effect of NBC environments on aircraft cockpits and on aircrew performance. Two of the studies concentrated on: 1. Determining the build up rates inside small non hardened helicopter cockpits and 2. Determining the effects of the chemical protective clothing individual components on aircrew performance. The first study was used to determine the performance requirements for chemical detection systems. The second study was used to identify the short comings of existing chemical suits used by aviators and quantify those shortcomings in

order to recommend improvements in future designs. The studies were intended to be generic in nature and apply to non-hardened scout type aircraft. The first study used the cockpit specifications and ventilation systems of a Jet Ranger type aircraft to determine the expected build up rates of chemical agents in the cockpit given a specific exterior contamination level. The task lists and manuals for the OH58 D Kiowa helicopter were used to provide input data for the Task and Workload analysis in the second study. The build up study determined the rate at which agent built up in the cockpit These data were plotted against the casualty effects of the specific agent as reported in standard military field manuals, and the exposure times were used to calculate the sensor response time requirements. The requirements were for the sensors to provide the crew adequate warning in both point and remote sensing modes. If adequate warning can be provided, aircrews can fly into suspected contamination areas in a lower protective posture and, as the warning is provided, they can maneuver to avoid the contamination or increase the personal protection to a higher level. For example, the crew may fly with protective mask off and the protective suit open to provide cooling and until the moment the protection is required. This capacity can improve both mission endurance and crew efficiency. This paper reports briefly the methodology used and the expected effects of one specific agent, and reports in detail on the methodology and the results of a human performance modeling analysis.
DE- <MAJOR> *CHEMICAL WARFARE; *PROTECTIVE CLOTHING; *WORKLOADS (PSYCHOPHYSIOLOGY); *COCKPITS; *HUMAN FACTORS ENGINEERING; *AIRCRAFT PILOTS; *HUMAN PERFORMANCE
DE- GLOVES; FIELD OF VIEW; TASKS; SUITS; CREW PROCEDURES (INFLIGHT); CREW PROCEDURES (PREFLIGHT)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02520856
AN- <AEROSPACE> N00-12856
TI- Current Operational Issues in the Civil Guard Air Service
AU- Llamas, Bernardo Baldanta (Civil Guard, Helicopter Unit, Valencia, Spain)
SO- NASA no. 20000011741. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011741
LA- English
GL- Spain
CP- Spain
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- The aim of this paper is to present a short description of the Helicopter Units of the Civil Guard. Beginning with a description of the general tasks of the Civil Guard, its organization and statute of its personal. Later on, a superficial approach to the Helicopter Units within the Civil Guard is exposed. In this paragraph, I will discuss some aspects such as the organization, the territorial deployment, the aircraft models that it fly, the missions that it fulfilled, and finally a study of the operational problems that often appear in the such missions development.
DE- <MAJOR> *CIVIL AVIATION; *AIRCRAFT MODELS; *DEPLOYMENT; *OPERATIONAL PROBLEMS; *HUMAN FACTORS ENGINEERING
DE- FLIGHT CREWS; APPLICATIONS PROGRAMS (COMPUTERS); HUMAN-COMPUTER INTERFACE; VISIBILITY
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 02520853
AN- <AEROSPACE> N00-12853
TI- Practice of a Theory Concept of CRM (Cockpit Resource Management) Training for Equipping Military Helicopters
TI- <ORIGINAL> De la Theorie a la Pratique: Conception d'un Cours CRM Pour les Equipages d'Helicopteres Militaires
AU- Grau, J. Y. (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Inst. de Medecine Aerospatiale, Bretigny sur Orge, France); Derain, P. (LEMP, Mont de Marsan France); Maugey, B. (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Inst. de Medecine Aerospatiale, Bretigny sur Orge, France); Valot, C. (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Inst. de Medecine Aerospatiale, Bretigny sur Orge, France); Seynaeve, A. (COMALAT, Villacoublay-Air, France)
SO- NASA no. 20000011738. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011738
LA- French

GL- France
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- Cockpit Resource Management (CRM) is one of the ways available to improve flight safety. "Human factors" training's are designed for military air crews hut due to the absence of international military regulation, there is a large variety of training goals and contents between countries. From the know-how acquired during the design of "Puma" helicopter CRM, guidelines can he given lor "human factors" training policy definition and CRM courses design. In conclusion data exchange between countries is proposed by the authors as as way way standardize "human factors" training in order to improve either flight safety and aircrew proficiency multinational missions.
DE- <MAJOR> *MILITARY HELICOPTERS; *COCKPITS; *HUMAN FACTORS ENGINEERING;
*RESOURCES MANAGEMENT; *PILOT TRAINING
DE- FLIGHT SAFETY; FLIGHT CREWS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02520852
AN- <AEROSPACE> N00-12852
TI- High Fidelity Survival Training for Ditched Aircrew and Passengers
AU- Bohemier, A. (Survival Systems Ltd., Dartmouth, Nova Scotia Canada); Brooks, C. J. (Survival Systems Ltd., Dartmouth, Nova Scotia Canada); Morton, J. S. (Survival Systems Ltd., Dartmouth, Nova Scotia Canada); Swain, J. H. (Survival Systems Ltd., Dartmouth, Nova Scotia Canada)
SO- NASA no. 20000011737. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011737
LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- When Survival Systems was established in 1982, it was decided that the sole purpose of our existence was: To enhance and preserve workers' lives through safety education, training technologies, and applied research and development. The principle people at risk were those that flew over water for a living whether pilots, crewmen, or passengers. It was decided to focus on emergency evacuation training for them. To be global leaders in our work (our service) required that we needed to enroll not only our clients, but also our own people in an exciting, seemingly unreachable, significant vision. The end result of this strategic intent would affect every human being who may have to react to, escape, egress from, affect a rescue, or survive a life-threatening situation over water or on land worldwide. It was determined that the global standards we were attempting to establish in every case would include practical training, the most modern equipment and simulation technologies, and the research and development conducted to maintain this global market leadership. Survival Systems Limited's strategic objective was to: Create, set, and maintain the standard or measurement by which all aircrew and passengers (fixed wing or rotary wing) (military or civilian) in the world will be trained to survive an emergency ditching or crash situation. Over a decade ago, Survival Systems adopted the premise that egressing a downed, flooded helicopter is a survivable event. Further, a trainee success rate approaching 100% in actual emergency egress situations could be achieved with a training protocol that replicated all variables of a true ditching. In addition, it was believed that through learned emergency response techniques, aircrew and passengers could significantly reduce ditching impact injuries. High-fidelity training programs were designed to prepare an individual to save his / her own life and the lives of others. Our team holds a moral obligation to ensure that trained aircrew can survive actual emergency situations. Survival System's original ditching training programs were developed for civilian, offshore workers. Their companies, concerned with operational efficiency, insisted on absolute safety, ease of personnel training, and as close to 100% successful course completion as possible.
DE- <MAJOR> *FLIGHT CREWS; *AIRCRAFT SURVIVABILITY; *DITCHING (LANDING);
*HUMAN FACTORS ENGINEERING; *TRAINING SIMULATORS; *ROTARY WING AIRCRAFT
; *PILOT TRAINING
DE- CRASHES; PROTOCOL (COMPUTERS); RESCUE OPERATIONS; DISORIENTATION;
PASSENGERS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02520851
AN- <AEROSPACE> N00-12851
TI- Controlling the Hazard of Spatial Disorientation in Rotary-Wing

Operations by Enhanced Training
AU- Braithwaite, M. G. (Headquarters Army Aviation, Middle Wallop, United Kingdom)
SO- NASA no. 20000011736. Current Aeromedical Issues in Rotary Wing Operations.
PY- 1999
PD- 199908
RN- NASA no. 20000011736
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- Spatial Disorientation (SD) remains an important source of attrition in military flying. Several recent symposia and technical meetings have recommended various initiatives to control this hazard such as education training research and technological improvements. This paper gives details of the various training initiatives that have been established through the Technical Working Group (TWO) of the Triservice Aeromedical Research Panel. and the international forum of Working Pam: 61 of the Air Standardization Coordinating Committee (ASCC). Nations and individual services were asked to contribute to a panel to consider how the hazard of SD could best be controlled by means of training enhancements. All aspects of existing and potential training were reviewed: classroom instruction ground based demonstrations and training in both dedicated SD demonstrators and flight simulators. in flight demonstration and training, SD training for special forms of flight; and training the SD trainers. It was clear from this review that many improvements were required, and that most could readily be adopted. It must be remembered that training is not necessarily the only? or even the preferred solution to the various problems associated with SD. Nevertheless, where training can help, it must be regarded as the most readily applied control. The most specific enhancement identified was to make SD training more "experienced-based." This essentially implies more simulator and in-flight demonstrations and better SD preventive and management procedures.
DE- <MAJOR> *AEROSPACE MEDICINE; *DISORIENTATION; *PSYCHOLOGICAL EFFECTS; *HUMAN FACTORS ENGINEERING; *FLIGHT SIMULATORS; *EDUCATION; *ROTARY WING AIRCRAFT
DE- FLIGHT CREWS; TRAINING DEVICES; IN-FLIGHT MONITORING; GROUND TESTS; BARANY CHAIR; GROUND BASED CONTROL
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02520850
AN- <AEROSPACE> N00-12850
TI- Current Aeromedical Issues in Rotary Wing Operations
TI- <ORIGINAL> Problemes Actuels de Medecine Aeronautique Poses par les Operations Utilisant des Voilures Tournantes
SO- NASA no. 20000011735. United States.
PY- 1999
PD- 199908
RN- NASA no. 20000011735; RTO-MP-19; AC/323(HFM)TP/4
LA- English
GL- France
CP- France
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- These proceedings include the Technical Evaluation Report, Keynote Address, and 41 papers from the Symposium sponsored by the NATO/RTO Human Factors and Medicine Panel, which was held in San Diego, California, USA from 19-21 October 1998. Rotary wing operations include military or civilian missions such as transport, medevac, and combat. A range of human factors problems may be implicated in helicopter mishaps, such as spatial disorientation or excessive workload. Furthermore, flying a helicopter can contribute to various specific pathologies, ranging from lower back pain to flight phobias. In several helicopter accidents, it has been suggested that injuries could have been avoided if adequate safety and protection technologies had been used. Although helicopters can be used for medevac involving large numbers of wounded, the use of helicopters has to be fully integrated with other transport systems and their equipment should be adapted for this type of mission. New training methods, such as crew resource management or spatial disorientation training, and new technologies, such as the "tactile situation awareness system" (TSASI) may, when fully implemented, help to avoid accidents. Utilization of swimming pools with specific tools for helicopter evacuation training can greatly reduce the risk of death by immersion. On the other hand, more effort is needed to improve the personal flight equipment. Although epidemiological data suggest that the risk of accidents and injuries is already low in certain air forces, the introduction of new protection technologies may help to further reduce the numbers of wounded. This symposium provided a review, of the state-of-the-art concerning the

various human factors implicated in helicopter operations, new methods and systems for increasing safety and efficiency of the helicopter operations, and new methods and systems for increasing safety and efficiency of the helicopter crew.
DE- <MAJOR> *AEROSPACE MEDICINE; *HUMAN FACTORS ENGINEERING; *ROTARY WING
AIRCRAFT; *NORTH ATLANTIC TREATY ORGANIZATION (NATO); *RESOURCES MANAGEMENT; *CONFERENCES; *PSYCHOLOGICAL EFFECTS
DE- WORKLOADS (PSYCHOPHYSIOLOGY); SAFETY; FLIGHT CREWS; COMBAT; COCKPITS;
AIRCRAFT ACCIDENTS; DISORIENTATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02520019
AN- <AEROSPACE> N00-12019
TI- Use of Commercial Silicon Vibrating Structure Gyroscopes in High-G Applications
AU- Thomas, H. (British Aerospace Systems and Equipment Ltd., Plymouth, United Kingdom); Hopkin, I. D. (British Aerospace Systems and Equipment Ltd., Plymouth, United Kingdom); Mason, T. (British Aerospace Systems and Equipment Ltd., Plymouth, United Kingdom)
SO- NASA no. 20000004551. Nanotechnology and Microengineering for Future Guided Weapons: Proceedings.
PY- 1999
PD- 199901
RN- NASA no. 20000004551
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- BAe (British Aerospace) in partnership with SPP (Sumitomo Precision Products) developed the Si VSG (Silicon Vibrating Gyroscope). The Sensor already has success in a wide range of applications from model helicopters to car braking systems. A volume production facility has been established and is being expanded to meet increasing customer demands. By application of continuous improvement techniques the performance of the sensor is being enhanced, allowing its use in many new applications, such as instrumentation for aircraft. This paper discusses the use of the sensor in high-G applications and describes the design features that allows this to happen. Results from experimental work to verify its capability up to 20,000g are also presented.
DE- <MAJOR> *GYROSCOPES; *SILICON; *RESONANT VIBRATION; *MICROELECTROMECHANICAL SYSTEMS; *MECHANICAL PROPERTIES; *DESIGN
ANALYSIS
DE- CORIOLIS EFFECT; SHOCK LOADS; FINITE ELEMENT METHOD; TENSILE STRENGTH;
SHEAR STRENGTH; VIBRATION MODE
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02519021
AN- <AEROSPACE> N00-11021
TI- STS-51C Launch and Landing
SO- NASA no. 19990116995.
PY- 1985
PD- 198501
RN- NASA no. 19990116995; NONP-NASA-VT-1999207923
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR0001
AB- This NASA KSC video release is comprised of live shots covering the day launch and landing of STS-51C/Discovery. The flight crew members were: Thomas K. Mattingly II, Commander; Loren J. Shriver, Pilot; Ellison S. Onizuka, Mission Specialist; James F. Buchli, Mission Specialist; and Gary E. Payton, Payload Specialist. The launch video is presented from several different vantage points and covers the countdown from the launch pad, main engine ignition, liftoff, and solid rocket booster separation. The landing footage contains final descent and approach, landing gear deployment, and touchdown, which was also captured from different locations including a helicopter. STS-51C carried the DoD 85-1 payload and was the first mission dedicated to the Department of Defense.
DE- <MAJOR> *SPACE SHUTTLE MISSION 51-C; *DISCOVERY (ORBITER); *SPACECRAFT
LANDING; *SPACECRAFT LAUNCHING
DE- SPACE SHUTTLE PAYLOADS; DEFENSE PROGRAM
SH- 7516 Space Transportation (1975-)

AN- <DIALOG> 02516130

AN- <AEROSPACE> A00-26130
TI- The effects of positive vertical acceleration on mental effort and performance during simulated aerobatics manoeuvres in a centrifuge
AU- Hanson, Eamonn (National Aerospace Lab., Amsterdam, Netherlands); Galinska, Anna (Polish Air Force, Inst. of Aviation Medicine, Warsaw, Poland)
SO- In: Engineering psychology and cognitive ergonomics. Vol. 3 - Transportation systems, medical ergonomics and training; Proceedings of the 2nd International Conference, Oxford, United Kingdom, Oct. 28-30, 1998 (A00-26101 06-54), Aldershot, United Kingdom and Brookfield, VT, Ashgate, 1999, p. 259-266.
PY- 1999
PD- 199900
RF- 12
LA- English
GL- Netherlands
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0006
AB- This study assesses changes in pilot's performance and mental effort associated with positive vertical acceleration (+Gz) and task load. Performance was reflected by reaction time and the number of response errors on a reaction time task, and mental effort was indicated by heart rate variability and self-reports. The results show that pilots were able to maintain task execution times during acceleration profiles at the cost of more errors toward the end of the task, reflecting a speed-accuracy trade-off. Even after normal acceleration had been restored, performance remained impaired. Task load increases perceived mental effort during +Gz, and it is argued that +Gz may have 'delayed' adverse effects on performance. This may have practical implications for actual flights involving acceleration: preparing a mission in advance may allow the pilot to anticipate or compensate for degraded performance, making the total mission more effective. (Author)
DE- <MAJOR> *ACCELERATION (PHYSICS); *VERTICAL FLIGHT; *PILOT PERFORMANCE; *AEROBATICS; *AIRCRAFT MANEUVERS; *FLIGHT SIMULATION; *MENTAL PERFORMANCE; *EFFORT; *AVIATION PSYCHOLOGY
DE- HUMAN CENTRIFUGES; HUMAN FACTORS ENGINEERING; TASKS; WORKLOADS (PSYCHOPHYSIOLOGY); REACTION TIME
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02510117
AN- <AEROSPACE> A00-20117
TI- U.S. Navy and Marine Corps TACAIR and rotary wing Class A mishaps 1990-1996 - A comprehensive review of CRM accidents
AU- Wiegmann, Douglas A. (Illinois, Univ., Champaign); Shappell, Scott (U.S. Naval Safety Center, Norfolk, VA)
SO- In: International Symposium on Aviation Psychology, 10th, Columbus, OH, May 3-6, 1999, Proceedings. Vol. 2 (A00-20034 04-53), Columbus, OH, Ohio State University, 1999, p. 1158-1160.
PY- 1999
PD- 199900
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0004
AB- A review of all tactical jet (TACAIR) and rotary wing Class A flight mishaps between fiscal years 1990-1996 was performed to examine the role of human error and crew-resource management (CRM) failures in U.S. Naval aviation mishaps. Results of the analysis revealed that over 75 percent of the mishaps within these communities were attributable, at least in part, to some form of human error. Approximately 70 percent of these human error mishaps were associated with aircrew human factors, of which 56 percent involved at least one CRM failure. These percentages are very similar to those observed prior to the implementation of aircrew coordination training (ACT) in the fleet. Apparently, the initial benefits of the ACT program originally documented by other researchers in this area have not persisted. CRM failures continue to be a safety problem in naval aviation. (Author)
DE- <MAJOR> *ROTARY WING AIRCRAFT; *CREW RESOURCES MANAGEMENT; *AIRCRAFT ACCIDENTS; *JET AIRCRAFT; *PILOT TRAINING; *FLIGHT CREWS
DE- UNITED STATES; NAVY; ANNUAL VARIATIONS; FAILURE ANALYSIS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02509955
AN- <AEROSPACE> A00-19955
TI- A preliminary descriptive critical incident analysis of night vision goggle helicopter operations
AU- Renshaw, Peter F. (Western Sydney, Macarthur, Univ., Campbelltown, Australia)

SO- In: International Symposium on Aviation Psychology, 10th, Columbus, OH, May 3-6, 1999, Proceedings. Vol. 1 (A00-19918 04-53), Columbus, OH, Ohio State University, 1999, p. 221-228.
PY- 1999
PD- 199900
RF- 27
LA- English
GL- Australia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0004
AB- Night vision goggles (NVGs) and, in particular, the helmet mounted Aviators Night-Vision-Imaging-System (ANVIS), have gained increasing importance in nighttime military helicopter operations. Moreover, NVG accident data have demonstrated that there is a need to address the multifaceted human factors aspects associated with low-level tactical NVG helicopter operations, including the impact of cognitive factors, such as situational awareness and decision-making. The current research examines the perceptions of Australian Army helicopter pilots on NVG operations. The study utilizes a 4D theoretical model of complexity proposed by Woods (1988) to examine the cognitive impact of NVGs on pilot performance. This model forms the basis of a critical incident questionnaire which is used to exact and qualify the characteristics of errors that pilots believe adversely impact NVG helicopter operations. The Night Vision Goggles Critical Incident Questionnaire (NVGCIQ) is designed to anticipate accident-producing situations and provide a theoretical basis for examining the origins of human error in complex task performance. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *NIGHT VISION; *GOGGLES; *HELICOPTER CONTROL; *HELMET MOUNTED DISPLAYS; *AIRCRAFT ACCIDENTS
DE- ACCIDENT PREVENTION; DECISION MAKING; IMAGING TECHNIQUES; COGNITIVE PSYCHOLOGY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02509928
AN- <AEROSPACE> A00-19928
TI- Flight command-guidance indicators or pathway displays - My way or the highway?
AU- Beringer, Dennis B. (FAA, Civil Aeromedical Inst., Oklahoma City, OK)
SO- In: International Symposium on Aviation Psychology, 10th, Columbus, OH, May 3-6, 1999, Proceedings. Vol. 1 (A00-19918 04-53), Columbus, OH, Ohio State University, 1999, p. 57-62.
PY- 1999
PD- 199900
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0004
AB- Recent renewed attention to perspective displays for flight and navigation has raised questions concerning the comparative efficacy of command-guidance indicators vs pathway or 'highway-in-the-sky' depictions of desired flight path. Simulator data were collected to compare performance with a follow-me airplane style of guidance and a pathway-format display. Findings suggest that pilot performance with the pathway display format exhibited more error in vertical and horizontal path tracking but evidenced less control-input activity than did the follow-me airplane guidance cue. Of the two guidance cues, the follow-me airplane produced better flight-path tracking when entering turns than did the pathway display. This advantage was due in part to the turn anticipation possible with the follow-me airplane and to specific problems associated with the display field of view. (Author)
DE- <MAJOR> *FLIGHT CONTROL; *DISPLAY DEVICES; *FLIGHT PATHS; *COMMAND AND CONTROL; *AIRCRAFT GUIDANCE; *PILOT PERFORMANCE
DE- VERTICAL FLIGHT; HORIZONTAL FLIGHT; FIELD OF VIEW
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02505244
AN- <AEROSPACE> A00-15244
TI- Human error and crew resource management failures in naval aviation mishaps - A review of U.S. Naval Safety Center data, 1990-96
AU- Wiegmann, Douglas A.; Shappell, Scott A. (U.S. Navy, Naval Safety Center, Norfolk, VA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 70, no. 12, Dec. 1999, p. 1147-1151.
PY- 1999
PD- 199912
RF- 8
SN- 0095-6562
LA- English

GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0002
AB- The present study examined the role of human error and crew resource management (CRM) failures in U.S. Naval aviation mishaps. All tactical jet (TACAIR) and rotary wing Class A flight mishaps between fiscal years 1990-1996 were reviewed. Results indicated that over 75 percent of both TACAIR and rotary wing mishaps were attributable, at least in part, to some form of human error of which 70 percent were associated with aircrew human factors. Of these aircrew-related mishaps, approximately 56 percent involved at least one CRM failure. These percentages are very similar to those observed prior to the implementation of aircrew coordination training (ACT) in the fleet, suggesting that the initial benefits of the program have not persisted and that CRM failures continue to plague Naval aviation. Closer examination of these CRM-related mishaps suggests that the type of flight operations (preflight, routine, emergency) do play a role in the etiology of CRM failures. A larger percentage of CRM failures occurred during nonroutine or extremis flight situations when TACAIR mishaps were considered. In contrast, a larger percentage of rotary wing CRM mishaps involved failures that occurred during routine flight operations. These findings illustrate the complex etiology of CRM failures within Naval aviation and support the need for ACT programs tailored to the unique problems faced by specific communities in the fleet. (Author)
DE- <MAJOR> *ERRORS; *CREW RESOURCES MANAGEMENT; *MILITARY AVIATION;
*FLIGHT CREWS; *AIRCRAFT ACCIDENT INVESTIGATION
DE- NAVY; JET AIRCRAFT; ROTARY WING AIRCRAFT; PILOT ERROR; FLIGHT CONDITIONS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02502999
AN- <AEROSPACE> A00-12999
TI- 21st century helicopter
AU- Rainey, Peter
SO- Helicopter World (ISSN 0262-0448), vol. 18, no. 8, Oct. 1999, p. 6-10.
PY- 1999
PD- 199910
SN- 0262-0448
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA0001
AB- A flight qualities evaluation and commercial prospects assessment are presented for the civilian version of the EH101 helicopter. Attention is given to the maneuverability, IFR instrumentation, passenger accommodations, and potential applications of this utility helicopter. (AIAA)
DE- <MAJOR> *EH-101 HELICOPTER; *TECHNOLOGY TRANSFER; *HELICOPTER PERFORMANCE; *TECHNOLOGY ASSESSMENT
DE- TECHNOLOGICAL FORECASTING; HELICOPTER DESIGN
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02434717
AN- <AEROSPACE> A99-45965
TI- Lessons learned from test flight of military HMDs - Possible application to civilian rotorcraft operation
AU- Leger, A.; Gardelle, C.; Bruniaux, G. (Sextant Avionique, St.-Medard-en-Jalles, France)
SO- AIAA and SAE, 1999 World Aviation Conference, San Francisco, CA, Oct. 19-21, 1999, 7 p..
PD- 199910
RF- 5
RN- AIAA Paper 99-5606; SAE Paper 1999-01-5606
LA- English
GL- France
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9912
AB- Advanced binocular Helmet Mounted Displays (HMD) capable of bisensor operation (I-squared tubes and video images) with overlaid symbology have been developed for military use in various helicopters. Extensive flight testing of such helmets as the French TOPOWL have provided a considerable amount of data relative to Night Vision System design and use. Design options allowing improved mass and center of gravity with regard to classical NVG, such as folded optics and visor projection, have been shown to yield very effective results. Performance in various flight conditions, including fog, snow, and obstacles, is investigated. Training issues with I-squared and head-steered thermal imagery during test flight are also addressed. Lessons learned from test flight

provide interesting possibilities for further use of such systems in civilian rotorcraft operation, provided acceptably low-cost solutions can be achieved. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *FLIGHT TESTS; *ROTARY WING AIRCRAFT
DE- NIGHT VISION; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02432085
AN- <AEROSPACE> A99-43333
TI- AGM-114 Hellfire Missile System and FLIR/LASER test and integration on the H-60 aircraft
AU- Roberts, D.; Capezzuto, R. (U.S. Navy, Naval Air Warfare Center, Patuxent River, MD)
SO- In: 1999 IEEE Aerospace Conference, Aspen, CO, Mar. 6-13, 1999, Proceedings. Vol. 3 (A99-43326 12-31), Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1999, p. 63-72.
PD- 199900
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9912
AB- The AGM-114 (Air-to-Ground Missile) Hellfire Missile System (HMS) and a nose-mounted Forward Looking Infrared (FLIR) sensor with LASER designator system were selected as integration candidates on U.S. Navy H-60 derivatives. Naval Air Warfare Center Aircraft Division (NAWCAD) Patuxent River conducted ground and flight tests to structurally qualify the HMS and FLIR systems and evaluate their integration into the H-60 airframe. Testing demonstrated successful structural integration of the HMS and FLIR/LASER systems. Testing proceeded with integration of the functional FLIR/LASER and the HMS. Integration and testing utilized specialized U.S. Army Hellfire instrumentation as well as the LASER Designator Weapons System Simulator (LDWSS) modeling tool. LDWSS was used to simulate launch conditions and engagement scenarios, predict missile launch transients and trajectories, and identify launch constraint and LASER self-designation issues. The simulation tools and test methods employed minimized test flights and required assets, resulting in an efficient certification of this weapon system. (Author)
DE- <MAJOR> *AIR TO SURFACE MISSILES; *H-60 HELICOPTER; *MISSILE SYSTEMS;
*FLIR DETECTORS; *SYSTEMS INTEGRATION; *FLIGHT TESTS
DE- NAVY; MATHEMATICAL MODELS; WEAPON SYSTEMS; TRAJECTORY ANALYSIS; LAUNCH
VEHICLES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02431721
AN- <AEROSPACE> A99-42969
TI- Does CRM training improve teamwork skills in the cockpit? Two evaluation studies
AU- Salas, Eduardo; Fowlkes, Jennifer E. (Central Florida, Univ., Orlando, FL); Stout, Renee J.; Milanovich, Dana M.; Prince, Carolyn (U.S. Navy, Naval Air Warfare Center, Orlando, FL)
SO- Human Factors (ISSN 0018-7208), vol. 41, no. 2, June 1999, p. 326-343.
PD- 199906
RF- 30
SN- 0018-7208
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9911
AB- The current paper describes two evaluation studies of crew resources management (CRM) training that were conducted with 96 naval aviators and followed a multiple assessment approach. Results indicated that highly experienced aviators benefited from the training, which focused on increasing the use of several critical teamwork skills. These rare evaluation data suggest that CRM training is a viable strategy for improving teamwork in the cockpit. Implications for team training are discussed. (Author)
DE- <MAJOR> *CREW RESOURCES MANAGEMENT; *TRAINING EVALUATION; *TEAMS;
*PERFORMANCE ENHANCEMENT; *PILOT TRAINING; *COCKPITS; *PILOT PERFORMANCE
DE- NAVY; SHIPBORNE AIRCRAFT; HELICOPTERS; HUMAN FACTORS ENGINEERING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02429181

AN- <AEROSPACE> A99-40429
TI- Helmet-mounted display human factors engineering design issues - Past, present, and future
AU- Licina, Joseph R.; Rash, Clarence E.; Mora, John C.; Ledford, Melissa H. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- In: Helmet- and head-mounted displays IV; Proceedings of the Conference, Orlando, FL, Apr. 5, 6, 1999 (A99-40425 11-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3689), 1999, p. 32-44.
PD- 199900
RF- 36
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9911
AB- An often overlooked area of helmet-mounted display (HMD) design is that of good human factors engineering. Systems which pass bench testing with flying colors can often find less enthusiastic acceptance during fielding when good human factors engineering principles are not adhered to throughout the design process. This paper addresses lessons learned on the fielding of the AH-64 Apache Integrated Helmet and Display Sight System (IHADSS) and the Aviator's Night Vision Imaging System (ANVIS). These lessons are used to develop guidance for future HMDs in such diverse areas as user adjustments, anthropometry, fit and comfort, manpower and personnel requirements, and equipment compatibility. (Author)
DE- <MAJOR> *AH-64 HELICOPTER; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *FLIGHT TESTS; *NIGHT VISION; *FLIGHT CREWS
DE- TECHNOLOGY ASSESSMENT; TECHNOLOGICAL FORECASTING; COMFORT; ANTHROPOMETRY; MANPOWER
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02428839
AN- <AEROSPACE> A99-40087
TI- Helicopter simulator qualification to AC 120-63 standards - Lessons learned
AU- Longo, Vito (CAE Electronics, Ltd., Montreal, Canada)
SO- In: Can flight simulation do everything? Flight simulation capabilities, capability gaps and ways to fill the gaps; Proceedings of the Conference, London, United Kingdom, May 19, 20, 1999 (A99-40076 11-09), London, United Kingdom, Royal Aeronautical Society, 1999, p. 13.1-13.10.
PD- 199900
RF- 3
LA- English
GL- Canada
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9911
AB- The lessons learned in achieving the certification of the Bell 412 and 212 helicopter simulators are presented. AC 120-63 has required, to some extent, a rethinking of what is required for model development. Everything from design data requirements to model fidelity and flight test data had to be carefully considered. In the past, the approach often taken was to make do with what was available and use pilots to subjectively 'me' until it felt 'right'. The philosophy of AC 120-63 was to validate the simulator as objectively as possible, thereby removing or at least minimizing the subjective nature of simulator qualification. This is an approach that has served the commercial fixed-wing community very well. The qualification of the SAS Bell 412 and 212 and the application of similar testing methodology to other programs has generated much insight into the requirements for model design, validation and qualification. Changes to the circular along with suggestions as to which areas of helicopter simulation should be improved are discussed. (Author)
DE- <MAJOR> *TRAINING SIMULATORS; *HELICOPTERS; *PILOT PERFORMANCE
DE- COST EFFECTIVENESS; VALIDATION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02428829
AN- <AEROSPACE> A99-40077
TI- The realisation of the first film mirror based 60 deg vertical field of view collimated display
AU- Bridgwater, Ray; Creek, Roy (SEOS Displays, Ltd., Burgess Hill, United Kingdom)
SO- In: Can flight simulation do everything? Flight simulation capabilities, capability gaps and ways to fill the gaps; Proceedings of the Conference, London, United Kingdom, May 19, 20, 1999 (A99-40076 11-09), London, United Kingdom, Royal Aeronautical Society, 1999, p. 1.1-1.6.
PD- 199900
RF- 6

LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9911
AB- Three display systems, each providing continuous fields of view of 60 deg vertically and 200 deg horizontally, have been fitted to new full flight simulators. A fourth system has been installed on a reconfigurable trainer. One of these systems has recently achieved FAA AC 120-63 Level D certification, proving its suitability for the civil market. Another has passed its acceptance test for a military customer, demonstrating similar suitability for that alternative market. This paper describes the new display in detail and provide actual measured performance data. It will also describe how the system can be extended to cover not only helicopter operations but also the challenges met in air-to-air refuelling of both fixed and rotary wing aircraft. (Author)
DE- <MAJOR> *MIRRORS; *FIELD OF VIEW; *COLLIMATION; *PILOT PERFORMANCE
DE- COCKPITS; REFLECTION
SH- 7531 Engineering--General (1975-)

AN- <DIALOG> 02425680
AN- <AEROSPACE> A99-36928
TI- Piloted simulation evaluation of a neural network limit avoidance system for rotorcraft
AU- Bateman, Alec J. D.; Ward, David G.; Barron, Roger L. (Barron Associates, Inc., Charlottesville, VA); Whalley, Matthew S. (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AIAA Atmospheric Flight Mechanics Conference and Exhibit, Portland, OR, Aug. 9-11, 1999, Collection of Technical Papers (A99-36864 09-08), Reston, VA, American Institute of Aeronautics and Astronautics, 1999, p. 661-673.
PD- 199900
RF- 4
CN- DAAJ02-96-C-0031
RN- AIAA Paper 99-4252
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- Piloting a rotorcraft is typically a high gain task, and under adverse conditions the workload may increase to the extent that the pilot is not able to achieve all goals simultaneously. Increased exceedances of operating limits may occur as a result of this high workload. The goal of this research has been to implement in piloted simulations a system that reduces workload and helps pilots to avoid aircraft limits. The system uses neural networks to predict near-future limit exceedances, and alerts pilots to these impending exceedances through tactile cues on the control inceptors and visual cues on the HUD. The system was demonstrated in piloted simulations of the UH-60A and OH-58D and was found to reduce limit exceedances and pilot workload. In these experiments, tactile cues alone generally performed better than visual cues alone, but the combination of visual and tactile cues generally performed best. Pilot comments and handling qualities ratings of the system were highly favorable. (Author)
DE- <MAJOR> *NEURAL NETS; *ROTARY WING AIRCRAFT; *WORKLOADS (PSYCHOPHYSIOLOGY); *PILOT PERFORMANCE
DE- COMPUTERIZED SIMULATION; UH-60A HELICOPTER
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02425650
AN- <AEROSPACE> A99-36898
TI- Advanced modelling of the engine torque characteristics of a Bell 412HP helicopter
AU- Hui, Kenneth (NRC of Canada, Ottawa)
SO- In: AIAA Atmospheric Flight Mechanics Conference and Exhibit, Portland, OR, Aug. 9-11, 1999, Collection of Technical Papers (A99-36864 09-08), Reston, VA, American Institute of Aeronautics and Astronautics, 1999, p. 348-358.
PD- 199900
RF- 8
RN- AIAA Paper 99-4110
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- This paper describes the development of an engine dynamic mathematical model for a single-rotor helicopter from flight test data. The model is based on flight data gathered from 'frequency sweep' and 'doublet' maneuvers with the NRC Bell 412HP helicopter in hover at sea level, and 60 knots at both 3000 and 8000 ft. The data suite installed included standard engine and fuselage response parameters. These flight data

were analyzed using frequency domain (ClFER) system identification techniques. This paper describes the flight test planning and execution, with emphasis on instrumentation, test input design, and safety. The models developed are compared to determine their robustness. Excellent engine model fidelity was obtained using the frequency domain technique. (Author)
DE- <MAJOR> *AIRCRAFT MODELS; *HELICOPTERS; *TORQUE; *MATHEMATICAL MODELS;
*FLIGHT TESTS; *ROTARY WINGS
DE- FREQUENCY DOMAINS; ROBUSTNESS (MATHEMATICS); SYSTEM IDENTIFICATION
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 02425564
AN- <AEROSPACE> A99-36812
TI- Spatial frequency and platform motion effects on helicopter altitude control
AU- Schroeder, Jeffery A. (NASA, Ames Research Center, Moffett Field, CA); Chung, William W. Y. (Logicon Information Systems and Services, Moffett Field, CA); Hess, Ronald A. (California, Univ., Davis)
SO- In: AIAA Modeling and Simulation Technologies Conference and Exhibit, Portland, OR, Aug. 9-11, 1999, Collection of Technical Papers (A99-36794 09-54), Reston, VA, American Institute of Aeronautics and Astronautics, 1999, p. 171-181.
PD- 199900
RF- 26
RN- AIAA Paper 99-4113
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- An experiment examined how visual scene and platform motion variations affected a pilot's ability to perform altitude changes. Pilots controlled a helicopter model in the vertical axis and moved between two points 32-ft apart in a specified time. Four factors were varied: visual scene spatial frequency, visual scene background, motion filter gain, and motion filter natural frequency. Drawing alternating black and white stripes of varying widths between the two extreme altitude points varied visual scene spatial frequency. Visual scene background varied by either drawing the stripes to fill the entire field-of-view or by placing the stripes on a narrow pole with a natural sky and ground plane behind the pole. Both the motion filter gain and natural frequency were varied in the motion platform command software. Five pilots evaluated all combinations of the visual and motion variations. The results showed that only the motion filter natural frequency and visual scene background affected pilot performance and their subjective ratings. No significant effects of spatial frequency or motion system gain were found for the values examined in this tracking task. A previous motion fidelity criterion was found to still be a reasonable predictor of motion fidelity. (Author)
DE- <MAJOR> *ALTITUDE CONTROL; *HELICOPTER CONTROL; *PILOT PERFORMANCE;
*MOTION SIMULATORS
DE- TRANSFER FUNCTIONS; AH-64 HELICOPTER; TRACKING ERRORS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02425557
AN- <AEROSPACE> A99-36805
TI- A flight simulator study of enhanced/synthetic vision for helicopter search and rescue
AU- Sattler, D. E.; Reid, L. D. (Toronto, Univ., Canada)
SO- In: AIAA Modeling and Simulation Technologies Conference and Exhibit, Portland, OR, Aug. 9-11, 1999, Collection of Technical Papers (A99-36794 09-54), Reston, VA, American Institute of Aeronautics and Astronautics, 1999, p. 99-121.
PD- 199900
RF- 20
RN- AIAA Paper 99-4031
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- This paper describes a preliminary piloted flight simulator investigation into the use of Enhanced/Synthetic Vision System (E/SVS) concepts for the en route phase of a helicopter search and rescue (SAR) mission. Fourteen military helicopter-qualified pilots evaluated an advanced fiber optic helmet mounted display driven by a CAE MaxVue image generator to provide three visual components; an enhanced/synthetic image, aircraft structure normally visible to the pilot and a headup display presentation. A simulated SAR mission was flown which encompassed piloting aspects that would normally take place between commencement of a search phase and completion of a search

phase. The independent experimental variables under investigation consisted of the pilot's eyepoint location and the visual database complexity. The piloting tasks were carefully designed so as to provide guidance in the development of a Canadian flying technology demonstrator to be flown early in 2001. Based on the results from this simulator investigation, it would appear that the E/SVS could play an extremely useful role in the helicopter SAR activity. Objective performance data have indicated that an eyepoint location associated with an externally-mounted sensor could provide benefits by reducing minimum obstacle clearance incursions, and that a visual database of reduced complexity could provide a more accurate approach angle to the final hover. Level of pilot experience, technical background, and proficiency training were found to influence performance significantly. (Author)

DE- <MAJOR> *FLIGHT SIMULATORS; *COMPUTER VISION; *HELICOPTERS; *SEARCH AND RESCUE MISSIONS; *PILOT PERFORMANCE

DE- FLIR DETECTORS; HEAD-UP DISPLAYS

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02425546

AN- <AEROSPACE> A99-36794

TI- AIAA Modeling and Simulation Technologies Conference and Exhibit, Portland, OR, Aug. 9-11, 1999, Collection of Technical Papers

SO- Reston, VA, American Institute of Aeronautics and Astronautics, 1999, 589 p. (For individual items see A99-36795 to A99-36857).

PD- 199900

RN- ISBN 1-56347-301-1

LA- English

GL- United States

CP- United States

DT- CONFERENCE PROCEEDINGS

JA- IAA9909

AB- Various papers on modeling and simulation are presented. The general topics discussed are: avionics, weapons, and engagement modeling and simulation; human factors and cueing systems; simulation testing, verification, and validation; helicopter/aircraft modeling and simulation; network technologies and applications; space systems simulation; low cost simulation, device development, and environments; aircraft dynamics, modeling, and performance; simulator/flight training devices and program overviews; vehicle dynamic modeling; motion systems, human factors, and cueing; and simulation standards and reuse. Some individual topics addressed are: avionic system modeling framework; collaborative decision making airspace visualization tool; design and flight tests of ground collision avoidance system; spatial frequency and platform motion effects on helicopter attitude control; high-fidelity GPS satellite simulator; real-time simulation of a free-flying robotic vehicle; low-cost fast trainer prototyping via distributed simulation; low-cost, real-time simulation of an unmanned aerial vehicle; and random choice model for thrust profile. Also considered are: development of a free-flight simulation infrastructure; language-based modeling and simulation in Verilot-A; KARI Engineering Simulator for regional transport aircraft development; hypervelocity vehicle modeling and simulation using GENESIS; hardware-in-the-loop simulation of an attitude control system; motion fidelity criteria for roll-lateral translational tasks; generic object-oriented implementation for flight control systems; and object-oriented design for rapid modification of filters. (AIAA)

DE- <MAJOR> *CONFERENCES; *AVIONICS; *HUMAN FACTORS ENGINEERING; *FLIGHT SIMULATION; *AIRCRAFT MODELS; *FLIGHT MECHANICS

DE- QUEUEING THEORY; LOW COST; COMPUTERIZED SIMULATION; COCKPITS; FLIGHT SIMULATORS; GLOBAL POSITIONING SYSTEM; TERRAIN; DATA BASES; CONTROL SYSTEMS DESIGN; MOTION CONTROL; FLIGHT DECKS; FLIGHT CONTROL; COMMERCIAL OFF-THE-SHELF TECHNOLOGY

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02423795

AN- <AEROSPACE> A99-35043

TI- Rotorcraft Pilot's Associate full-mission simulation architecture

AU- Huff, Kip; Edwards, Eric (Boeing Co., Mesa, AZ)

SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 2140-2154.

PD- 199900

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9909

AB- The Rotorcraft Pilot's Associate (RPA) program demonstrates cognitive decision aiding technology focused on aiding the Army aviation pilot in execution of attack, reconnaissance, and special operations forces

missions. The development, integration, and evaluation of this crew-aiding technology required a flexible, rapid-prototyping, full mission simulation system. The RPA Full Mission Simulation (FMS) was developed to meet these objectives. The RPA FMS architecture includes dual crew stations, advanced controls and displays, advanced mission equipment package, tactical mission computer environment, manned team player stations, an area-of-interest head-tracked dome visual for the pilot, System Control, flexible data collection, large area terrain databases, and the RPA crew-aiding system. The RPA FMS system is based on commercially available off-the-shelf hardware and software, with major system components hosted on Silicon Graphics symmetric multiprocessing computers. (Author)
DE- <MAJOR> *ROTARY WING AIRCRAFT; *DECISION MAKING; *PILOT PERFORMANCE;
*COGNITION; *COMBAT
DE- ARCHITECTURE (COMPUTERS); WORKSTATIONS; TEAMS; SOFTWARE ENGINEERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02423788
AN- <AEROSPACE> A99-35036
TI- Contrasting effects of control system delay and visual system delay on helicopter pilot performance - Preliminary findings
AU- Jennings, S.; Craig, G.; Swail, C. (National Research Council of Canada, Ottawa); Kruk, R. (CAE Electronics, Ltd., St.-Laurent, Canada)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 2041-2048.
PD- 199900
RF- 11
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- A helicopter display imaging system which does not provide accurate imagery with a minimal processing delay may be disorienting to the pilot. There are few direct comparisons of visual time delay and control time delay effects. An experiment was conducted in the variable stability NRC Bell 205 research helicopter to compare visual and control delays. Three hypotheses were examined: (1) that a time delay in either the helicopter control system or the pilot visual feedback loop would increase pilot workload and errors in maintaining aircraft position; (2) that time delay in the visually coupled system will have greater performance effects due to disorientation and motion sickness effects associated with visual delay conditions in a dynamic environment; and (3) that time delay effects would be more pronounced in tasks requiring large aircraft pitch or roll rates near ground. An image buffer was inserted into the video stream of a visually coupled system, which could add programmable pure time delays. Additionally, incremental time delays were programmed into the helicopter fly-by-wire control system. Pilots performed a series of standardized maneuvers to evaluate the effect of the delays on their ability to control the aircraft. Visual and control system delays degrade performance an equivalent amount; however, long video delays also increased the incidence of reported motion sickness symptoms. (Author)
DE- <MAJOR> *HELICOPTERS; *PILOT PERFORMANCE; *CONTROL SYSTEMS DESIGN;
*TIME LAG; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FEEDBACK CONTROL; IMAGE PROCESSING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02423785
AN- <AEROSPACE> A99-35033
TI- The RAH-66 Comanche flight envelope cueing system
AU- Mayo, John R. (Sikorsky Aircraft, Stratford, CT); Iannacci, Vincenzo N. (Boeing Co., Seattle, WA)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 2010-2024.
PD- 199900
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- This paper details the design features and piloted simulation evaluation results of the RAH-66 envelope cueing system, which provides precautionary information to the pilot so that established flight limits are not inadvertently exceeded by determining the state of the aircraft relative to the service flight envelope, and generating appropriate visual and aural alerts. Visual cues are presented in helmet-mounted display symbology, and tones and voice messages are

heard in the pilot headset. Piloted simulation data presented indicate improved limit protection with the envelope cueing system active, in terms of limit transgressions, time at limits, and degree of limit penetration. Simulation testing also demonstrated that cueing significantly improves the overall air vehicle handling qualities by aiding the pilot during task performance. The cueing media served to increase situational awareness by reducing the need to subjectively monitor limit conditions or cross-check headsdown instrumentation, thereby allowing the pilot to safely extract maximum aircraft performance. While the featured system does not provide carefree maneuvering capability, it is expected that the system will enhance flight safety and ease pilot workload. It remains to be proved if the passive aural and visual cues are sufficiently effective in a real-world environment. (Author)

DE- <MAJOR> *AH-66 HELICOPTER; *FLIGHT ENVELOPES; *QUEUEING THEORY; *COMPUTERIZED SIMULATION; *HELMET MOUNTED DISPLAYS

DE- AIRCRAFT MANEUVERS; PITCH (INCLINATION); ROLL; YAW

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02423784

AN- <AEROSPACE> A99-35032

TI- Evaluation of helicopter handling qualities improvements during a steep approach using new piloting modes

AU- Taghizad, A. (ONERA, Salon-de-Provence, France); Bouwer, G. (German Aerospace Research Establishment, Inst. of Flight Mechanics, Braunschweig, Germany)

SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 2001-2009.

PD- 199900

RF- 5

LA- English

GL- Germany

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9909

AB- Two new piloting modes are evaluated for handling quality improvements during a helicopter steep approach. The new piloting modes are the Translational Rate Command (TRC) and the Speed and Glide Slope control (SGS). In order to simulate the behavior of a BO-105 helicopter equipped with either the TRC or the SGS, two Conceptual Simulation Models are developed and implemented on a DLR ground-based simulator. A steep approach scenario is also defined. The task consists of a dynamic descent of the helicopter from 500 m altitude to approximately 100 m with an average slope angle of -8 deg. Dynamic descent means that the slope angle, the heading and the speed are varying, and the pilot has to follow these variations with a required precision. Handling qualities investigations with four pilots' participation provided comparisons of the TRC and SGS modes with existing configuration. Good and promising results on TRC and SGS demonstrated the high interest of this kind of piloting modes in specific missions of helicopters where the trajectory control is critical. (Author)

DE- <MAJOR> *APPROACH; *HELICOPTER CONTROL; *HOVERING; *CONTROLLABILITY; *PILOT PERFORMANCE

DE- COMPUTERIZED SIMULATION; GROUND STATIONS

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02423763

AN- <AEROSPACE> A99-35011

TI- Ergonomic simulation for rotorcraft manufacturing

AU- Dong, Hugh (Sikorsky Aircraft, Stratford, CT)

SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 1739-1746.

PD- 199900

RF- 5

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9909

AB- Sikorsky has recently installed sophisticated 3D ergonomic simulation software that allows ergonomic manufacturability design studies to be carried out during the initial design phase using CAD data; design changes can be made more easily for lower cost. Additionally, by using the 3D solid model data in a virtual 3D space, a more accurate assessment of the manufacturability of any given design will be reached in comparison with the old method of laying up 2D line drawings. This paper describes the tools and methodology used in the ergonomic simulation process at Sikorsky Aircraft, from the translation of CAD data to the various output formats available. Methods of integrating simulations into shop floor work instructions are also described in detail. Areas to be covered include fabrication of detailed parts

involving heavy machinery (e.g., multiaxis milling machines), fixtured assembly of parts, assembly of nonfixtured parts, and maintainability studies. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *COMPUTERIZED SIMULATION; *ROTARY
WING AIRCRAFT; *MANUFACTURING
DE- SOFTWARE ENGINEERING; COMPUTER AIDED DESIGN
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02423757
AN- <AEROSPACE> A99-35005
TI- Development of a water impact dynamic test facility and crash testing a UH-1H aircraft onto a water surface
AU- Richards, Marvin K. (Simula Technologies, Inc., Phoenix, AZ); Kelley, E. A. (U.S. Army, Yuma Proving Ground, AZ)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 1653-1664.
PD- 199900
RF- 2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- A test facility and test methodologies are being developed for full-scale aircraft water dynamic impact tests. The facility and methodologies for conducting pure vertical impacts has been completed, and a combined vertical/longitudinal test facility is near completion. Methods of instrumentation and data acquisition have been developed and demonstrated. A 24-ft/sec vertical drop test of an instrumented UH-1H helicopter shell onto a water surface has been completed. This test indicated that water impacts can induce a relatively high acceleration onset rate when compared to ground impacts. A high acceleration onset rate, coupled with a lack of landing gear interaction with the impact surface, can increase the lethality of the crash in terms of occupant spinal loading and seat stroke required. Several UH-1H helicopter shells have been procured and are available for future water impact tests. The test facility is also capable of conducting full-scale vehicle crash impacts into other surfaces, if desired. (Author)
DE- <MAJOR> *IMPACT; *WATER; *TEST FACILITIES; *CRASH LANDING; *UH-1 HELICOPTER
DE- STRUCTURAL DAMAGE; PRESSURE SENSORS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02423742
AN- <AEROSPACE> A99-34990
TI- Nacelle control augmentation for tiltrotor flight directors
AU- Walz, Curtis; Brick, Scott; Bauer, Carl; Fischer, Doug (Boeing Co., Philadelphia, PA)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2 (A99-34969 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 1477-1486.
PD- 199900
RF- 7
CN- N00019-95-G-0242
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- Flight directors perform the basic task of translating flight guidance commands into a logical set of display symbology. The pilot responds to the display symbology and applies control system inputs to guide the aircraft along a desired flight path. A principal flight director design objective is to provide the pilot with precise flight path control and low workload, particularly when operating at night and/or in instrument meteorological conditions. This paper discusses limitations of standard flight director symbology for the tilt-rotor application and a design approach to supplement standard flight director symbology with nacelle control augmentation to accommodate the unique control characteristics of tilt-rotor aircraft. An overview of the MV-22 tiltrotor flight director system is provided, along with a description of three candidate types of nacelle control augmentation that were evaluated using man-in-the-loop simulation. This paper summarizes the results of an engineering trade study conducted to determine a nacelle control augmentation design approach for the MV-22 flight director system. (Author)
DE- <MAJOR> *NACELLES; *TILT ROTOR AIRCRAFT; *AUTOMATIC PILOTS; *AIRCRAFT
CONTROL; *PILOT PERFORMANCE
DE- V-22 AIRCRAFT; COMPUTERIZED SIMULATION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02423721
AN- <AEROSPACE> A99-34969
TI- AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 2
SO- Alexandria, VA, American Helicopter Society, 1999, 1060 p. (For individual items see A99-34970 to A99-35068).
PD- 199900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9909
AB- The present conference volume discusses beam modeling methods for rotor blade applications, the development of a helicopter fatigue-load spectrum, a damage assessment methodology for the Longbow Apache, the Rotorcraft Pilot's Associate (RPA) concept, decision-aiding battlefield technologies, the use of dynamic optimal sensors, battlefield uses of RPAs, an RPA shared memory task network architecture, Kirschoff integration for rotor noise prediction, a crew load evaluation methodology, tilt-rotor nacelle control augmentation, and a helicopter sidestick controller. Also discussed are a flywheel rotor/wing, technology impacts for tilt-rotor aircraft, press-forming simulation for thermoplastic components, laser trimming of GRP laminates, helicopter health and usage monitoring systems, the STOVL Joint Strike Fighter, high-order accurate simulations of wake and tip flowfields, an on-deck dynamic interface analysis, a variable-diameter short-haul civil tilt-rotor, V-22 drivetrain vibration monitoring, preliminary design software for future VTOL configurations, structural life monitoring for the V-22, and the S-92 Helibus test program. (AIAA)
DE- <MAJOR> *CONFERENCES; *HELICOPTERS
DE- AEROACOUSTICS; COST REDUCTION; AVIONICS; STRUCTURAL DAMAGE; HEALTH MONITORING (ENGINEERING); AERODYNAMICS; FLIGHT SIMULATION; MANUFACTURING; SYSTEMS INTEGRATION; HELICOPTER DESIGN; AIRCRAFT STRUCTURES; WORKSTATIONS; HUMAN FACTORS ENGINEERING; WIND TUNNEL TESTS; SERVOCONTROL; V/STOL AIRCRAFT; FLIGHT MECHANICS; ROTARY WINGS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02423681
AN- <AEROSPACE> A99-34929
TI- Simulation of the human pilot applied at the helicopter/ship dynamic interface
AU- Bradley, Roy (Glasgow Caledonian Univ., United Kingdom); Turner, Graham (Defence Evaluation and Research Agency, Bedford, United Kingdom)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 1 (A99-34876 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 677-688.
PD- 199900
RF- 8
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- The paper provides a review of the development of an algorithm to predict the control actions required to fly a given maneuver. The new algorithm, called SyCoS (Synthesis through Constrained Simulation), incorporates the crossover model to represent the pilots reflexive actions in terms of simple gain and delay parameters. In its final form the algorithm is referred to as the Compensatory Tracking Model (CTM) and has been implemented in the FLIGHTLAB environment for the study the control actions required for the launch and recovery of a helicopter to a moving ship in the presence of ship motion, airwake and turbulence. The results confirm that the SyCoS pilot can successfully carry out this task and replicate key aspects of the pilot strategy, such as guidance and response to atmospheric disturbances. Other important features of the control activity which impact on pilot workload appear to be missing, however, indicating that further development of the SyCoS model is required before convincing predictions of workload can be obtained. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *COMPUTERIZED SIMULATION; *MAN MACHINE SYSTEMS; *HELICOPTERS; *SHIPS; *AIRCRAFT MANEUVERS
DE- WAKES; EQUATIONS OF MOTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02423651
AN- <AEROSPACE> A99-34899
TI- Rotorcraft Pilot's Associate hierarchical planning
AU- McBryan, Bernie; Joy, Mark (Boeing Co., Mesa, AZ)
SO- In: AHS International Annual Forum, 55th, Montreal, Canada, May 25-27, 1999, Proceedings. Vol. 1 (A99-34876 09-01), Alexandria, VA, American Helicopter Society, 1999, p. 282-292.

PD- 199900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- The Army's Rotorcraft Pilot's Associate (RPA) program is a multi-year Advanced Technology Demonstration (ATD) program to demonstrate knowledge based cognitive decision aiding technology for existing and new helicopters. Our tightly integrated team shares responsibility for the hierarchically-structured planning elements of our Cognitive Decision Aiding Subsystem (CDAS). The Boeing Company, Mesa, Arizona is responsible for the attack and survivability planning elements. Lockheed-Martin Federal Systems is responsible for the reconnaissance, sensor utilization, communication, and route planning elements. This paper provides a general overview of the RPA system and program, describes our approach to hierarchical planning, and concludes with a synopsis of our progress. Status is portrayed as a function of eight software build cycles. Flight testing on an Apache Longbow is ongoing and will be completed by June of 1999. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *ROTARY WING AIRCRAFT; *COGNITION; *DECISION MAKING; *PILOT PERFORMANCE
DE- MILITARY HELICOPTERS; SURVIVAL
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02423043
AN- <AEROSPACE> A99-34291
TI- Rotary wing test stand capability for the Republic of Korea
AU- Breaks, Jeffrey; Cooper, Michael (Micro Craft-Hampton Div., VA)
SO- In: CEAS/AIAA/ICASE/NASA Langley International Forum on Aeroelasticity and Structural Dynamics, Williamsburg, VA, June 22-25, 1999, Proceedings. Pt. 1 (A99-34276 09-39), Hampton, VA, NASA, Langley Research Center, 1999, p. 159-169.
PD- 199900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9909
AB- Two agencies in the Republic of Korea have commissioned the design and fabrication of rotor test stands to provide performance and dynamic testing capability for helicopter rotor systems in newly constructed wind tunnel facilities near Taejon, Korea. These test stands, based on the proven design of the 2 Meter Rotor Test Stand (2MRTS) that has been operating in the NASA Langley Research Center, 14 x 22-Foot Low Speed Tunnel for some time, incorporate significant improvements in the drive power and in the control and instrumentation subsystems. Both rotor test systems are robust and utilize many off-the-shelf components for durability and ease of maintenance. (Author)
DE- <MAJOR> *ROTARY WINGS; *TEST STANDS; *DYNAMIC TESTS; *WIND TUNNEL TESTS ; *MODAL RESPONSE
DE- KOREA; FINITE ELEMENT METHOD; DATA ACQUISITION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02421397
AN- <AEROSPACE> N99-20106
TI- Controlling Tension Between Performance and Safety in Helicopter Operations: The Contribution of Handling Qualities to Flight Safety
AU- Padfield, Gareth D. (Defence Evaluation Research Agency, Flight Management and Control Dept., Bedford, United Kingdom)
SO- NASA no. 19990045794. Rotorcraft, Marseilles, France, Sep. 1998Rotorcraft Flight Safety: Proceedings.
PY- 1998
PD- 199801
RN- NASA no. 19990045794; Paper-8
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- As twin goals in the design and operation of aircraft, performance and safety often struggle together for prominence. This struggle creates a tension that runs throughout the design, development and qualification process. The tension is felt most when missions are stressed, in the sense of being at the extremes of the requirements; for example, operations into degraded visual conditions in poor weather or when the degree of urgency increases, in emergency maneuvers or when the pilot is required to divide attention between flying and other mission duties. Two important contributions assist the pilot in managing this tension. First, designs which confer the aircraft with sufficiently good handling characteristics, such that even in emergency conditions,

the attentional demands of control workload are acceptable. Second, providing sufficient spatial awareness relative to the surrounding airspace and surface/obstacle layout that the pilot is able to maintain an adequate safety margin. In this paper, mission oriented flying qualities engineering is described within the system framework of Aeronautical Design Standard-33 (ADS-33), utilizing concepts like the mission task element, usable cue environment, and dynamic response criteria. The paper argues that the requirements for what constitutes safe and easy, Level 1 flying qualities now exist and are well substantiated. New flying qualities now exist and safety standards, and existing aircraft can be upgrade with integrated flight management systems featuring advanced control/flying management technologies. Good flying qualities provide critical support to the pilot in the management of the performance-safety tension. This paper will examine this tension in more detail, drawing on results of probabilistic analysis of the impact of flying qualities on flight safety.
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *FLIGHT MANAGEMENT SYSTEMS; *FLIGHT SAFETY; *HELICOPTERS; *SAFETY; *PILOT PERFORMANCE
DE- DYNAMIC RESPONSE; FLIGHT CHARACTERISTICS; CONTROLLABILITY
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02421396
AN- <AEROSPACE> N99-20105
TI- Human Error Tolerance in Helicopter Cockpit Systems
AU- Courteney, Hazel (Civil Aviation Authority, Safety Regulation Group, Gatwick, United Kingdom)
SO- NASA no. 19990045793. Rotorcraft Flight Safety: Proceedings.
PY- 1998
PD- 199801
RN- NASA no. 19990045793; Paper-7
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- This paper is aimed at helicopter operators ho may be considering new cockpit equipment fits. It is intended to raise awareness of the effect that such systems can have on flight safety, because of their relationship to crew performance, and the possibility of error. One way to approach this si to identify the most important risk areas, then review the effects - positive and negative that the new system could have in these respects. The paper will begin by identifying the main risk areas for UK helicopter operations. An analysis or recent Mandatory Occurrence Reports (MORs) is presented. Comparisons will be made between difference categories of operators and between MOR events caused by technical versus human causal factors. It will be suggested that the greater risks currently lie with helicopter operations that are outside the Police / Ambulance (P/A) and other Public Transport (PT) categories, and with those events that arise from human - as opposed to technical - causes, although these are the minority of MORs. New cockpit technologies are likely to be available for helicopters within the next five years, for example, Flight Management Systems (FMS) that are comparable to their fixed wing counterparts. Drawing on the findings of the MOR analysis, and some feedback from fixed wing operators of FMS, suggestions will be made concerning the effects that such systems could have on helicopter flight safety. Finally, CAA activity to address the crew related aspects of light deck design in Type certification will be outlined.
DE- <MAJOR> *COCKPITS; *HELICOPTERS; *HUMAN PERFORMANCE; *AIRCRAFT EQUIPMENT; *FLIGHT INSTRUMENTS; *HUMAN FACTORS ENGINEERING; *FLIGHT SAFETY; *SAFETY DEVICES
DE- AIRCRAFT ACCIDENTS; AIRCRAFT SAFETY; FLIGHT MANAGEMENT SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02421391
AN- <AEROSPACE> N99-20100
TI- Rotorcraft Flight Safety: Proceedings
SO- NASA no. 19990045788. In: Rotorcraft Flight Safety.
PY- 1998
PD- 199801
RN- NASA no. 19990045788
LA- English
GL- United Kingdom
CP- United Kingdom
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- The underlying theme of today's conference is what we can do to improve Rotorcraft flight safety in the future. It is interesting to note that, on the operational side, we have speakers on Public Transport operations in the very hostile areas of the emergency services sector and the military. On the airworthiness side we'll learn of the regulation and management of airworthiness and of safety assessments.

The increasingly important topic of Human factors will be covered by my colleagues from the Safety Regulation Group (SRG), and, finally, two other eminent speakers in the fields of rotorcraft handling qualities and human engineering will conclude.
DE- <MAJOR> *AIRCRAFT RELIABILITY; *CONFERENCES; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING; *ROTARY WING AIRCRAFT; *HELICOPTER PERFORMANCE
DE- LIGHT HELICOPTERS; MILITARY HELICOPTERS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02417427
AN- <AEROSPACE> A99-23229
TI- VIGILANTE - System description and first experiment approach and results
AU- Suddarth, Steven (BMDO, Washington, DC); Brenner, Michael; Udomkesmalee, Suraphol; Liebe, Carl C.; Padgett, Curtis; Vo, Hung; Avril, Larry (JPL, Pasadena, CA)
SO- In: Automatic target recognition VIII; Proceedings of the Meeting, Orlando, FL, Apr. 13-17, 1998 (A99-23226 05-63), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3371), 1998, p. 25-36.
PY- 1998
PD- 199800
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9905
AB- The VIGILANTE project is a planned vision system capable of tracking and recognizing targets in real time, on a small airborne platform. The project encompases the Viewing Imager/Gimbaled Instrumentation Laboratory (VIGIL), which is an IR/visible sensor platform with appropriate optics, and the analog neural 3D processing experiment, 'ANTE,' which is a massively parallel neural-based, high-speed processor. The VIGIL sensors are mounted on a helicopter. VIGIL consists of an optical bench containing a visible camera, a long wave IR camera and a two-axes gyrostabilized gimbaled mirror. The helicopter is also equipped with GPS and an inertial measurement unit (IMU) for attitude and position determination and two video links for ground-based image collection. Finally, a jet-powered, radio-controlled VIGILANTE Target Vehicle (VTV) has been manufactured and equipped with GPS. In the first stages of the project, the VIGIL system is mounted in a Hughes 500 helicopter and is used to acquire image sequences of the VTV for training and testing of the ANTE image recognition processor. Based on GPS and IMU input, the gimbal is pointed toward the VTV and acquires images. We discuss the results of experiments and of follow-on experiments that demonstrate real-time target recognition and tracking. (Author)
DE- <MAJOR> *TARGET TRACKING; *AIRBORNE OBSERVATION; *REAL TIME OPERATION; *TARGET RECOGNITION; *INFRARED IMAGERY; *VISIBLE SPECTRUM
DE- NEURAL NETS; IMAGE PROCESSING; INFRARED CAMERAS; RADIO CONTROL; CENTRAL PROCESSING UNITS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02417227
AN- <AEROSPACE> A99-23029
TI- Merlin avionics test system - A COTS solution
AU- Foggie, Peter (Serco Test Systems, Waterlooville, United Kingdom)
SO- In: AUTOTESTCON '98; Proceedings of the System Readiness Technology Conference, Salt Lake City, UT, Aug. 24-27, 1998 (A99-23001 05-62), Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1998, p. 192-197.
PY- 1998
PD- 199800
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9905
AB- The Merlin Avionics Test System (MATS) provides a comprehensive second-line (intermediate level) test solution for the avionic fit of the Royal Navy's new antisubmarine helicopter Merlin. The ATS provides an automatic test gapability covering some 140 Line Replaceable Units (LRUs) and is based on extensive use of COTS. This paper discusses the MATS requirement and outlines the design solution. The paper also includes discussion of the experience to date in the widespread use of COTS instrumentation. (Author)
DE- <MAJOR> *AVIONICS; *COMMERCIAL OFF-THE-SHELF TECHNOLOGY; *ANTISUBMARINE WARFARE; *HELICOPTERS; *TEST EQUIPMENT

DE- WEAPON SYSTEMS; SERVICE LIFE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02407694
AN- <AEROSPACE> A99-28496
TI- Shared models of flight management system vertical guidance
AU- Sherry, Lance (Honeywell Air Transport Systems, Phoenix, AZ); Polson, Peter G. (Colorado, Univ., Boulder)
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 9, no. 2, 1999, p. 139-153.
PY- 1999
PD- 199900
RF- 19
SN- 1050-8414
CN- NCC2-904; NAS1-20219
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9907
AB- Solutions to operational and training issues with flight automation should be based on a complete model of the behaviors of the avionics software shared by pilots, developers, trainers, and human factors researchers. The operational procedure model, described in this article, represents the behavior of the avionics software as a set of intentions associated with situation-action rules. This article focuses on the guidance function incorporated in flight management systems and presents an operational procedure model of vertical guidance. (Author)
DE- <MAJOR> *AIRCRAFT GUIDANCE; *VERTICAL FLIGHT; *FLIGHT MANAGEMENT SYSTEMS; *AVIONICS; *SOFTWARE DEVELOPMENT TOOLS; *MAN MACHINE SYSTEMS
DE- MATHEMATICAL MODELS; PILOT TRAINING; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02404991
AN- <AEROSPACE> A99-25793
TI- Wavelet analysis of pilot workload in helicopter low-level flying tasks
AU- Jones, J. G.; Padfield, G. D.; Charlton, M. T. (Defence Evaluation and Research Agency, Bedford, United Kingdom)
SO- Aeronautical Journal (ISSN 0001-9240), vol. 103, no. 1019, Jan. 1999, p. 55-63.
PY- 1999
PD- 199901
RF- 8
SN- 0001-9240
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9906
AB- As part of a program of research to improve mission effectiveness by studying pilot workload and task performance in mission-oriented flight tasks, a methodology has been developed in which wavelet analysis is used to extract information from records of vehicle response and of pilot control activity. By decomposing the records into discrete wavelets, components of vehicle agility and pilot workload are derived in the form of wavelet-based 'quickness' parameters for vehicle agility and so-called 'attack' parameters for pilot workload. It is shown how individual wavelet components in the records of pilot control activity, referred to as 'worklets', can be associated with the subtasks of guidance and stabilization. It is demonstrated how these concepts can be applied to quantify changes in pilot control activity associated with increasing task difficulty or changes in aircraft handling qualities. Two examples are presented, one from a flight trial in which the task difficulty was increased by changes in a prescribed ground track and the other from a simulation trial in which an increased time delay was introduced into the response of the flight control system. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *WAVELET ANALYSIS; *WORKLOADS (PSYCHOPHYSIOLOGY); *TASK COMPLEXITY; *FLIGHT PATHS; *FLIGHT CONTROL
DE- AIRCRAFT PILOTS; DATA RECORDERS; FLIGHT RECORDERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02400006
AN- <AEROSPACE> N99-14915
TI- The Efficacy of Dextroamphetamine for Sustaining Helicopter Pilot Performance: An In-Flight Evaluation
AU- Caldwell, John A., Jr. (Army Aeromedical Research Lab., Fort Rucker, AL United States)
SO- NASA no. 19990025678.
PY- 1998
PD- 199809

RN- NASA no. 19990025678
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- The capability to operate 24 hours per day on the battlefield creates a tactical advantage over enemy forces. However, staffing shortages necessitating long work hours devoid of sleep eventually produce overwhelming fatigue, impairing performance and safety. In these situations, the only effective means to sustain performance may be the administration of stimulants. Unfortunately, studies of stimulants such as dextroamphetamine on the actual flight performance of aviators are virtually nonexistent. The present study assessed actual in-flight performance, mood, and alertness of UH-60 pilots during sleep-deprivation periods in which they were given either a 10-mg dose of Dexedrine or a placebo at 0000, 0400, and 0800 within the last 23 hours of each period. Results indicated better control (smaller RMS errors) of several flight parameters (i.e., heading, altitude, airspeed, etc.) under Dexedrine than placebo during straight-and-levels, climbs, descents, right turns, and a left-descending turn. Tendencies toward Dexedrine-related improvements also occurred in the left turns and the Instrument Landing System approach. The Profile of Mood States revealed reductions in fatigue, confusion, and depression concurrent with increases in vigor as a function of Dexedrine. Electroencephalographic data indicated enhanced central nervous system arousal under Dexedrine relative to placebo. No significant side effects occurred. It can be concluded that dextroamphetamine effectively sustained aviator performance during short-term sustained operations.
DE- <MAJOR> *PILOT PERFORMANCE; *SLEEP DEPRIVATION; *AMPHETAMINES; *IN-FLIGHT MONITORING; *CENTRAL NERVOUS SYSTEM STIMULANTS
DE- ALERTNESS; AROUSAL; CENTRAL NERVOUS SYSTEM
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02396201
AN- <AEROSPACE> N99-11111
TI- Applications of Speech-Based Control
AU- Anderson, Timothy R. (Air Force Research Lab., Information Analysis and Exploitation Branch, Wright-Patterson AFB, OH United States)
SO- NASA no. 19990007891.
PY- 1998
PD- 199810
RN- NASA no. 19990007891
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- This lecture will examine many applications of speech based control in aerospace environments. Applications of speech recognition in fixed and rotary wing aircraft as well as in space and command and control will be discussed. Current performance of the technology and application problems will be presented. The lecture concludes with a discussion of required enhancements for aerospace applications.
DE- <MAJOR> *SPEECH RECOGNITION; *VOICE CONTROL; *CONTROL SYSTEMS DESIGN;
*CONTROL EQUIPMENT; *COMMAND AND CONTROL; *MAN MACHINE SYSTEMS
DE- TECHNOLOGY UTILIZATION; FIXED WINGS; ROTARY WING AIRCRAFT; AIRCRAFT
CONFIGURATIONS; AEROSPACE ENVIRONMENTS; HUMAN FACTORS ENGINEERING;
PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02396197
AN- <AEROSPACE> N99-11107
TI- Operational Rationale and Related Issues for Alternative Control Technologies
AU- Rood, G. M. (Defence Evaluation Research Agency, Systems Integration Dept., Farnborough, United Kingdom)
SO- NASA no. 19990007887. Alternative Control Technologies: Human Factors Issues.
PY- 1998
PD- 199810
RN- NASA no. 19990007887
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9901
AB- The demanding operations in the current generations of fixed and rotary wing aircraft, particularly at night and in poor weather, have

increased the need for more 'eyes-out' operations, which decreases the time for'head down' or 'head in' viewing time, both for switching operations and for assimilation of information from head down displays. Similarly the speed of operations has led to less time being available for these two operations. Progress has been made towards the assimilation of visual display data through the move towards Helmet Mounted Displays and the time reductions in switching have been achieved through ensuring that the pilot has no need to move his hands from the primary aircraft controls during high workload periods by the use of the Hands On Throttle And Stick (HOTAS) concept. Using Fitts Law, namely that the time to move the hand to a target (in this case a switch or button) depends only upon the relative precision required, indicates that the movement time - a summed combination of perceptual processing, cognitive processing and motor processing - is in the region of 250 ms (an aircraft moving at 500 knots travels in the region of 80 metres in this time). Thus a time saving of around 250 msec is achievable by minimising the hand movements. This generally involves the provision of all of the necessary manual switches on either the throttle top or the control column (stick) top, (HOTAS) or Hands On Collective And Cyclic (HOCAC) - for helicopters - during all critical flight operations.

DE- <MAJOR> *AIRCRAFT CONTROL; *HELMET MOUNTED DISPLAYS; *WORKLOADS (PSYCHOPHYSIOLOGY); *FLIGHT OPERATIONS; *CONTROL SYSTEMS DESIGN; *HUMAN FACTORS ENGINEERING

DE- AIRCRAFT CONFIGURATIONS; FIXED WINGS; CONTROL STICKS; DISPLAY DEVICES; ROTARY WING AIRCRAFT; EYE MOVEMENTS; PILOT PERFORMANCE; MAN MACHINE SYSTEMS; HEAD MOVEMENT; FLIGHT INSTRUMENTS

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02392436

AN- <AEROSPACE> N98-25699

TI- Calculating A Helicopter Pilot's Instrument Scan Pattern from Discrete, 60-Hz Measures of the Line-of-Sight: The Evaluation of an Algorithm

SO- NASA no. 19980223933.

PY- 1998

PD- 199806

RN- NASA no. 19980223933; AD-A350657; NAMRL-1403

LA- English

GL- United States

CP- United States

DT- REPORT

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR9801

AB- In order obtain data to develop and evaluate theories relating instrument scanning to flight performance we recorded the line of sight (LOS) of student naval helicopter pilots as they flew prescribed maneuvers in a motion-based, high fidelity, instrument training simulator. These LOS data were discrete, 60 Hz samples of eye pointing. For some types of analysis it is helpful to think of a scan pattern as a sequence of fixations and to use an averaging algorithm to transform the 60 Hz data into such a sequence, a scan path. An appropriate algorithm was identified, developed and evaluated. As part of this evaluation, we developed a String Similarity measure, SS, a measure of the similarity between two scan paths. The evaluation of the algorithm, consisting of observing the algorithm's output as a function of the algorithm's parameter values, showed that the algorithm behaved in a sensible fashion, logically consistent with the input data. This increased our confidence in our implementation of the fixation algorithm. The SS metric proved to be an informative, useful tool that may have addition uses in the analysis scanning behavior and flight performance.

DE- <MAJOR> *HELICOPTERS; *SCANNERS; *FLIGHT INSTRUMENTS; *LINE OF SIGHT; *ALGORITHMS; *AIRCRAFT PILOTS

DE- VISUAL PERCEPTION; EYE MOVEMENTS; FLIGHT TRAINING; HUMAN FACTORS ENGINEERING; FLIGHT SIMULATORS; MAN MACHINE SYSTEMS; ANALOGIES; EYE (ANATOMY); FLIGHT CHARACTERISTICS; STRINGS; STUDENTS; PILOT PERFORMANCE

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02391961

AN- <AEROSPACE> N98-25224

TI- Candidate Sample Acquisition System for the Rosetta Mission

AU- Magnani, P. G. (Tecnospazio S.p.A., Milan, Italy); Gerli, C. (Tecnospazio S.p.A., Milan, Italy); Colombina, G. (Tecnospazio S.p.A., Milan, Italy); Vielmo, P. (Tecnomare S.p.A., Italy)

SO- NASA no. 19980218991. Analysis of Returned Comet Nucleus Samples.

PY- 1997

PD- 199712

RN- NASA no. 19980218991
LA- English
GL- Italy
CP- Italy
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9801
AB- The Comet Nucleus Sample Return (CNSR) Mission, is a cornerstone of ESA scientific program. While Giotto, Vega I and II provided the first picture of a comet nucleus, a much improved understanding of the nucleus and processes on it will result from in situ measurements and Earth based analysis of the material samples collected on the nucleus surface. The CNSR baseline mission foresees the landing and anchoring of a spacecraft on the comet nucleus surface, and the collection of the following three types of samples by means of a dedicated "Sample Acquisition System" (SAS): (1) a core sample gathered from surface down to a maximum depth of 3 meters to be cut in 0,5 m. long sections for storage; (2) a volatile material sample, to be gathered at the bottom of the core sample hole; and (3) a surface material sample, gathered from one or more locations on the surface. These samples will have to be placed in a storage canister in the capsule (to be returned on Earth) and preserved therein at a temperature not higher than 160 k. If on board sensing instrumentation identified comet nucleus features not allowing a safe landing, a back-up system based on a 'harpoon" sampler, would be launched from the spacecraft hovering the comet, and recovered via a tether line; degraded sample quality would be accepted in this case (no surface and volatile samples and limited core sampling depth).
DE- <MAJOR> *COMET NUCLEI; *CORE SAMPLING; *SAMPLES; *COMETS; *SAMPLERS; *SURFACE PROPERTIES; *GALACTIC STRUCTURE
DE- GIOTTO MISSION; CHEMICAL ANALYSIS; COMPOSITION (PROPERTY); PHYSICAL PROPERTIES
SH- 7590 Astrophysics (1975-)

AN- <DIALOG> 02390265
AN- <AEROSPACE> N98-23528
TI- Functional Simulator Requirements for the Chinook and the Cougar Transport Helicopters
TI- <ORIGINAL> Functionele simulatoreisen voor de Chinook en de Cougar transporthelikopters
AU- vanRooij, J. C. G. M. (Institute for Human Factors TNO, Soesterberg, Netherlands); deVries, S. C. (Institute for Human Factors TNO, Soesterberg, Netherlands); Buitelaar, M. (National Aerospace Lab., Amsterdam, Netherlands); Ligthart, V. (National Aerospace Lab., Amsterdam, Netherlands); Brouwer, W. (National Aerospace Lab., Amsterdam, Netherlands); Roessingh, J. J. M. (National Aerospace Lab., Amsterdam, Netherlands); Verwey, W. B. (Institute for Human Factors TNO, Soesterberg, Netherlands); vanEmmerik, M. L. (Institute for Human Factors TNO, Soesterberg, Netherlands)
SO- NASA no. 19980210390.
PY- 1997
PD- 199710
CN- A95/KLu/357
RN- NASA no. 19980210390; TNO-TM-97-A062; TD97-0245
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9801
AB- By the end of 1995 the Chinook CH-47D transport helicopter was introduced into the Royal Netherlands Air Force (RNLAF), In 1996 the AS 532 U2 Cougar MK2 transport helicopter has also entered service. Both helicopters are new to the RNLAF. The purpose of both helicopters is to provide the Dutch Airmobile Brigade with the required tactical mobility. It is the intention of the RNLAF to perform part of the helicopter-crew training in helicopter simulators. However, at the moment no specific plans exist delineating which part of the training should be done in a simulator. The RNLAF has commissioned the TNO Human Factors Research Institute and the National Aerospace Laboratory NLR to inventory and analyse the available information and to advise on the training and simulation requirements. In order to keep the choice of options as unrestricted as possible, a number of hierarchically layered training clusters has been specified, each leading to a specific simulator configuration. The training clusters range from simple and restricted to complex and comprehensive, where it is understood that each cluster includes all elements of its predecessors: (1) instrument-based procedural training; (2) procedure and simple maneuver training; (3) standard maneuver training and disturbances; (4) degraded mode maneuver training; (5) critical and sling maneuver training. Each of these clusters has been consecutively analysed with respect to its skill, cue, and simulation requirements according to a common systematic approach. In addition to the requirements that are associated with each of the training need clusters, requirements with respect to Night Vision Goggles (NVG) training and with respect to the Instructor Operator Station (IOS) have been specified. On the basis of

the requirements that have been specified, cost assessments have been made. The report concludes with a number of recommendations with respect to the acquisition of the required training and simulation capability.
DE- <MAJOR> *ARMED FORCES; *TRAINING SIMULATORS; *CH-47 HELICOPTER; *FUNCTIONAL DESIGN SPECIFICATIONS; *GOGGLES; *NIGHT VISION
DE- NETHERLANDS; COSTS; EDUCATION; HUMAN FACTORS ENGINEERING; INSTRUCTORS; INVENTORIES; MOBILITY; SELECTION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02388267
AN- <AEROSPACE> N98-21530
TI- Speech Transmission Quality and Sound Attenuation of the Bose ANR Prototype for the SPH-5 Helmet
TI- <ORIGINAL> Spraaktransmissiekwaliteit en geluidverzwakking van het Bose ANR Prototype voor de SPH-5 helm
AU- vanWijngaarden, S. J. (Institute for Human Factors TNO, Soesterberg, Netherlands)
SO- NASA no. 19980202963.
PY- 1997
PD- 199710
CN- A97/KLu/328
RN- NASA no. 19980202963; TM-97-A064; TD-97-0247
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9801
AB- Upon request of the Royal Netherlands Air Force, speech transmission and hearing protection of an Active Noise Reduction (ANR) prototype by Bose for the SPH-5 helmet has been investigated. The (active and passive) sound attenuation properties and the speech transmission quality of the telephones of the headset have been measured. On the basis of ambient noise levels measured in the helicopter, noise levels at the ear and maximum daily exposure time have been predicted. The maximum exposure time, calculated from the attenuation curves, may be extended using the Bose ANR prototype to up to 8 hours daily in the cockpit and 2.5 hours daily in the cargo compartment. The passive attenuation is poor; the good active attenuation due to the ANR at low frequencies compensates for this. The active attenuation for frequencies below 160 Hz is higher than generally found for other (commercial) systems. The speech transmission quality in ambient noise is higher than with the original SPH-5, but lower than with the Peltor-modified version of the SPH-5. The system showed good stability in the laboratory; no clipping or oscillations were observed.
DE- <MAJOR> *ACOUSTIC ATTENUATION; *NOISE INTENSITY; *AIRCRAFT NOISE; *HELMETS; *HEARING; *EARPHONES; *NOISE PREDICTION; *VOICE COMMUNICATION ; *NOISE REDUCTION
DE- HELICOPTERS; LOW FREQUENCIES; OSCILLATIONS; PROTOTYPES; SOUND TRANSMISSION; AIRCRAFT COMPARTMENTS; FLIGHT CREWS; HUMAN FACTORS ENGINEERING; EAR PROTECTORS
SH- 8732 Communications & Radar (1987-)

AN- <DIALOG> 02388089
AN- <AEROSPACE> N98-21352
TI- Human Factors Evaluation of Vocoders for Air Traffic Control Environments
AU- Sollenberger, Randy L. (Federal Aviation Administration, Technical Center, Atlantic City, NJ United States); LaDue, James (Federal Aviation Administration, Technical Center, Atlantic City, NJ United States); Carver, Brian (Federal Aviation Administration, Technical Center, Atlantic City, NJ United States); Heinze, Annmarie (Federal Aviation Administration, Technical Center, Atlantic City, NJ United States)
SO- NASA no. 19980202599.
PY- 1997
PD- 199712
CN- DTFA03-94-C-00042
RN- NASA no. 19980202599; AD-A341106; DOT/FAA/CT-TN97/25
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR9801
AB- Vocoders offer a potential solution to radio congestion by digitizing human speech and compressing the signal to achieve low bandwidth voice transmissions. A reduction in bandwidth will allow the addition of more communication channels to the system and reduce radio congestion. This air traffic control simulation study is the second phase of a research effort to compare the effectiveness of two 4.8 kbps vocoders (designated as A and B for test purposes) with the current analog radio

communication system. Sixteen air traffic controllers from Level 5 Terminal Radar Approach Controls participated in the study and performed 12 one hour traffic scenarios over 3 days of testing. Scenarios consisted of medium and high traffic volumes designed to produce different levels of controller tasidoad. The communications configuration allowed each simulation pilot to transmit with jet, propeller, or helicopter background noises. The results indicated that the vocoders did not affect controller workload or performance. In general, intelligibility and acceptability ratings were highest for analog radio, slightly lower for vocoder B, and lowest for vocoder A. In addition, intelligibility and acceptability ratings were highest for jet background noise, slightly lower for propeller background noise, and lowest for helicopter background noise. Controller taskload had no effect on intelligibility and acceptability. This human factors evaluation indicated that both vocoders were highly intelligible and acceptable for air traffic control environments. Even the least preferred vocoder did not substantially interfere with controller performance. This study suggests that vocoder technology could replace the current analog radio system in the future.

DE- <MAJOR> *ENVIRONMENTS; *HUMAN FACTORS ENGINEERING; *VOCODERS; *AIR TRAFFIC CONTROL; *AIR TRAFFIC CONTROLLERS (PERSONNEL); *CONTROL SIMULATION; *RADIO COMMUNICATION; *JET AIRCRAFT NOISE; *VOICE COMMUNICATION

DE- HUMAN PERFORMANCE; NOISE POLLUTION; BACKGROUND NOISE; BANDWIDTH; WORKLOADS (PSYCHOPHYSIOLOGY); HELICOPTERS; ANALOG DATA; APPROACH CONTROL; INTELLIGIBILITY; PROPELLER NOISE; NOISE REDUCTION; TELECOMMUNICATION

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02377544

AN- <AEROSPACE> N98-10807

TI- Military Helicopters. (Latest Citations from the Ei Compendex*Plus Database)

SO- NASA no. 19980001238.

PY- 1996

PD- 199612

RN- NASA no. 19980001238; PB97-853998

LA- English

GL- United States

CP- United States

DT- REPORT

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR9801

AB- The bibliography contains citations concerning the design, development, and testing of military helicopters. Topics include helicopter airworthiness, design and flight testing, flight mechanics, structures, propulsion, avionics, human factors, V/STOL and advance concepts, and noise and vibration problems. (Contains 50-250 citations and includes a subject term index and title list.)

DE- <MAJOR> *BIBLIOGRAPHIES; *MILITARY HELICOPTERS; *HELICOPTER DESIGN; *FLIGHT TESTS

DE- AIRCRAFT RELIABILITY; FLIGHT MECHANICS; AIRCRAFT STRUCTURES; HUMAN FACTORS ENGINEERING; NOISE PROPAGATION; VIBRATION EFFECTS; INDEXES (DOCUMENTATION); AVIONICS; DATA BASES; SHORT TAKEOFF AIRCRAFT; VERTICAL TAKEOFF AIRCRAFT

SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02373197

AN- <AEROSPACE> A99-15460

TI- Limited systems evaluation of the HH60G Pavehawk

TI- <EXTENSION> Abstract only

AU- Weare, J. (DND, Aerospace Engineering Test Establishment, Cold Lake, Canada)

SO- In: Annual CASI Conference, 45th, Calgary, Canada, May 10-13, 1998, Proceedings (A99-15455 02-01), Ottawa, Canadian Aeronautics and Space Institute, 1998, p. 29.

PY- 1998

PD- 199800

LA- English

GL- Canada

CP- Canada

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9902

AB- A limited systems evaluation of the HH-60G Pavehawk was performed to determine its suitability as a Search and Rescue (SAR) helicopter. The presentation covers the systems that were assessed during a 4 1/2 hour flight test program to include a Breeze Eastern rescue hoist, a Forward Looking Infra-Red (FLIR), an Automatic Flight Control System (AFCS), a

radar, and radio and navigation systems. System performance and human factors associated with all controls were determined. The helicopter cabin was evaluated on its capacity for both crew and survivors based on the mission and role specifications. The evaluation determined that the FLIR was unable to recognize a target at 1/2 nm during searches in both high and low clutter. The AFCS was unable to complete a coupled approach, thereby limiting the scenarios in which a rescue could be conducted. The AFCS could not accurately maintain attitude, airspeed, or heading. The VHF-FM radio did not have a marine frequency capability thereby preventing the aircraft from communicating with ships at sea during rescue operations. The aircraft was too small, allowing only two stretchers or six passengers in the cabin. It is concluded that the HH-60G Pavehawk is unacceptable as a Search and Rescue helicopter based on the specifications given during the initial project. (Abstract only). (AIAA)
DE- <MAJOR> *EVALUATION; *HELICOPTERS; *RESCUE OPERATIONS
DE- FLIR DETECTORS; FLIGHT CONTROL
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02373196
AN- <AEROSPACE> A99-15459
TI- Evaluation of the MD-900 Explorer helicopter for the military emergency medical evacuation mission
TI- <EXTENSION> Abstract only
AU- Fleming, A. (DND, Aerospace Engineering Test Establishment, Cold Lake, Canada)
SO- In: Annual CASI Conference, 45th, Calgary, Canada, May 10-13, 1998, Proceedings (A99-15455 02-01), Ottawa, Canadian Aeronautics and Space Institute, 1998, p. 27.
PY- 1998
PD- 199800
LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- This paper documents the results of the Developmental Phase II-A evaluation of the MD-900 Explorer helicopter for the military Emergency Medical Evacuation mission. Four flights, totaling 6.0 hours, were conducted under day visual meteorological conditions. The test helicopter was representative of production aircraft. The aircraft's production instruments, hand held instrumentation, and cloth measuring tapes were used for the evaluation. The MD-900 demonstrated excellent capability for aeromedical evacuation operations. The aircraft's automatic engine start procedure may save lives by reducing the time required to launch aircraft for Emergency Medical Evacuation missions. Another enhancing feature was the aircraft's low vibration levels which are ideal for transporting wounded personnel. The IMC capabilities of the MD900 and MD-900 Helicopter Instrument Flight System were also excellent and well suited to single pilot IFR missions. Within the scope of the evaluation, the MD-900 helicopter demonstrated excellent potential for the military Emergency Medical Evacuation mission. (Abstract only). (Author)
DE- <MAJOR> *EVALUATION; *EMERGENCIES; *HELICOPTERS
DE- AIRCRAFT INSTRUMENTS; HOVERING
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02371869
AN- <AEROSPACE> A99-14132
TI- Subjective measurement assessment in a full mission scout-attack helicopter simulation
AU- Heers, Susan T.; Casper, Patricia A. (Monterey Technologies, Inc., Los Gatos, CA)
SO- In: Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, IL, Oct. 5-9, 1998, Proceedings. Vol. 1 (A99-14126 02-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1998, p. 26-30.
PY- 1998
PD- 199800
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- A full mission helicopter simulation was conducted in support of the U.S. Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration. Four crews flew four doctrinally correct scenarios under two mission equipment package conditions. The Advanced Mission Equipment Package (AMEP) contained additional equipment and longer sensor ranges than the Baseline Mission Equipment Package (BMEP). Following each run, pilots filled out the NASA Task Load Index (TLX) workload scales and a perceived situation awareness (SA) scale. TLX ratings were lower for the AMEP, while SA ratings were higher for the AMEP. A similar inverse relationship was found in the scenario effects.

A stepwise multiple regression found a significant relationship between SA ratings and three of the component TLX subscale ratings. Both perceived workload and situation awareness ratings indicate a benefit from the advanced technologies available on the AMEP. These measures were also sensitive to the varying demands of the scenarios and pilot responsibilities. (Author)
DE- <MAJOR> *FLIGHT SIMULATION; *MILITARY HELICOPTERS
DE- WORKLOADS (PSYCHOPHYSIOLOGY); PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02371662
AN- <AEROSPACE> A99-13925
TI- Simulation and testing of the landing period designator (LPD) helicopter recovery aid
AU- de Ferrier, Bernard (Bombardier Services Corp., Arlington, VA)
SO- In: European Rotorcraft Forum, 24th, Marseilles, France, Sept. 15-17, 1998, Preprints. Vol. 2 (A99-13851 02-05), Paris, Association Aeronautique et Astronautique de France, 1998, p. OP11.1-OP11.16.
PY- 1998
PD- 199800
RF- 21
LA- English
GL- United States
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- A synopsis is presented summarizing the development tasks, simulation projects, and testing program of the Landing Period Designator (LPD) helicopter recovery aid. The LPD, an empirical formulation, relates real-time ship motion to safe recovery times of a given aircraft-ship combination. It is designed to complete recovery envelopes with a real-time dynamic assessment of ship motion as a function of the helicopter limits. The proof-of-concept testing program required satisfaction of three criteria. The index must be sensitive to different aircraft and ship models for given sea conditions. Second, the energy index trace from a low to a high energy state must never violate a given motion time delay. Third, for a given sea condition, the energy index response using simulated data must approximate recorded ship motion index response. Test program results supported all three test hypotheses. The next step employed the manned flight simulator in order to assess LPD utility. Recoveries in various sea conditions were conducted using the operational limits of several helicopter models. Results confirmed LPD utility in reducing pilot workload while improving pilot performance. In the final phase of the testing program, at-sea analysis was conducted. The results support the proof-of-concept hypothesis and the manned flight simulator test conclusions. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *FLIGHT TESTS; *AIRCRAFT LANDING; *SEARCH
AND RESCUE MISSIONS
DE- SEA WATER; AIRCRAFT MODELS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02371658
AN- <AEROSPACE> A99-13921
TI- Flight testing of a binocular, bisensor HMD for helicopter - Some human factors aspects
AU- Leger, A. (Sextant Avionique, St.-Medard-en-Jalles, France); Roumes, C. (Service de Sante des Armees, Inst. de Medecine Aerospatiale, Bretigny-sur-Orge, France); Bergeaud, J. M.; Dareoux, P.; Gardelle, C. (Centre d'Essais en Vol, Istres Air, France)
SO- In: European Rotorcraft Forum, 24th, Marseilles, France, Sept. 15-17, 1998, Preprints. Vol. 2 (A99-13851 02-05), Paris, Association Aeronautique et Astronautique de France, 1998, p. OP06.1-OP06.8.
PY- 1998
PD- 199800
RF- 10
LA- English
GL- France
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- A binocular helmet with a 40 deg full overlap FOV has been developed under a contract of the French DGA. Two image intensifiers tubes located on each side of the head are integrated on the helmet. Both images are projected on the visor of the helmet and collimated to infinity. IR sensor imagery and navigation system are coupled to the helmet using an electromagnetic head-tracker. Test flight of the helmet have been conducted by the French Flight Test Center (CEV) on specially equipped Puma testbed aircraft. Approximately 150 flight hours have been devoted to testing of the helmet, either with 12 and IR sensors. Along with more technical issues, major human factors concerns can be summarized as follow: visor projection, effects of increased interocular separation due to 12 sensor location, image intensifier

(I2) and IR image usability for piloting tasks and transitions between sensors. In addition to classical test flight methodology basically used by CEV, specific human factor methodology was introduced in ground and flight trial. After adequate training, increased interocular separation with I2 was found not to be a problem for piloting the aircraft. Errors in speed, altitude, and distance are in the same direction those encountered with NVG and pilots rapidly built their own internal metrics to compensate. Both 12 and IR image were found usable for piloting the aircraft. The visor projection concept was validated and found extremely agreeable by most pilots. (Author)
DE- <MAJOR> *HELICOPTER PERFORMANCE; *FLIGHT TESTS; *BINOCULAR VISION;
*HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING
DE- MAN MACHINE SYSTEMS; FIELD OF VIEW
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02371657
AN- <AEROSPACE> A99-13920
TI- A methodology for the prediction of pilot workload and the influence on effectiveness in rotorcraft mission tasks
AU- Charlton, M. T.; Howell, S. E.; Padfield, G. D.; Jones, J. G. (DERA, Bedford, United Kingdom); Bradley, R.; MacDonald, C. (Glasgow Caledonian Univ., United Kingdom); Thomson, D.; Leacock, G. (Glasgow, Univ., United Kingdom)
SO- In: European Rotorcraft Forum, 24th, Marseilles, France, Sept. 15-17, 1998, Preprints. Vol. 2 (A99-13851 02-05), Paris, Association Aeronautique et Astronautique de France, 1998, p. OP05.1-OP05.14.
PY- 1998
PD- 199800
RF- 23
LA- English
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- The paper provides an overview of a new methodology for the prediction and estimation of pilot workload and the influence on effectiveness in rotorcraft mission tasks. The approach integrates contributions from several substantial individual research activities including inverse simulation, wavelet-based control analysis, exceedance/rule-based prediction and probabilistic handling qualities metrics. The method is focused on the primary piloting function with the aim of providing a cost effective tool, using off-line simulation and analysis, for assessing the impact and effectiveness of piloting aids on rotorcraft mission peformance. The method is intended for exploitation in support of the requirements capture, competitive assessment and preliminary design phases of procurement. In the paper the elements of the methodology and selected results will be presented to highlight progress and demonstrate how off-line predictions compare favorably with data from piloted experiments. Sufficient progress has been made with each of the individual aspects and their integration to assert confidently the feasibility of predicting workload ratings and metrics of practical value during early phases of procurement and design using aircraft configurational information and outline mission requirements. The future direction of the research will also be briefly discussed. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *PILOT PERFORMANCE; *WORK CAPACITY; *ROTARY
WING AIRCRAFT; *MAN MACHINE SYSTEMS
DE- SYSTEM EFFECTIVENESS; PREDICTION ANALYSIS TECHNIQUES; TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02371614
AN- <AEROSPACE> A99-13877
TI- Method and examples for calculation of flight path and parameters while performing aerobatics maneuvers by the Ka-50 helicopter based on flight data recorder information
AU- Bourtsev, Boris N.; Guendline, Leonid J.; Selemenev, Sergey V. (Kamov Co., Lyubertsy, Russia)
SO- In: European Rotorcraft Forum, 24th, Marseilles, France, Sept. 15-17, 1998, Preprints. Vol. 1 (A99-13851 02-05), Paris, Association Aeronautique et Astronautique de France, 1998, p. AD04.1-AD04.15.
PY- 1998
PD- 199800
RF- 26
LA- English
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- Extremely high maneuverability of the Ka-50 helicopter requires the development of software for analysis of flight dynamics. This paper presents a brief description and functions of the NSTAR program system to provide processing, analysis, and registration of the records from the on-board recording devices. This system performs analysis and error elimination in recording by test instrumentation, filtration for

partial restoration of recordings by using kinematic ratios in Euler or Hamilton/Rodriges forms. Using records made by test instrumentation, the NSTAR system makes possible the restoration of the flight path and the calculation of the values of the immediate unmeasurable flight parameters specifically in the dead (band) of nanometric/aneroid pressure transducers, and vane (aerometric) sensors, i.e., at low flight speeds/large attack and slip angels. The paper describes a track restoration solution and indirect flight parameter calculation in a helicopter motion equation integration. The paper presents examples of aircraft record processing by means of the NSTAR system and tracks of Ka-50 helicopter maneuvers. (Author)
DE- <MAJOR> *FLIGHT PATHS; *AEROBATICS; *DATA RECORDERS; *HELICOPTERS
DE- EQUATIONS OF MOTION; MATHEMATICAL MODELS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02371440
AN- <AEROSPACE> A99-13703
TI- VIGIL - A GPS based target-tracking system
AU- Liebe, Carl C.; Brown, Kenneth; Udomkesmalee, Suraphol; Padgett, Curtis ; Brenner, Michael; Howard, Ayanna; Wysocky, Terry; Brown, David (JPL, Pasadena, CA); Suddarth, Steven (Ballistic Missile Defense Organization, Washington, DC)
SO- In: Acquisition, tracking, and pointing XII; Proceedings of the Meeting, Orlando, FL, Apr. 15, 16, 1998 (A99-13701 02-63), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3365), 1998, p. 10-21.
PY- 1998
PD- 199800
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9902
AB- The VIGILANTE project is a planned vision system capable of tracking and recognizing targets in real time on a small airborne platform. The project consists of two parts: (1) the Viewing Imager/Gimballed Instrumentation Laboratory (VIGIL), which is an infrared and visible sensor platform with appropriate optics and (2) the Analog Neural Three-dimensional processing Experiment (ANTE), a massively parallel neural based high-speed processor. The VIGIL platform is mounted on a helicopter equipped with GPS, IMU, gimbal, radio link and antivibration platform. Also, a jet powered radio controlled VIGILANTE Target Vehicle (VTV) has been manufactured and equipped with GPS. In the first stages of the project, the VIGIL system is used to acquire image sequences of the VTV for training and testing of the ANTE image recognition processor. Based on GPS and IMU input, the gimbal is pointed toward the VTV and acquires images. This paper describes the VIGIL system in detail. It discusses position-based pointing, tracking algorithms, and the alignment procedure. Test imagery and an evaluation of the system will be presented. (Author)
DE- <MAJOR> *GLOBAL POSITIONING SYSTEM; *TARGET TRACKING; *GIMBALS; *INFRARED IMAGERY; *VISIBLE SPECTRUM; *NEURAL NETS
DE- REAL TIME OPERATION; MASSIVELY PARALLEL PROCESSORS; RADIO CONTROL; ALGORITHMS
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 02368338
AN- <AEROSPACE> A99-10601
TI- SAFE Association Annual Symposium, 36th, Phoenix, AZ, Sept. 14-16, 1998, Proceedings
SO- Nashville, TN, SAFE Association, 1998, 648 p. (For individual items see A99-10602 to A99-10661).
PY- 1998
PD- 199800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9901
AB- The papers presented in this volume provide an overview of recent developments in the field of support, survival, and safety technology. Topics discussed include measuring observer's visual acuity through night vision goggles; safety of flight and anthropometry in United States aircraft; investigation and evaluation of a replacement parachute for the SJU-5/A escape system; and evolution of ejection seat pintle technology. Other topics include the development of human model validation methods for cockpit accommodation evaluation; feasibility study for a helicopter survival seat pack; factors affecting the decision to eject; and a methodology for evaluating pintle system life cycle costs. (AIAA)
DE- <MAJOR> *CONFERENCES; *AIRCRAFT PILOTS; *NIGHT VISION; *ESCAPE SYSTEMS;

*HUMAN FACTORS ENGINEERING; *FLIGHT SAFETY
DE- VISUAL ACUITY; RISK ASSESSMENT; EYE PROTECTION; COCKPITS; LIFE SUPPORT
SYSTEMS; FLIGHT CREWS; MILITARY TECHNOLOGY; SURVIVAL EQUIPMENT; DISPLAY
DEVICES; EJECTION SEATS; INFLATABLE STRUCTURES; HUMAN CENTRIFUGES;
CRASHWORTHINESS; ACCELERATION PROTECTION; HELICOPTER PERFORMANCE;
ANTHROPOMETRY; G SUITS; MAN MACHINE SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02367513
AN- <AEROSPACE> A98-45776
TI- Spatial disorientation in U.S. Army rotary-wing operations
AU- Braithwaite, Malcolm G.; Durnford, Simon J.; Crowley, John S.; Rosado, Norberto R.; Albano, John P. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 69, no. 11, Oct. 1998, p. 1031-1037.
PY- 1998
PD- 199810
RF- 20
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9812
AB- This paper describes two surveys concerning spatial disorientation (SD) in U.S. Army rotary-wing operations that sought to assess the hazard and to identify recommendations to control it. One survey was of accident records, and the other was of aircrew experiences. Both surveys highlighted the magnitude of the problem. The accident survey showed that 30 percent of class A to C accidents involved SD as a significant factor, while the aircrew survey showed that 78 percent of aircrews have been disoriented. Both surveys showed a significant increase in SD associated with combat operations. Several differences between the two surveys were noted: 90 percent of the reviewed accidents were thought to involve type I SD compared with only 43 percent of the reported incidents; both pilots in a particular aircraft were considered to have been disoriented in at least 59 percent of accidents compared with 23 percent of incidents; sudden loss of visual cues accounted for 25 percent of SD accidents compared with 13 percent of incidents; and 62 percent of the accidents occurred at night compared with only 36 percent of incidents. Neither survey showed any association between SD and fatigue or other human factors. The results of both surveys suggested that crew coordination, alerting devices, flight information displays, and autopilot functions would be good targets for improvement. (Author)
DE- <MAJOR> *DISORIENTATION; *ROTARY WINGS; *ATTITUDE (INCLINATION); *RISK
ASSESSMENT; *FLIGHT HAZARDS; *SURVEYS; *MILITARY HELICOPTERS;
*OPERATIONAL HAZARDS; *RISK MANAGEMENT
DE- ARMED FORCES (UNITED STATES); AIRCRAFT ACCIDENTS; FLIGHT CREWS; COMBAT;
DISPLAY DEVICES; WARNING SYSTEMS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02363817
AN- <AEROSPACE> A98-42080
TI- V-22 Tiltrotor Osprey - Designed for the maintainer
AU- Apollo, E. W. (Boeing Co., Philadelphia, PA)
SO- In: International Powered Lift Conference, London, United Kingdom, Sept. 2-4, 1998, Proceedings (A98-42051 11-05), London, Royal Aeronautical Society, 1998, p. 37.1-37.7.
PY- 1998
PD- 199800
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9811
AB- This presentation/paper identifies several of the aircraft systems put in place, technologies utilized, and processes implemented to achieve the V-22 Tiltrotor Osprey reliability, maintainability, testability, and supportability requirements. It will also identify the Integrated Product Team (IPT) structure at the contractor's organization, new Computer-Aided Three-Dimensional Interactive Application (CATIA)-based tools and electronic mock-up capabilities, and specific R&M processes utilized in maximizing design for the maintainer. (Author)
DE- <MAJOR> *V-22 AIRCRAFT; *TILT ROTOR AIRCRAFT; *AIRCRAFT MAINTENANCE;
*AIRCRAFT DESIGN

DE- HUMAN FACTORS ENGINEERING; IN-FLIGHT MONITORING; LANDING GEAR; FLIGHT
CONTROL
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02362286
AN- <AEROSPACE> A98-40549
TI- Flight crew fatigue. VI - A synthesis
AU- Gander, Philippa H.; Rosekind, Mark R. (NASA, Ames Research Center, Moffett Field, CA); Gregory, Kevin B. (Sterling Software, Inc., Moffett Field, CA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 69, no. 9, section 2, Sept. 1998, p. B49-B60.
PY- 1998
PD- 199809
RF- 55
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9811
AB- Sleep, circadian rhythm, subjective fatigue, mood, nutrition, and physical symptoms were monitored in flight crews before, during, and after scheduled commercial operations. Duty-related changes in these measures were examined in four different types of air transport: short-haul fixed wing; short-haul helicopter; domestic overnight cargo; and long-haul. The extent of these changes, and the duty-related and physiological factors contributing to them, are compared among the different operations. During all operations, the level of sleep loss was such that the majority of crewmembers would be expected to have become increasingly sleepy across trip days, with some experiencing performance decrements. In addition, during overnight cargo and long-haul operations, crewmembers were sometimes flying aircraft during the circadian low point in alertness and performance. Specific recommendations for reducing flight crew fatigue are offered for each operating environment. (AIAA)
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT FATIGUE; *SLEEP; *CIRCADIAN RHYTHMS;
*MENTAL PERFORMANCE; *PHYSIOLOGICAL FACTORS
DE- AIR TRANSPORTATION; MOODS; SHORT HAUL AIRCRAFT; NUTRITION; AIRLINE
OPERATIONS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02362283
AN- <AEROSPACE> A98-40546
TI- Flight crew fatigue. III - North Sea helicopter air transport operations
AU- Gander, Philippa H. (NASA, Ames Research Center, Moffett Field, CA); Barnes, Rory M. (Civil Aviation Authority, London, United Kingdom); Gregory, Kevin B. (Sterling Software, Inc., Moffett Field, CA); Graeber, R. C. (Boeing Commercial Airplane Group, Seattle, WA); Connell, Linda J.; Rosekind, Mark R. (NASA, Ames Research Center, Moffett Field, CA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 69, no. 9, section 2, Sept. 1998, p. B16-B25.
PY- 1998
PD- 199809
RF- 17
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9811
AB- We studied 32 helicopter pilots before, during, and after 4-5 d trips from Aberdeen, Scotland, to service North Sea oil rigs. On duty days, subjects awoke 1.5 h earlier than pretrip or posttrip, after having slept nearly an hour less. Subjective fatigue was greater posttrip than pretrip. By the end of trip days, fatigue was greater and mood more negative than by the end of pretrip days. During trips, daily caffeine consumption increased 42 percent, reports of headache doubled, reports of back pain increased 12-fold, and reports of burning eyes quadrupled. In the cockpits studied, thermal discomfort and high vibration levels were common. Subjective workload during preflight, taxi, climb, and cruise was related to the crewmembers' ratings of the quality of the aircraft systems. During descent and approach, workload was affected by weather at the landing site. During landing, it was influenced by the quality of the landing site and air traffic control. Beginning duty later and greater attention to aircraft comfort and maintenance should reduce fatigue in these operations. (Author)
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT FATIGUE; *AIR TRANSPORTATION; *HELICOPTER PERFORMANCE; *SLEEP; *WORKLOADS (PSYCHOPHYSIOLOGY)

DE- NORTH SEA; AIRLINE OPERATIONS; AIRCRAFT PILOTS; CAFFEINE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02362190
AN- <AEROSPACE> A98-40453
TI- Designing the V-22 tiltrotor - A flight test pilot's perspective
AU- Dugan, Daniel C.
SO- Vertiflite (ISSN 0042-4455), vol. 44, no. 3, 1998, p. 32-36.
PY- 1998
PD- 199800
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9811
AB- This article gives an overview of the technology development of tiltrotor aircraft in the U.S. over the last 42 years. The efforts have led to the development of the world's first military tiltrotor, the Osprey, and the first civil tiltrotor, the Bell 609. Beginning with the Bell XV-3 in the 1950s, the tiltrotor concept was proven by this primitive aircraft which demonstrated the feasibility of the inflight conversion process from the helicopter configuration to the airplane mode and back. Followed by the Bell XV-15 of the 1970s, 1980s, and 1990s, the concept was refined and advanced with this turbine-powered research aircraft. High-speed turboprop performance was achieved along with an efficient helicopter mode and a safe straightforward conversion procedure. The success of the XV-15 led to the development of the Marine's V-22 Osprey. This innovative military tiltrotor, which will be fully operational in 2001, will revolutionize air assault tactics and give the U.S. a new means of projecting force as required in the opening years of the next century. From these developments the Bell 609 will emerge in 2001 as the first commercial application of the tiltrotor concept. The article discusses the specific historical details of the above from a flight test pilot's perspective. (AIAA)
DE- <MAJOR> *V-22 AIRCRAFT; *FLIGHT TESTS; *PILOT PERFORMANCE; *AIRCRAFT DESIGN
DE- WIND TUNNEL TESTS; AIRCRAFT ACCIDENTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02362008
AN- <AEROSPACE> A98-40271
TI- Talk to me
AU- Donaldson, Peter
SO- Helicopter World (ISSN 0262-0448), vol. 17, no. 5, June 1998, p. 25-27.
PY- 1998
PD- 199806
SN- 0262-0448
LA- English
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9811
AB- The current communication needs of helicopters and the unique problems which are primarily due to their limited weight, vibration, and the variety of environments they operate in are briefly examined, and recent development in helicopter communication technologies are reviewed. These include advanced radios and lighter, simpler, and less costly satellite communication equipment as well as advances in active noise control. (AIAA)
DE- <MAJOR> *SATELLITE COMMUNICATION; *HELICOPTERS; *EMERGENCIES; *PILOT PERFORMANCE
DE- VERY HIGH FREQUENCIES; ULTRAHIGH FREQUENCIES
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 02359575
AN- <AEROSPACE> A98-38838
TI- Operation in snow and icing conditions - Reducing the risk
AU- Curtis, Ray (DERA, Salisbury, United Kingdom)
SO- In: Future development in ice protection; Proceedings of the Conference, London, United Kingdom, May 21, 1998 (A98-38837 10-03), London, Royal Aeronautical Society, 1998, p. (i)-(xv).
PY- 1998
PD- 199800
LA- English
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9810
AB- DERA Boscombe's experience in the field of clearing military rotorcraft for operation in snow and icing now spans almost 40 years, with virtually all UK Military helicopter types having undergone at least one winter season testing in these conditions at sites in North America or Europe. This paper provides some historical information based on my

own recollections and involvement in these DERA trials and some undertaken by others. I include a very brief description of the difficulties we have found operating helicopters in snow and icing and give an insight into some of the more interesting findings, test techniques, and instrumentation used. Such techniques and instrumentation were developed and employed by DERA to improve our understanding of the conditions and the effects on the aircraft in order to reduce the risk associated with any icing or snow flying clearance granted. The paper then poses a few questions that stem from fixed and rotary wing aircraft incidents and accidents that have occurred in recent years. At its end, it provides my personal 'wish list' that perhaps if satisfied would enhance rotorcraft safety in snow and icing conditions, some of which may also have relevance to fixed wing aircraft. (Author)
DE- <MAJOR> *MILITARY HELICOPTERS; *ROTARY WING AIRCRAFT; *SNOW; *AIRCRAFT ICING; *RISK ASSESSMENT; *DEICING
DE- HOVERING; FLIGHT ENVELOPES; SYSTEMS ENGINEERING
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02358049
AN- <AEROSPACE> A98-37312
TI- Model simplification using statistical analysis - A case study and process
AU- Krainski, John C. (Boeing Co., Mesa, AZ)
SO- In: AIAA Modeling and Simulation Technologies Conference and Exhibit, Boston, MA, Aug. 10-12, 1998, Collection of Technical Papers (A98-37288 10-01), Reston, VA, American Institute of Aeronautics and Astronautics, 1998, p. 193-202.
PY- 1998
PD- 199800
RF- 4
RN- AIAA Paper 98-4356
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9810
AB- Real-time simulation requires simplified aerodynamic models because of limited computational resources. This experiment consisted of replacing a traditional simplified model with a rapidly generated, statistically derived model, and evaluating it in a real-time flight simulation environment. It was found that a relatively simple, automatically generated, statistical model derived from experiments run on a high-fidelity model can drastically reduce computational requirements while maintaining significant accuracy. A simplified model of a General Electric T700-GE-701 turbine engine on an Apache AH-64A was generated using data obtained from test flights with a high-fidelity model. The simplified model is compared to the original in three areas: quality of the fit to the collected data, resources required to run the model, and handling qualities in simulated flight. The results of this initial study indicate that using statistical analysis for model simplification is a useful technique for certain domains, such as a concept demonstrator on a platform with low computational power. In addition, a process for rapidly developing statistical models is presented. (Author)
DE- <MAJOR> *STATISTICAL ANALYSIS; *REAL TIME OPERATION; *AIRCRAFT MODELS; *AH-64 HELICOPTER; *FLIGHT SIMULATION; *PILOT PERFORMANCE
DE- REGRESSION ANALYSIS; ROLL
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02355089
AN- <AEROSPACE> A98-34352
TI- Assessment of vertical axis handling qualities for the shipborne recovery task - ADS 33 (Maritime)
AU- Carignan, Stephan J. R. P.; Gubbels, Arthur W. (NRC of Canada, Flight Research Lab., Ottawa)
SO- In: AHS International, Annual Forum, 54th, Washington, DC, May 20-22, 1998, Proceedings. Vol. 2 (A98-34317 09-01), Alexandria, VA, AHS International, 1998, p. 1083-1092.
PY- 1998
PD- 199800
RF- 11
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9809
AB- Flight trials on the NRC Bell 205 Airborne Simulator were conducted at the Flight Research Laboratory to develop a vertical axis handling qualities criterion for a shipborne helicopter. A motorized vertical axis-tracking mission task element was developed to simulate the high hover position of the flight deck landing task. The handling qualities

resulting from the variation of heave damping and thrust/weight ratio were evaluated for deck motions associated with sea states 3 through 6. Desired performance was generally achieved with heave damping greater than -0.2/sec, provided that the thrust/weight ratio was high enough to enable the helicopter to match the flight deck vertical velocity. However, for sea states 5 and 6, pilot workload, due primarily to collective activity, was cited as being too high for a Level 1 handling qualities rating. Further testing to establish suitable torque dynamics and verify roll requirements are proposed. (Author)
DE- <MAJOR> *SHIPBORNE AIRCRAFT; *BELL AIRCRAFT; *AIRCRAFT CONTROL; *HELICOPTER PERFORMANCE; *VERTICAL MOTION; *RESCUE OPERATIONS
DE- TASKS; FLIGHT DECKS; AIRCRAFT LANDING; THRUST-WEIGHT RATIO; SEA STATES; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02355062
AN- <AEROSPACE> A98-34325
TI- Rapid pilot interface development simulator
AU- Lee, Alan G. (U.S. Army/NASA, Rotorcraft Div., Moffett Field, CA); Simpson, Carol (Psycho-Linguistic Research Associates, Woodside, CA)
SO- In: AHS International, Annual Forum, 54th, Washington, DC, May 20-22, 1998, Proceedings. Vol. 2 (A98-34317 09-01), Alexandria, VA, AHS International, 1998, p. 765-776.
PY- 1998
PD- 199800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9809
AB- We have developed a low cost military rotorcraft flight simulator located at the Crew Station Research and Development Facility at NASA-Ames. The Rapid Pilot Integration Development (RAPID) simulator is used to perform human factors studies of new cockpit displays and auditory warning systems. The simulation includes a simple rotorcraft dynamics model, a three-axis control stick, an out-the-window scene, an integrated caution/warning system, and representations of malfunctions, threats and weapon systems. Various cockpit display configurations and auditory information formats can be implemented quickly and tested. So far, this facility has been used to evaluate auditory warning formats and multifunction display symbology for MH-60K and MH-47E helicopters used by Army Special Forces, as well as auditory warning formats for advanced countermeasure systems in the AH-64D Longbow Apache. Results from the Special Forces study showed that a large tactical situation display in the center console should be the primary candidate display that is used for the aircraft survivability equipment pilot vehicle interface in these aircraft. The study also showed that pilots judged the new text-to-speech warning voice as more intelligible than the current threat warning voice. Results from the AH-64D Longbow Apache study showed that pilots preferred detailed auditory messages over the existing format. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *MILITARY HELICOPTERS; *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *COCKPITS; *DISPLAY DEVICES
DE- LOW COST; NASA FACILITIES; DYNAMIC MODELS; WEAPON SYSTEMS; AIRCRAFT SURVIVABILITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02355023
AN- <AEROSPACE> A98-34286
TI- Helmet-mounted displays - Cathode-ray tube (CRT) vs. flat-panel
AU- Frezell, Thomas L. (Star Mountain, Inc.; U.S. Army, Aviation Technical Test Center, Fort Rucker, AL)
SO- In: AHS International, Annual Forum, 54th, Washington, DC, May 20-22, 1998, Proceedings. Vol. 1 (A98-34263 09-01), Alexandria, VA, AHS International, 1998, p. 272-275.
PY- 1998
PD- 199800
RF- 2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9809
AB- The helmet-mounted display (HMD) system designed for the RAH-66 Comanche helicopter must meet numerous design and system specifications regarding optical performance, weight, center of gravity, military equipment compatibility, and human factors integration constraints. The HMD technology currently used in the AH-64 Apache consists of a monocular miniature CRT on which the pilot can view both imagery and symbology. Technology and market forces have required the developer to consider the integration of advanced helmet-mounted, flat-panel

displays in lieu of miniaturized CRTs. Advancements in the field of small flat-panel displays make them viable candidates to replace the heavier, bulkier, higher voltage, monochromatic miniature CRTs that are near the end of product maturity with regard to electro-optical performance. Flat-panel displays are in their infancy with respect to brightness, gray scale range, switching speed, resolution, durability, power, cost, and safety. Decision-makers must decide between the currently available CRT displays or emerging active-matrix flat-panel displays. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *CATHODE RAY TUBES; *FLAT PANEL DISPLAYS; *MILITARY HELICOPTERS; *MONOCULAR VISION; *ELECTRO-OPTICS
DE- EQUIPMENT SPECIFICATIONS; MILITARY TECHNOLOGY; GRAY SCALE; DECISION MAKING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02355000
AN- <AEROSPACE> A98-34263
TI- AHS International, Annual Forum, 54th, Washington, DC, May 20-22, 1998, Proceedings. Vol. 1
SO- Alexandria, VA, AHS International, 1998, 706 p. (For individual items see A98-34264 to A98-34316).
PY- 1998
PD- 199800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9809
AB- The present volume on vertical lift technology discusses aerodynamics, structures and materials, acoustics, crew station and human factors, evaluation, and dynamics. Attention is given to computer visualization of vortex wake systems, Navier-Stokes calculations of helcopter fuselage flow field and loads, V-22 airframe fatigue test methodology and spectrum development, and helicopter interior noise reduction by active gearbox struts. Other topics addressed include the CV-22 Osprey Flight Path Cueing Flight Director System, mechanical force override as an effective component of a research helicopter safety system, development of an advanced energy absorber, flight dynamics issues relating to autogyro airworthiness and flight safety, and active vibration control of rotorcraft driveshaft-airframe dynamics. (AIAA)
DE- <MAJOR> *CONFERENCES; *INTERACTIONAL AERODYNAMICS; *HUMAN FACTORS ENGINEERING; *AIRCRAFT STRUCTURES; *FLIGHT SAFETY; *AERODYNAMIC CHARACTERISTICS
DE- UNSTEADY AERODYNAMICS; AIRCRAFT CONSTRUCTION MATERIALS; AEROACOUSTICS; FLOW VISUALIZATION; FATIGUE TESTS; HELICOPTER PERFORMANCE; NOISE REDUCTION; FLIGHT MECHANICS; AIRCRAFT RELIABILITY; ROTOR BLADES; AVIONICS; DAMAGE TOLERANCE; CRASHWORTHINESS; COMPUTATIONAL FLUID DYNAMICS; FLIGHT TESTS; PILOT SUPPORT SYSTEMS; AIRCRAFT VIBRATION; FLIGHT CONTROL
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02353450
AN- <AEROSPACE> A98-32713
TI- Hardening Doppler Global Velocimetry for large wind tunnel applications
AU- Meyers, James F.; Lee, Joseph W.; Fletcher, Mark T.; South, Bruce W. (NASA, Langley Research Center, Hampton, VA)
SO- AIAA, Advanced Measurement and Ground Testing Technology Conference, 20th, Albuquerque, NM, June 15-18, 1998, 15 p..
PY- 1998
PD- 199806
RF- 19
RN- AIAA Paper 98-2606
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9808
AB- The development of Doppler Global Velocimetry from a laboratory curiosity to a wind tunnel instrumentation system is discussed. This development includes system advancements from a single velocity component to simultaneous three components, and from a steady state to instantaneous measurement. Improvements to system control and stability are discussed along with solutions to real-world problems encountered in the wind tunnel. This ongoing development program follows the cyclic evolution of understanding the physics of the technology, development of solutions, laboratory and wind tunnel testing, and reevaluation of the physics based on the test results. (Author)
DE- <MAJOR> *VELOCITY MEASUREMENT; *WIND TUNNEL TESTS; *WIND TUNNEL APPARATUS; *LASER DOPPLER VELOCIMETERS

DE- YAG LASERS; ROTARY WING AIRCRAFT; CHARGE COUPLED DEVICES; ARGON LASERS
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02352696
AN- <AEROSPACE> A98-31959
TI- Cockpit design
AU- Leger, Alain (Sextant Avionique/MMI, Saint-Medard-en-Jalles, France)
SO- In: Fighter Helicopter Conference & Exhibition, London, United Kingdom, Jan. 26, 27, 1998, Proceedings. Pt. 2 (A98-31952 08-01), Burnham, United Kingdom, Shephard Press, 18 p., 1998.
PY- 1998
PD- 199800
LA- English
GL- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9808
AB- A graphical presentation is given of state-of-the-art considerations regarding the design of attack helicopter 'glass cockpits' employing advanced displays of both 'head-out' and 'head-in' types. Attention is given to the factors of global and local situational awareness, head-mounted displays, pilot binocular field-of-view, and Map/Tactical Management Systems. (AIAA)
DE- <MAJOR> *COCKPITS; *STRUCTURAL DESIGN; *GLASS
DE- HUMAN FACTORS ENGINEERING; FLIGHT TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02351943
AN- <AEROSPACE> A98-31206
TI- Flight performance effects of thermal stress and two aviator uniforms in a UH-60 helicopter simulator
AU- Reardon, Matthew J.; Fraser, Evie B.; Omer, Julia M. (U.S. Army, Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 69, no. 6, June 1998, p. 569-576.
PY- 1998
PD- 199806
RF- 14
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9808
AB- The effects on flight performance of the four combinations of an unencumbered mission oriented protective posture (MOPP) aviator battle dress uniform (ABDU) and encumbered MOPP4 over ABDU flight ensemble in cool and hot UH-60 simulator cockpit conditions were evaluated with a repeated measures, 2 x 2 factorial study using nine crews. The encumbered MOPP4 uniform had the most frequent adverse effect on flight performance followed by heat stress, with less frequent effects from the combination or interaction of these two factors. This study confirmed that heat stress and wearing an encumbered U.S. Army MOPP4 flight uniform significantly reduced endurance and flight performance in a UH-60 simulator. (Author)
DE- <MAJOR> *UH-60A HELICOPTER; *FLIGHT SIMULATORS; *PILOT PERFORMANCE;
*SUITS; *COCKPITS; *HEAT TOLERANCE
DE- AIRCRAFT PILOTS; POSTURE; ENDURANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02349854
AN- <AEROSPACE> A98-29117
TI- Using near-miss data - The role of organisational learning
AU- Spaven, Malcolm
SO- In: International Symposium on Aviation Psychology, 9th, Columbus, OH, Apr. 27-May 1, 1997, Proceedings. Vol. 2 (A98-29016 07-53), Columbus, OH, Ohio State University, 1997, p. 1383-1387.
PY- 1997
PD- 199700
RF- 8
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9807
AB- A comparison is made between the reporting of near-miss aircraft encounters in the U.K. and Canada. The cultural context of the differences is considered and some improvements are recommended. (AIAA)

DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *AIRCRAFT SAFETY; *COLLISION AVOIDANCE
DE- HELICOPTERS; CIVIL AVIATION

SH- 7581 Administration & Management (1975-)

AN- <DIALOG> 02349844
AN- <AEROSPACE> A98-29107
TI- Defining the critical aptitudes for attack helicopter crews
AU- Pian, Christian (Ingenia, Issy-les-Moulineaux, France); Kokorian, Agnes (DGA, Paris, France); Burke, Eugene (People Technologies, London, United Kingdom)
SO- In: International Symposium on Aviation Psychology, 9th, Columbus, OH, Apr. 27-May 1, 1997, Proceedings. Vol. 2 (A98-29016 07-53), Columbus, OH, Ohio State University, 1997, p. 1330-1334.
PY- 1997
PD- 199700
RF- 6
LA- English
GL- France
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9807
AB- Results from a recent job analysis are described which examined the key aptitudes required for effective crew performance on present and future attack helicopters. Domains of aptitudes examined included cognitive, perceptual, motor, interpersonal, and personality. The study examined these requirements for both pilot and chief (weapons operator), and compared aptitude requirements across the two (present and future) weapons platforms. Results are discussed in terms of their applications for crew selection, development of personnel from pilot to chief roles, transfer of skills from existing to new airframes, and in terms of crew resource management (CRM). (Author)
DE- <MAJOR> *MILITARY HELICOPTERS; *FLIGHT CREWS; *APTITUDE; *CREW RESOURCES MANAGEMENT
DE- METHODOLOGY; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02349779
AN- <AEROSPACE> A98-29042
TI- What ASRS data tell about inadequate flight crew monitoring
AU- Sumwalt, Robert L.; Morrison, Rowena; Watson, Alan; Taube, Elisa (Battelle, Aviation Safety Reporting System Program Office, Mountain View, CA)
SO- In: International Symposium on Aviation Psychology, 9th, Columbus, OH, Apr. 27-May 1, 1997, Proceedings. Vol. 2 (A98-29016 07-53), Columbus, OH, Ohio State University, 1997, p. 977-983.
PY- 1997
PD- 199700
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9807
AB- A study is reported whose aim was to identify factors that contribute to flight crew monitoring errors and to offer operationally-oriented recommendations aimed at improving crew monitoring. The emphasis was on monitoring errors in air carrier operations. It is recommended that management must commit to provide clearly thought-out procedures that do not conflict with the monitoring function, and the crews should balance nonmonitoring tasks with the critical task of monitoring, especially when the aircraft is in vertical flight phases. Operators should carefully review the Flight Management Systems and related automation philosophies to ensure that they enhance flight crew monitoring. On long-haul flights, particular attention should be devoted to altitude and course changes. (AIAA)
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT SAFETY; *IN-FLIGHT MONITORING; *AIRCRAFT ACCIDENTS
DE- AUTOMATION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7581 Administration & Management (1975-)

AN- <DIALOG> 02347148
AN- <AEROSPACE> A98-27610
TI- Modern display systems - Principles, solutions and new approaches
AU- Schroer, G. (VDO Luftfahrtgeraetewerk GmbH, Frankfurt am Main, Germany)
SO- In: European Rotorcraft Forum, 23rd, Dresden, Germany, Sept. 16-18, 1997, Proceedings. Vol. 2 (A98-27551 06-05), Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1997, p. 76.1-76.9.
PY- 1997
PD- 199700
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9806
AB- The evolution of cockpit instrumentation is outlined along with new types of displays. The main characteristics of Avionique Nouvelle and some other types of displays are outlined and examples are shown. (AIAA)
DE- <MAJOR> *DISPLAY DEVICES; *COCKPITS; *MOTION CONTROL; *AIRCRAFT COMMUNICATION; *HELICOPTERS
DE- MAN MACHINE SYSTEMS; EUROPEAN AIRBUS; HEAD-UP DISPLAYS; HELMET MOUNTED DISPLAYS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02347134
AN- <AEROSPACE> A98-27596
TI- The status of human factors in civil rotorcraft safety
AU- Hughes, Tim; Ingram, David (GKN Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: European Rotorcraft Forum, 23rd, Dresden, Germany, Sept. 16-18, 1997, Proceedings. Vol. 2 (A98-27551 06-05), Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1997, p. 57.1-57.13.
PY- 1997
PD- 199700
RF- 21
LA- English
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- This paper examines the role of human factors in civil rotorcraft safety, notably the contribution of poor situation awareness and high workload to reduced safety. Evidence of the key issues is drawn from two studies sponsored by the UK Civil Aviation Authority (CAA). The first of these considered the factors contributing to 30 helicopter accidents in which fully functional helicopters either flew into the sea or ground or came close to doing so. Key conclusions from a second study, a survey of workload and safety hazards in offshore operations, are also introduced. This study focused on inflight paperwork but also covered many other safety issues. In addition to the potential problems faced in helicopter operations the paper examines the contribution human factors can make towards the solution of these problems. In particular the rationale behind new airworthiness regulations proposed for the certification of the human factors design process in commercial fixed-wing aircraft is discussed. The challenges of adapting these procedures to the rotorcraft environment are addressed. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *CIVIL AVIATION; *ROTORCRAFT AIRCRAFT; *FLIGHT SAFETY
DE- AIRCRAFT RELIABILITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02347133
AN- <AEROSPACE> A98-27595
TI- The Royal Air Force Chinook helicopter snow and icing flight envelope
AU- Roots, Mark; Dyer, Tony; Curnow, Mike; Tier, Malcolm (DERA, Salisbury, United Kingdom)
SO- In: European Rotorcraft Forum, 23rd, Dresden, Germany, Sept. 16-18, 1997, Proceedings. Vol. 2 (A98-27551 06-05), Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1997, p. 56.1-56.20.
PY- 1997
PD- 199700
RF- 3
LA- English
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- An extensive trials program was carried out during the winter of 1996/97 to gain data to expand the current flight envelopes of the Royal Air Force Chinook helicopter for operating in snow and icing conditions. The primary aim of the trial was to improve the icing clearance to a temperature of 10 C and to relax the limitations for operation in snow. A number of different engine intakes were tested and a snow/icing detection and the measurement system was evaluated for possible incorporation into the aircraft to provide pilots with information on the severity of the conditions. This paper briefly summarizes the previous snow and icing clearance work carried out in the early 1980's and covers, in more detail, the recent trial. A description of the trials aircraft, aircraft modifications tested, and the instrumentation suite fitted are included. A result of the problems associated with flying in snow and icing conditions is given. The flight test methods employed, reasons for choosing Halifax, Canada for the trial, and the flight test data analysis system are also covered. (Author)
DE- <MAJOR> *AIRCRAFT ICING; *HELICOPTERS; *FLIGHT ENVELOPES; *SNOW
DE- ENGINE INLETS; GROUND STATIONS; SUPERCOOLING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02347126
AN- <AEROSPACE> A98-27588
TI- An analysis of pilotage task maneuver metrics
AU- Blanken, Chris L. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); Ockier, Carl J. (DLR, Inst. fuer Flugmechanik, Braunschweig, Germany)
SO- In: European Rotorcraft Forum, 23rd, Dresden, Germany, Sept. 16-18, 1997, Proceedings. Vol. 1 (A98-27551 06-05), Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1997, p. 44.1-44.15.
PY- 1997
PD- 199700
RF- 11
LA- English
GL- United States
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- A helicopter handling qualities investigation was conducted to characterize the pilot's basic flying task and its impact on handling qualities. This study involved complementary use of a NASA groundbased and a DLR in-flight simulator. Over 150 evaluations were collected while performing three roll-axis slalom-type maneuvers at three different speeds over a range of control-response bandwidths. Putting the results into the traditional flying qualities metrics like bandwidth and attitude quickness parameters shows that some increase is recommended in the Level 1 attitude quickness boundary for air combat, the Level 1 bandwidth boundary for air combat is well supported, and decreases are recommended in the Level 2 attitude quickness and bandwidth boundaries. Using these results to correlate with frequency-domain task characterization metrics had mixed results. Using a time-domain task-characterization metric had similar results, but was somewhat more predicable. (Author)
DE- <MAJOR> *AIRCRAFT MANEUVERS; *FLIGHT SIMULATORS; *PILOT PERFORMANCE;
*BO-105 HELICOPTER
DE- BANDWIDTH; FREQUENCY DOMAINS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02347125
AN- <AEROSPACE> A98-27587
TI- An investigation of helmet mounted display field-of-view and overlap tradeoffs in rotorcraft handling qualities
AU- Jennings, Sion; Srinivasan, Ramesh; Baillie, Stewart (NRC of Canada, Inst. for Aerospace Research, Ottawa); Dion, Manfred (Federal Armed Forces, Technical Center for Aircraft, Manching, Germany)
SO- In: European Rotorcraft Forum, 23rd, Dresden, Germany, Sept. 16-18, 1997, Proceedings. Vol. 1 (A98-27551 06-05), Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1997, p. 43.1-43.10.
PY- 1997
PD- 199700
RF- 13
LA- English
GL- Canada
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- Research engineers at NRC's Flight Research Laboratory studied the effects of binocular overlap and field-of-view on pilot workload and aircraft system handling qualities. They systematically varied both binocular overlap and the total field-of-view in two separate in-flight experiments. In each experiment, evaluation pilots performed a series of ADS-33 maneuvers while wearing goggles that simulated a helmet-mounted display and, thus, limited their field-of-view. The effects of the goggles on pilot performance were evaluated using the following Cooper-Harper handling qualities ratings, visual cue ratings, pilot comments, and observer notes. It was found that handling qualities improved in a nonlinear fashion as either the field-of-view or the binocular overlap increased. The results of the study show that reduced field-of-view and binocular overlap degrade helicopter system performance to the point where additional control system augmentation is needed to fly a helicopter safely in nap-of-the-Earth operations. The results suggest that full binocular overlap provides the best performance in practical situations. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *FIELD OF VIEW; *ROTORCRAFT AIRCRAFT
DE- GOGGLES; LANDING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02346698
AN- <AEROSPACE> A98-27160
TI- Back pain in Australian military helicopter pilots - A preliminary study
AU- Thomae, M. K. (Royal Newcastle Hospital, Australia); Porteous, J. E.;

Brock, J. R.; Allen, G. D.; Heller, R. F. (Newcastle, Univ., Australia)

SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 69, no. 5, May 1998, p. 468-473.
PY- 1998
PD- 199805
RF- 23
SN- 0095-6562
LA- English
GL- Australia
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- The prevalence, risk factors, and consequences of low back pain were assessed in a cross-sectional survey of 200 Australian military helicopter pilots by self-completion questionnaire. Responses were received from 131 (66 percent) of available pilots. The overall prevalence of reported back pain was 64 percent (95 percent CI 56 percent-72 percent), with a further 28 percent of pilots describing back discomfort while flying. More than half the pilots (55 percent) indicated that back pain had interfered with their concentration while flying, with 16 percent reporting that they had hurried flying missions because of pain. A minority of pilots (7 percent) had refused to fly because of back problems. After adjusting for age, education, BMI, posture, and numbers of hours flown, multiple logistic regression modelling indicated that a prior history of back injury was the most significant predictor of back pain among rotary wing pilots. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *MILITARY HELICOPTERS; *PAIN; *PILOT PERFORMANCE
DE- FLIGHT SAFETY; BACK INJURIES; AUSTRALIA
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02346169
AN- <AEROSPACE> A98-26631
TI- Emergency in IMC
AU- Parker, Ian
SO- Helicopter World (ISSN 0262-0448), vol. 17, no. 2, Mar. 1998, p. 15-17.
PY- 1998
PD- 199803
SN- 0262-0448
LA- English
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- An evaluation has been conducted by Penn State University and FlightSafety International of the instrument meteorological condition (IMC; poor-to-zero visibility) responses of 28 commercial emergency medical service helicopter pilots, whem IMC was unexpectedly encountered. The purpose of this exercise was ostensibly the generation of pilot critiques of IMC-involving line-oriented flight training practives, but assessed pilot performance level correlation with prior IMC training. (AIAA)
DE- <MAJOR> *FLIGHT SAFETY; *FLIGHT CONDITIONS; *LOW VISIBILITY; *AIRCRAFT PILOTS
DE- AVIATION METEOROLOGY; CREW RESOURCES MANAGEMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02345807
AN- <AEROSPACE> A98-26269
TI- Avionics and aircraft equipment at the Polish Aviation Institute during 1945-1997
TI- <ORIGINAL> Awionika i osprzet w Instytucie Lotnictwa w latach 1945-1997
AU- Kunachowicz, Krzysztof; Parfianowicz, Grzegorz (Inst. Lotnictwa, Warsaw, Poland)
SO- Instytut Lotnictwa, Prace (ISSN 0509-6669), no. 151, pt. 2, 1997, p. 42-54. In Polish.
PY- 1997
PD- 199700
RF- 53
SN- 0509-6669
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9806
AB- The paper describes the research on aircraft and helicopter equipment at the Polish Aviation Institute which started at the end of World War II. The research focused on aircraft instrumentation for piloting and navigation, engine monitors, aircraft equipment, aircraft electrical equipment, electronic and radio communication systems, automatic flight control systems for aircraft and pilotless air vehicles, hydraulic and air conditioning systems, and measurements. A rapid growth of the Radio and Aircraft Equipment Department occurred with the manufacture under

licence of the MiG-15 jet fighter and its equipment. The gained experience helped to develop equipment for the Polish TS-11 combat trainer and the SO-1 engine. The work for civil aviation was also conducted, and the research and design activities connected with apparatus for space investigation started in 1969. The electrical equipment and avionics for I-22 Iryda aircraft were made under the PLEJADA program. (Author)
DE- <MAJOR> *AVIONICS; *AIRCRAFT EQUIPMENT; *AIRCRAFT INSTRUMENTS; *FIGHTER AIRCRAFT; *AUTOMATIC FLIGHT CONTROL
DE- MIG AIRCRAFT; RADIO ALTIMETERS; TRAINING AIRCRAFT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02342313
AN- <AEROSPACE> A98-22775
TI- Personalizing onboard route re-planning for recon, attack, and special operations missions
AU- Bodenhorn, Chris; Galkowski, Peggy; Stiles, Peter; Szczerba, Robert J.; Glickstein, Ira S. (Lockheed Martin Federal Systems, Owego, NY)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 10 p., 1997.
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- Over the past dozen years, first on independent R&D projects and most recently on the Rotorcraft Pilot's Associate Program (RPA), we have developed a powerful set of mission and route replanning functions designed to aid aviation operators in conducting recon, attack, and special operations missions. In order to support different mission types and operational units ranging from special operations to heavy attack, we have developed a set of personalization files that configure the planners at run-time. During part-mission assessments on the RPA program, we are tailoring these files to different mission types and pilot preferences. In addition, we are conducting evaluations of planner performance. Preliminary results indicate that high quality plans can be created by the computer, requiring little or no modification by pilots, in much less time than would be required by pilots acting alone. (Author)
DE- <MAJOR> *MILITARY AIRCRAFT; *COGNITION; *PILOT PERFORMANCE; *IN-FLIGHT MONITORING; *COMBAT; *FLIGHT PATHS
DE- MISSION PLANNING; COST REDUCTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02342308
AN- <AEROSPACE> A98-22770
TI- BellBoeing 609 commercial tiltrotor cockpit display design
AU- Fischer, Douglas S.; Buck, Richard W. (Boeing Rotorcraft Defense and Space Group, Philadelphia, PA)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 13 p., 1997.
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- Given size, weight, and cost constraints for the 609, the baseline designs of the BellBoeing 609 (609) cockpit displays relied upon the effective application of human performance theory and redundancy management. Three active matrix liquid crystal displays (AMLCD) were integrated into the cockpit to present the Primary Flight Display (PFD) and Engine Instrument Cockpit Alerting System (EICAS) parameters. Numerous display prototypes were developed and evaluated in terms of their effectiveness in displaying critical tiltrotor information. The selection and display of flight parameters for the PFDs and the EICAS were based on both criticality and the frequency in which displays were accessed. FAA certification requirements specified necessary design regulations to satisfy situational awareness and redundancy issues. Due to the unique characteristics of tiltrotor aircraft, the baseline displays provide a new level of pilot performance requirements, while maintaining consistent cockpit display principles and requirements. (Author)
DE- <MAJOR> *TILT ROTOR AIRCRAFT; *COCKPITS; *DISPLAY DEVICES; *ACTIVE MATRIX DISPLAYS; *LIQUID CRYSTALS
DE- FLIGHT DECKS; HUMAN PERFORMANCE; SYSTEMS INTEGRATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02342307
AN- <AEROSPACE> A98-22769
TI- Electronic kneeboard development for aviation use
AU- Spura, Thomas M. (Lockheed Martin Federal Systems, Owego, NY)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 11 p., 1997.
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- We have been studying methods for taking electronic data into the cockpit in lieu of using conventional paper products. Computer processing has become powerful enough to allow the elimination of paper in the cockpit, while providing easier access to any data the aviator may need. We developed a prototype kneeboard-type device for data access using a palm top computer with touch screen interfacing. This unit is called the Aviator's Associate and is initially targeted to military helicopter aviators, with growth to assist all forms of aviation, including fixed wing, crew chief and even maintenance functions. The development process has provided a wealth of design considerations that were solved using models, input from pilots, and adaptations to existing products. This paper describes the development cycle and concerns that evolved during the R&D process. It outlines the development process, modifications made to improve the product, and lessons learned during development. (Author)
DE- <MAJOR> *COCKPITS; *AIRBORNE/SPACEBORNE COMPUTERS; *PILOT'S ASSOCIATE; *PILOT PERFORMANCE
DE- FLIGHT TESTS; COMMERCIAL OFF-THE-SHELF TECHNOLOGY
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02342306
AN- <AEROSPACE> A98-22768
TI- Experimental study of helmet-mounted display attitude and flow cues on rotorcraft hover performance
AU- Bachelder, E. N.; Hansman, R. J., Jr. (MIT, Cambridge, MA)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 8 p., 1997.
PY- 1997
PD- 199700
RF- 4
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- A study was conducted to investigate the use of visual flow and attitude cues as an aid to lateral drift awareness during helicopter flight while using night vision goggles (NVGs). Four displays were compared: (1) NVG display: the baseline display simulating an NVG image of the cockpit and external environment; (2) NVG/Attitude display: NVG image with an overlay of an attitude symbol and a surrounding Earth-referenced wire-frame globe; (3) rate display: an NVG image with an overlay of a flow cue field; and (4) rate/attitude display: an NVG image with the rate and NVG/attitude display overlays. The task objective was to null out lateral rates in the presence of lateral gusts while in a hover (the yaw, longitudinal, and vertical axes of motion were stabilized with an autopilot). This task was conducted in a fixed-based helicopter simulator using a helmet-mounted virtual reality device. Three pilots were used in this preliminary study. The mean rms drift rate error associated with the baseline NVG display was approximately 6 ft/s. The introduction of rate cues reduced this error by a factor of three. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *ROTORCRAFT AIRCRAFT; *HOVERING; *NIGHT FLIGHTS (AIRCRAFT)
DE- FIELD OF VIEW; DRIFT (INSTRUMENTATION)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02342301
AN- <AEROSPACE> A98-22763
TI- Assuring human-centeredness in intelligent rotorcraft cockpits - Using crew intent estimation to coordinate RPA functions
AU- Andes, Robert C., Jr. (Applied Systems Intelligence, Inc., Roswell, GA)

SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06),

Alexandria, VA, American Helicopter Society, 8 p., 1997.
PY- 1997
PD- 199700
RF- 6
CN- DAAJ02-93-C-0008
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- The rationale and design for an intelligent Cockpit Intent Estimator (CIE) system for the Rotorcraft Pilot's Associate (RPA) is described. The CIE is an essential component of the RPA's crew-vehicle cockpit interface, known as the Cockpit Information Manager (CIM) function. Employment of the CIE in the associate allows the numerous, complex aiding functions of the RPA to remain 'lock-step' with the crew as the mission unfolds. CIE interpretation behavior, goal-processing activities, knowledge representation approach, and external communication mechanisms with other intelligent RPA subsystems are described with emphasis on CIE's essential role in the coordination of RPA functions to accurately follow the crew's lead and quickly regain coordination when the crew's intentions change. Of particular interest is the RPA team's significant accomplishment in the area of combining prescriptive, automated task coordination with descriptive, intent understanding for producing intelligent associate behavior. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *COCKPITS; *PILOT PERFORMANCE; *PILOT'S ASSOCIATE
DE- FLIGHT CREWS; ARTIFICIAL INTELLIGENCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02342300
AN- <AEROSPACE> A98-22762
TI- Task-based interface management - A Rotorcraft Pilot's Associate example
AU- Miller, Christopher A.; Funk, Harry B. (Honeywell Technology Center, Minneapolis, MN); Hannen, Matthew (Boeing Helicopter Systems, Mesa, AZ)

SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 6 p., 1997.
PY- 1997
PD- 199700
RF- 5
CN- DAAJ02-93-C-0008
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- Interface management (IM) involves sifting through a potentially overwhelming variety of incoming data, presentation options, control modes, and automation behaviors in order to present what the human operator(s) of a system currently need in a manner that will be easily understood and manipulated by them. In this paper, we discuss our work on an IM system for the U.S. Army's Rotorcraft Pilot's Associate (RPA) - a highly complex, flight-worthy associate system. Interface management functions, performed within RPA by the Cockpit Information Manager (CIM) can be summarized by five basic behaviors: symbol selection, page selection, window placement, pan and zoom setting, and task allocation. We describe each of these behaviors briefly, using examples from a sample RPA mission scenario, and present data from initial implementation and pilot evaluation studies pertaining to pilot acceptance of these interface management behaviors. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *PILOT'S ASSOCIATE; *PILOT PERFORMANCE; *COCKPITS; *INFORMATION MANAGEMENT
DE- COMPUTERIZED SIMULATION; CREW WORKSTATIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02342299
AN- <AEROSPACE> A98-22761
TI- Demonstrated value of data fusion and situation assessment
AU- Stiles, Peter (Lockheed Martin Federal Systems, Owego, NY); Hofmann, Martin (Lockheed Martin Advanced Technology Labs., Camden, NJ)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 9 p., 1997.
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- The Rotorcraft Pilot's Associate (RPA) team has made significant progress in many areas of cognitive decision aiding. This paper focuses on how we are demonstrating the value of data fusion and battlefield situation assessment. It provides an overview of the capabilities of RPA fusion and assessment. It discusses the methods by which we have obtained subjective and objective data and technical performance measures in pilot evaluations and engineering tests, and presents a summary of the results. Results from the first evaluation performed in the fall of 1996 show an average four-fold improvement in correct classification and vehicle count when using RPA compared to a simulated advanced baseline system without RPA. (Author)
DE- <MAJOR> *DATA FUSION; *SITUATIONAL AWARENESS; *COMBAT; *ROTORCRAFT
AIRCRAFT; *PILOT'S ASSOCIATE; *PILOT PERFORMANCE
DE- COMPUTERIZED SIMULATION; SOFTWARE TOOLS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02342298
AN- <AEROSPACE> A98-22760
TI- Rotorcraft Pilot's Associate
AU- Johnson, Dale (U.S. Army, Aviation Applied Technology Directorate, Fort Eustis, VA)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 10 p., 1997.
PY- 1997
PD- 199700
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- The Rotorcraft Pilot's Associate (RPA) is an application of AI and advanced computing technologies to create a cognitive decision aiding system (CDAS) for future combat helicopter pilots. RPA will understand and use information gathered from remote sensors, teammates, and organic mission equipment to develop plans that facilitate the achievement of mission objectives for individual platforms and teams of aircraft. This paper discusses the end-to-end RPA cognitive decision aiding process. It highlights the associate qualities created by the interaction of the task network architecture (TNA) and crew intent estimation (CIE). In addition, it discusses how RPA uses relevant battlefield information to aid the mission execution process. The paper specifies the methods by which the cockpit information manager (CIM) prevents information overload by determining what, when, and where plans and data are displayed based on individual crew preferences and mission context. It identifies the primary technical challenges and closes with an update of program status. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *PILOT'S ASSOCIATE; *AIRCRAFT PILOTS;
*PILOT PERFORMANCE; *ARTIFICIAL INTELLIGENCE; *COGNITION
DE- MILITARY HELICOPTERS; DATA FUSION; COMBAT; COCKPITS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02342295
AN- <AEROSPACE> A98-22757
TI- Transition of Rotorcraft Pilot's Associate cognitive decision aiding to tactical production rotorcraft
AU- Glickstein, Ira S.; Ives, Sherry A.; Stopper, Bernie A. (Lockheed Martin Federal Systems, Owego, NY)
SO- In: AHS Avionics and Crew Systems Technical Specialists' Meeting, Philadelphia, PA, Sept. 23-25, 1997, Proceedings (A98-22751 05-06), Alexandria, VA, American Helicopter Society, 9 p., 1997.
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9805
AB- The cognitive decision aiding (CDA) functionality of the Rotorcraft Pilot's Associate (RPA) project has been transitioned from the large and heavy simulation laboratory processor to a flyable processor suitable for a tactical helicopter. Software developed on a powerful Silicon Graphics multiprocessor that weighs 800 lb and takes up 40 cu ft is now running on our Real-Time Symmetric MultiProcessor (RTSMP) that weighs only 70 lb and takes up less than 2 cu ft. The rugged VME version has passed environmental testing and is available for RPA flight demonstration, scheduled for early 1998. RPA software was developed in the C++ language. Use of commercial off-the-shelf (COTS) hardware and software assures that RTSMP performance will continue to

increase at the high rates typical of the commercial UNIX workstation and PC markets. Our success in this effort demonstrates the potential advantages of ruggedized COTS hardware, COTS operating systems, and commercial software development languages. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *PILOT'S ASSOCIATE; *COGNITION; *PILOT PERFORMANCE; *SOFTWARE ENGINEERING
DE- COMMERCIAL OFF-THE-SHELF TECHNOLOGY; WORKSTATIONS; UNIX (OPERATING SYSTEM)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02334552
AN- <AEROSPACE> A98-15014
TI- The Draper Laboratory small autonomous aerial vehicle
AU- DeBitetto, Paul A.; Johnson, Eric N. (Charles Stark Draper Lab., Inc., Cambridge, MA); Bosse, Michael C. (Boston Univ., MA)
SO- In: Enhanced and synthetic vision 1997; Proceedings of the Meeting, Orlando, FL, Apr. 21, 22, 1997 (A98-15001 02-35), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3088), 1997, p. 110-120.
PY- 1997
PD- 199700
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9802
AB- The Charles Stark Draper Laboratory and students from MIT and Boston U. have cooperated to develop an autonomous aerial vehicle that won the 1996 International Aerial Robotics Competition. This paper describes the approach, system architecture and subsystem designs for the entry. This entry represents a combination of many technology areas: navigation, guidance, control, vision processing, human factors, packaging, power, real-time software, and others. The aerial vehicle, an autonomous helicopter, performs navigation and control functions using multiple sensors: differential GPS, inertial measurement unit, sonar altimeter, and a flux compass. The aerial transmits video imagery to the ground. A ground-based vision processor converts the image data into target position and classification estimates. The system was designed, built, and flown in less than one year, and has provided many lessons about autonomous vehicle systems, several of which are discussed. (Author)
DE- <MAJOR> *LABORATORY EQUIPMENT; *AUTONOMOUS NAVIGATION; *AIRCRAFT DESIGN ; *ROTARY WING AIRCRAFT
DE- STUDENTS; BLOCK DIAGRAMS; FLIGHT TESTS; GROUND TESTS; AIRCRAFT GUIDANCE ; AIRCRAFT COMMUNICATION; ONBOARD DATA PROCESSING; GROUND STATIONS; DATA PROCESSING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02334182
AN- <AEROSPACE> A98-14644
TI- Flight technology and the human factor
TI- <ORIGINAL> Flugtechnik und Faktor Mensch
SO- DLR-Nachrichten (ISSN 0937-0420), no. 87, Nov. 1997, p. 14-19. In German.
PY- 1997
PD- 199711
SN- 0937-0420
LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9802
AB- Computerized simulations, wind tunnel tests, and flight tests being conducted on helicopters and fixed-wing aircraft at the Institute for Flight Mechanics at Braunschweig are examined. Special attention is given to the interface between man and machine. (AIAA)
DE- <MAJOR> *X-31 AIRCRAFT; *MAN MACHINE SYSTEMS; *HUMAN FACTORS ENGINEERING; *COMPUTERIZED SIMULATION; *HELICOPTERS; *WIND TUNNEL TESTS
DE- OPTIMIZATION; FLIGHT CHARACTERISTICS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02332308
AN- <AEROSPACE> A98-12770
TI- A usability assessment of virtual reality simulation for aerial gunner training
AU- Silverman, Denise R. (Hughes Training, Inc., Albuquerque, NM); Spiker,

V. A. (Anacapa Sciences, Inc., Santa Barbara, CA)
SO- In: Human Factors and Ergonomics Society, Annual Meeting, 41st, Albuquerque, NM, Sept. 22-26, 1997, Proceedings. Vol. 2 (A98-12670 01-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1997, p. 1218-1222.
PY- 1997
PD- 199700
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9801
AB- The 58th Training Support Squadron (58 TRSS) has begun use of a one-of-a-kind virtual reality (VR) simulator for training aerial gunner/scanner (AG/S) tasks. This paper briefly describes the development considerations of the device and an initial usability assessment of the helmet mounted display (HMD) and the helmet. Eleven experienced rotary-wing instructors with varying levels of experience in the Aerial Gunner Scanner Simulator (AGSS) were surveyed. Their ratings and comments regarding 17 helmet components are summarized. The results suggested that overall the helmet is acceptable. However, critical components require improvements. There is a need to improve the cathode ray tubes (CRTs) and to increase the update rates for the head trackers. The results also indicated that helmet comfort factors and fitting procedures are problematic. Several recommendations are made based on these central findings applicable to both AGSS-users in particular and VR-users in general. (Author)
DE- <MAJOR> *VIRTUAL REALITY; *TRAINING EVALUATION; *GUNNERY TRAINING; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING
DE- MILITARY PERSONNEL; TRAINING SIMULATORS; PRODUCT DEVELOPMENT; TECHNOLOGY ASSESSMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02332215
AN- <AEROSPACE> A98-12677
TI- An investigation of helmet-mounted display field-of-view and overlap tradeoffs
AU- Jennings, Sion (NRC of Canada, Ottawa); Dion, Manfred (German Armed Forces Flight Test Center, Manching, Germany)
SO- In: Human Factors and Ergonomics Society, Annual Meeting, 41st, Albuquerque, NM, Sept. 22-26, 1997, Proceedings. Vol. 1 (A98-12670 01-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1997, p. 32-36.
PY- 1997
PD- 199700
RF- 15
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9801
AB- NRC researchers investigated the tradeoffs between binocular-overlap and FOV in helmet-mounted displays. Four test pilots performed a series of maneuvers in a helicopter while wearing FOV limiting goggles. They evaluated a monocular FOV, a range of binocular overlaps, and unrestricted vision. Pilots evaluated the system performance and handling qualities using Cooper-Harper Handling Qualities Ratings, visual cue ratings, and subjective comments. The handling qualities of the helicopter/pilot system changed in a nonlinear fashion as the binocular overlap increased. Pilot comments, preferences, and visual cue ratings showed the same trends as the handling qualities data. Practical applications of the results are discussed, including helicopter control system augmentation to allow improved performance in degraded visual conditions. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *FIELD OF VIEW; *TRADEOFFS; *BINOCULAR VISION; *MONOCULAR VISION; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *CONTROLLABILITY; *MAN MACHINE SYSTEMS
DE- VISUAL SIGNALS; AIRCRAFT MANEUVERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02328884
AN- <AEROSPACE> N97-32048
TI- General Aviation Accidents, 1983-1994: Identification of Factors Related to Controlled-Flight-Into-Terrain (CFIT) Accidents
TI- <SUPPLEMENT> Final Report, 1983-1994
AU- BUD, MELISSA J.; MENGERT, PETER; RANSOM, STEPHEN; STEARNS, MARY D.
CS- Federal Aviation Administration, Atlantic City, NJ. John A. Volpe National Transportation Systems Center
CS- <CODE> FI751336
PY- 1997
PD- 199707
PG- 26P.
RN- AD-A329503; DOT-VNTSC-FAA-97-8; DOT/FAA/AAR-100-97-2; NIPS-97-61638

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9701
AB- The purpose of this report is to describe the characteristics of general aviation (GA) accidents and to identify factors related to the occurrence of controlled-flight-into-terrain (CFIT) accidents in GA. This study used the National Transportation Safety Board (NTSB) database of 31,790 aviation accidents that occurred between 1983 and 1994, inclusive. In the NTSB aviation accident database, 86.7 percent of these accidents were GA accidents. This study analyzed the subset of accidents involving GA airplanes and helicopters to investigate possible factors in CFIT accidents to guide further analyses and design of experiments to improve pilots' ability to avoid collisions with terrain. (DTIC)
SF- DTIC
DE- <MAJOR> *ACCIDENT INVESTIGATION; *AIRCRAFT ACCIDENTS; *GENERAL AVIATION AIRCRAFT
DE- ACCIDENT PREVENTION; AIRCRAFT SAFETY; DATA BASES; FLIGHT CONTROL; HELICOPTERS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE; TERRAIN
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02328642
AN- <AEROSPACE> N97-31792
TI- Effects of Pilot Workload on EEG Activity Recorded during the Performance of In-Flight Maneuvers in a UH-1 Helicopter
TI- <SUPPLEMENT> Final Report
AU- CALDWELL, JOHN A., JR.; ROBERTS, KRISTI A.; KELLY, C. F.; JONES, HEBER D.; LEWIS, JAMES A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL. Aircrew Health and Performance Div.
CS- <CODE> AY826435
PY- 1997
PD- 199708
PG- 63P.
RN- AD-A329232; USAARL-97-31; NIPS-97-61908
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9701
AB- The present investigation was designed to: (1) assess the overall quality of EEG recordings collected from helicopter pilots during the actual performance of in-flight maneuvers; (2) determine whether there are workload-induced changes in the EEGs recorded under resting in-flight conditions and on-the-controls in-flight conditions; and (3) evaluate whether in-flight EEGs are sufficiently sensitive to detect small changes in the workload levels associated with different types of flight maneuvers. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MANEUVERS; *ELECTROENCEPHALOGRAPHY; *PILOT PERFORMANCE; *UH-1 HELICOPTER; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DATA ACQUISITION; MEDICAL SCIENCE; SENSITIVITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02328548
AN- <AEROSPACE> N97-31692
TI- Helivionics: Helicopter Avionics
TI- <ORIGINAL> Smiglowce w Polsce
AU- MAZUREK, JACEK
CS- Instytut Lotnictwa, Warsaw (Poland).
CS- <CODE> IQ382796
PY- 1997
PD- 199701
NT- In its Transactions of the Institute of Aviation Scientific Quarterly p 66-78 (SEE N97-31685 01-01)
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9701
AB- An article represents specifics of helicopter avionics systems arising from helicopter's design features, flight conditions, tasks executed especially on low altitudes and pilotage techniques as well. Examples of modern equipment for NOE flights concerning elements of modern equipment elaborated in the Institute of Aviation are presented. The

part of avionics systems integration and experiences of the Institute of Aviation in this domain are discussed here. (Author)
DE- <MAJOR> *AIRCRAFT DESIGN; *AVIONICS; *HELICOPTERS; *SYSTEMS INTEGRATION

DE- FLIGHT CONDITIONS; LOW ALTITUDE; NIGHT FLIGHTS (AIRCRAFT); PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02325313
AN- <AEROSPACE> A97-45098
TI- A simulation evaluation of VFR heliport operations in an obstacle-rich environment
AU- Daum, James M.; Grenell, James F.; Wilkinson, Paul R.; Zmroczek, Leon A. (Boeing Defense & Space Group, Philadelphia, PA); Bolz, Eric H.; Sawyer, Brian M. (Science Applications International Corp., Arlington, VA); Kramer, Arthur F.; Weber, Timothy A.; Wickens, Christopher D. (Illinois, Univ., Urbana)
SO- AIAA and SAE, 1997 World Aviation Congress, Anaheim, CA, Oct. 13-16, 1997, 13 p..
PY- 1997
PD- 199710
RF- 26
RN- AIAA Paper 97-5532; SAE Paper 975532
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9712
AB- A study was conducted to investigate the impacts of obstacles on pilot performance, workload, and perceptions of safety in a visual flight rule (VFR) obstacle-rich environment. The study was conducted using a piloted simulation of a single-rotor, multiengine helicopter operating in a highly detailed urban visual scene database. The database contained multiple obstacle types, with variable obstacle heights and densities. Nine pilots completed the approaches and departures into and out of a heliport located in the center of the generic urban environment. Two flight routes offered unique presentations of terrain and obstacle types. Obstacle height/density and time of day/lighting parameters were systematically manipulated. A multidimensional data collection methodology employing the simultaneous collection of direct aircraft state, pilot performance data, pilot physiological data and pilot subjective responses was employed. This paper presents an overview of this experimental methodology, including data collection techniques. Problems and challenges encountered in this type of simulation experiment are also addressed. (Author)
DE- <MAJOR> *COMPUTERIZED SIMULATION; *HELIPORTS; *OBSTACLE AVOIDANCE;
*PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *VISUAL FLIGHT RULES
DE- DATA BASES; DATA ACQUISITION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02325312
AN- <AEROSPACE> A97-45097
TI- Simulation test of a novel display to minimize the risk of spatial disorientation
AU- Braithwaite, Malcolm G.; Durnford, Simon J.; Wildzunas, Robert M. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- AIAA and SAE, 1997 World Aviation Congress, Anaheim, CA, Oct. 13-16, 1997, 11 p..
PY- 1997
PD- 199710
RF- 9
RN- AIAA Paper 97-5528; SAE Paper 975528
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9712
AB- Spatial disorientation (SD) in flight remains a major source of attrition. Some aircraft accidents in which SD is implicated might be amenable to improved instrument displays. This paper describes an assessment of a novel flight instrument display in a UH-60 helicopter flight simulator. Sixteen male aviators flew a simulated instrument flight profile and recovered from unusual attitudes using the standard flight instruments and the novel display. The two display formats were tested both with and without a secondary task. Both control of flight parameters and recovery from unusual attitudes were significantly improved when using the novel display, and cognitive workload was reduced. (Author)
DE- <MAJOR> *COMPUTERIZED SIMULATION; *DISORIENTATION; *FLIGHT SIMULATORS;
*UH-60A HELICOPTER; *DISPLAY DEVICES; *PILOT PERFORMANCE

DE- WORKLOADS (PSYCHOPHYSIOLOGY); AUTOMATIC FLIGHT CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02323010
AN- <AEROSPACE> A97-47795
TI- Determining laser induced fluorescence excitation wavelengths for detection of stress in vegetation
AU- McMurtrey, James E. (USDA, Remote Sensing and Modeling Lab., Beltsville, MD); Corp, Lawrence A.; Chappelle, Emmett W.; Kim, Moon S. (NASA, Goddard Space Flight Center, Greenbelt, MD)
SO- In: Optics for science and new technology; Proceedings of the 17th Congress of the International Commission for Optics, Taejon, Republic of Korea, Aug. 19-23, 1996. Pt. 2 (A97-47776 13-74), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2778), 1996, p. 594, 595.
PY- 1996
PD- 199600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9713
AB- Considerable effort is being directed by many research groups toward the development of instrumentation to remotely excite and sense the fluorescence of vegetation at the field and forest canopy level. Fluorescence sensing systems are being developed for ground based mobile vans, helicopters, and small aircraft. Excitation of fluorescence for detection of plant stress conditions is the goal of these efforts. (Author)
DE- <MAJOR> *LASER INDUCED FLUORESCENCE; *PLANT STRESS; *EXCITATION; *WAVELENGTHS
DE- PHOTOSYNTHESIS; EMISSION SPECTRA
SH- 8743 Earth Resources & Remote Sensing (1987-)

AN- <DIALOG> 02318054
AN- <AEROSPACE> N97-25692
TI- Active Noise Reduction Flight Tests in Military Helicopters
AU- SIMPSON, CAROL; KING, ROBERT
CS- Psycho-Linguistic Research Associates, Menlo Park, CA.
CS- <CODE> P6249806
PY- 1997
PD- 199706
NT- In Psycho-Linguistic Research Associates, Audio Effectiveness in Aviation p (SEE N97-25668 01-32)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9701
AB- US Army Aeroflightdynamics Directorate (AFDD), in collaboration with AS Aeronautical and Maritime Research Laboratory (AMRL), has conducted flight tests in a range of military helicopters to determine the potential benefit of active noise reduction (ANR) earcups developed by the UK's Defense Research Agency (DRA) for military aircrew. Test data include (a) acoustic attenuation characteristics, (b) speech intelligibility, (c) aircrew ratings of cockpit speech intelligibility, clarity, and attention demand for speech message recognition, and (d) ratings of the suitability of ANR for operational use. Test aircraft in which data were collected include American NAH-1S (Cobra), UH-1H (Huey), OH-58D (Kiowa), AH-64A (Apache), EH-60 (Blackhawk), and Australian S-70B-2 (Seahawk) and S-70A-9 (Black Hawk). Results show that the DRA ANR system effectively reduced the level of low frequency noise (less than 800 Hz) and reduced overall at-ear sound pressure levels (SPL's) by around 10 dB. Results also indicate that ANR substantially increases speech intelligibility, reduces the level of attention pilots must use to understand speech communications, works with onboard weapons firing noise, allows pilots to hear familiar audio cues necessary for aircraft situational awareness, and functions without failure in training and actual combat conditions. With the DRA ANR system, speech intelligibility meets the exceptionally high intelligibility criteria as defined in MIL-STD 1472 for operational systems, providing the speech intelligibility needed to ensure that pilots and soldiers communicate tactical information accurately. (Author)
DE- <MAJOR> *ACOUSTIC ATTENUATION; *EAR PROTECTORS; *FLIGHT CREWS; *FLIGHT TESTS; *MILITARY HELICOPTERS; *NOISE REDUCTION; *SPEECH RECOGNITION
DE- AUDITORY FATIGUE; COCKPITS; CUES; HUMAN FACTORS ENGINEERING; LOW FREQUENCIES; SOUND PRESSURE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02318051
AN- <AEROSPACE> N97-25689
TI- Adaptive Active Noise Reduction Headset for Helicopter Aircrew
AU- PAN, G. J.; BRAMMER, A. J.; CRABTREE, R. B.
CS- National Research Council of Canada, Ottawa (Ontario).
CS- <CODE> NL210403
PY- 1997
PD- 199706
NT- In National Research Council of Canada, Audio Effectiveness in Aviation (SEE N97-25668 01-32)
LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9701
AB- The feasibility of applying adaptive active noise reduction (ANR) to a communication headset has been explored by applying digital feedforward control to a headset designed for helicopter aircrew. A miniature microphone was mounted on the outside of one circumaural earmuff to provide a reference signal, while the original microphone and earphone located within the volume enclosed by the earcup of a commercial ANR headset were retained to provide an 'error' signal and the corrective sound field, respectively. The signals were digitized and processed in real time by a TMS320C31 digital signal processor operating at 40 MHz. The performance of the apparatus has been evaluated in a reverberant room using a recording of Sea King helicopter noise at the aircrew position. The noise was replayed so as to reproduce the sound pressure levels measured in the helicopter during hover. Both noise spectrum and level were confirmed by one-third octaveband analysis. For active control, the helicopter noise was band-limited to from 10 to 1000 Hz. When tested on five subjects, the apparatus controlled the noise at the ear within this frequency range, and the control system was stable. The noise reduction recorded at the error microphone, i.e., close to the ear canal entrance, was in excess of 10 dB from 16 to 300 Hz for all subjects, and ranged from 10 to 26 dB at the rotor blade passage frequency (16 Hz), and from 10 to 20 dB at frequencies up to 200 Hz, depending on the subject. The differences in ANR experienced by the subjects are believed to be associated with variations in the fit of the headset, and remain the subject of continuing research. (Author)
DE- <MAJOR> *ACTIVE CONTROL; *AIRCRAFT NOISE; *DESIGN ANALYSIS; *DIGITAL SYSTEMS; *EARPHONES; *FEEDFORWARD CONTROL; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *MICROPHONES; *NOISE REDUCTION; *REAL TIME OPERATION; *SIGNAL ANALYZERS
DE- AUDITORY FATIGUE; ERROR SIGNALS; FREQUENCY RANGES; NOISE INJURIES; NOISE SPECTRA; SH-3 HELICOPTER; SIGNAL PROCESSING; SOUND FIELDS; SOUND PRESSURE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02318049
AN- <AEROSPACE> N97-25687
TI- Effects of Active Noise Reduction on Noise Levels at the Tympanic Membrane
AU- WAGSTAFF, A. S.; WOXEN, O. J.
CS- Royal Norwegian Air Force, Oslo (Norway). Inst. of Aviation Medicine
CS- <CODE> R6355300
PY- 1997
PD- 199706
NT- In Royal Norwegian Air Force, Audio Effectiveness in Aviation p (SEE N97-25668 01-32)
NT- Sponsored in part by Norwegian Air Ambulance
LA- English
GL- Norway
CP- Norway
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9701
AB- Active noise reduction (ANR) is an electronic system that works by continuous sampling of noise inside the earshell of the headset with a small microphone. This signal is inverted in phase through the headset speaker, thus reducing noise levels by destructive interference of the acoustic field. The system provides good low-frequency noise attenuation, but air crew differ in their subjective opinion of ANR. The present study is an attempt to provide an objective assessment of the effect of ANR on noise levels at the tympanic membrane. Seven subjects with normal ears were placed in an environment of recorded noise from a BO-105 helicopter. A microphone probe was inserted to within 5 mm of the tympanic membrane of each subjects right ear. Noise levels in the ear were measured without a headset and with two different ANR headsets. Measurements were performed with and without

the ANR system on, and, with and without white noise through the headset communication system. The white noise was used to simulate aircraft communication noise. The two headsets tested had differing levels of passive and active attenuation. The ANR system produced a substantial low-frequency attenuation. However, noise levels in the mid frequencies increased somewhat when the ANR system was switched on. This effect was augmented when white noise in the communications system was introduced, particularly for one of the two headsets. Low-frequency noise attenuation of ANR systems is substantial, but an increased mid-and high frequency noise level caused by the ANR may affect both communication and overall noise levels. Our data provide advice on what factors should be taken into account when ANR is evaluated for use in an aviation operational environment. (Author)

DE- <MAJOR> *ACOUSTICS; *ACTIVE CONTROL; *AIRCRAFT COMMUNICATION; *CONTINUOUS NOISE; *EAR PROTECTORS; *EARPHONES; *FLIGHT CREWS; *NOISE REDUCTION; *WHITE NOISE

DE- AUDITORY FATIGUE; BO-105 HELICOPTER; HUMAN FACTORS ENGINEERING; MICROPHONES; NOISE INJURIES; NOISE INTENSITY; SOUND FIELDS

SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02318048

AN- <AEROSPACE> N97-25686

TI- Assessment of Active Noise Reduction Hearing Protectors: Noise Attenuation and Speech Intelligibility

TI- <ORIGINAL> Evaluation de Casques a Reduction Active de Bruit: Protection Auditive et Intelligibilite

AU- PELLIEUX, L.; SARAFIAN, D.; REYNAUD, G.

CS- Centre d'Enseignement et de Recherches de Medecine Aeronautique, Bretigny (France). IMASSA

CS- <CODE> CK388768

PY- 1997

PD- 199706

NT- In Centre d'Enseignement et de Recherches de Medecine Aeronautique, Audio Effectiveness in Aviation p (SEE N97-25668 01-32)

LA- French

GL- France

CP- France

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> CASI HC A03/MF A03

JA- STAR9701

AB- Hearing protection offered by current pilot helmets is far to be fully satisfying as shown by the large number of hearing losses observed in military aviators at retirement age. Due to the poor intelligibility of communication channels the sound volume has to be significantly increased which adds a dangerous auditory stressor. Eight hearing protectors such as commercially available active noise reduction (ANR) headsets and prototype helmets, equipped with ANR earshells, were assessed in order to estimate their efficacy for both noise attenuation and improvement on speech intelligibility. The assessment was based on original experimental protocols including abnormal conditions, objective measurement of both passive and active attenuations by the MIRE method, subjective prediction of intelligibility by measuring the Speech Transmission Index, and its subjective evaluation through CVC tests. Realistic jet and helicopter noisy environments and a pink noise have been used to perform the tests. The results obtained with the various systems assessed are presented and discussed. (Author)

DE- <MAJOR> *AIRCRAFT PILOTS; *AUDITORY FATIGUE; *EAR PROTECTORS; *EARPHONES; *HEARING; *NOISE INJURIES; *NOISE REDUCTION; *SPEECH RECOGNITION

DE- ACTIVE CONTROL; HELMETS; HUMAN FACTORS ENGINEERING; LOUDNESS; SOUND INTENSITY

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02318046

AN- <AEROSPACE> N97-25684

TI- The Communications Earplug: A Logical Choice for Voice Communications in Aircraft

AU- MOZO, BEN T.; RIBERA, JOHN E.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.

CS- <CODE> AY826435

PY- 1997

PD- 199706

NT- In Army Aeromedical Research Lab., Audio Effectiveness in Aviation p (SEE N97-25668 01-32)

NT- Sponsored by Army Project Managers Office

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> CASI HC A02/MF A03

JA- STAR9701

AB- The U.S. Army aviator works in high levels of noise and routinely

faces the challenge of effective voice communication. Existing aviator helmets, while adequate in providing hearing protection, do not provide the signal-to-noise ratio necessary to optimize in-flight voice communications. The Communications Earplug (CEP) is a small device worn by the aviator and provides significant improvements in hearing protection and communication performance. The CEP uses a miniature earphone transducer adapted to a replaceable foam earplug. Attenuation characteristics of the CEP are similar to those of other insert hearing protective devices and provide adequate protection in U.S. Army noise environments. Additional protection results when the CEP is worn with the aviator's helmet. The CEP is comfortable over a period of several hours and, in its current configuration, is considered highly acceptable by seasoned aviators and crewmembers. The CEP is easier to insert and seat in the outer ear canal than other insert protectors available through military channels. Speech intelligibility in simulated helicopter noise is significantly enhanced when using the CEP when compared to the standard SPH-4 and HGU-56/P aviator's helmets. CEP and active noise reduction (ANR) results are comparable in terms of speech intelligibility. However, there are several differences that should be considered before deciding which is the system of choice. The technology developed for CEP has wide-ranging application in the military and can easily be adapted to communication needs in the civilian community. The CEP is an inexpensive device that can enhance air and ground crewmember voice communications in the operational environment, and should be positively considered for inclusion into all aircraft and vehicular communication helmets as a battlefield multiplier for the 21st century. (Author)
DE- <MAJOR> *ACTIVE CONTROL; *AIRCRAFT PILOTS; *AUDIO EQUIPMENT; *AUDITORY PERCEPTION; *EAR PROTECTORS; *EARPHONES; *HEARING; *HELMETS; *NOISE REDUCTION; *VOICE COMMUNICATION
DE- AIRCRAFT NOISE; DESIGN ANALYSIS; FLIGHT CLOTHING; HELICOPTERS; HUMAN FACTORS ENGINEERING; PERFORMANCE TESTS; SIGNAL TO NOISE RATIOS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02317882
AN- <AEROSPACE> N97-25502
TI- Store Separation
AU- MCBEATH, J. R. B.
CS- Westland Helicopters Ltd., Yeovil (England).
CS- <CODE> WW895582
PY- 1997
PD- 199707
NT- In Westland Helicopters Ltd., Helicopter/Weapon System Integration p (SEE N97-25498 01-01)
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A02
JA- STAR9701
AB- The safe separation of a store from any aircraft represents potentially the most hazardous phase of the store release process. The paper examines in turn the various mechanical and aerodynamic influences that come into play during store separation, reviews the requirements imposed by national standards, and explores how modeling and instrumentation techniques have advanced to benefit programs that include verification of safe store separation. (Derived from text)
SF- NASA CASI
DE- <MAJOR> *EXTERNAL STORE SEPARATION; *FLIGHT CHARACTERISTICS; *HELICOPTERS; *MILITARY HELICOPTERS; *ROTARY WING AIRCRAFT
DE- AIRCRAFT RELIABILITY; FLIGHT ENVELOPES; HELICOPTER PERFORMANCE; MANEUVERABILITY
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02317540
AN- <AEROSPACE> N97-24975
TI- Rotorcraft-Pilot Coupling: A Critical Issue for Highly Augmented Helicopters?
AU- HAMEL, PETER G.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugmechanik
CS- <CODE> DO696666
PY- 1997
PD- 199704
NT- In Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Advances in Rotorcraft Technology p (SEE N97-24957 01-05)
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A04

JA- STAR9701
AB- Rotorcraft-pilot coupling (RPC) has became a critical issue for flight safety. Based on experience in the field of aircraft-pilot coupling (APC), definitions and limited prediction opportunities of three RPC categories are discussed. Time delay, rate-limiting elements and pilot manipulators of full-authority FbW/L flight control systems provide new potentials of unfavorable rotorcraft-pilot coupling phenomena. Some limited RPC flight test experience at AFDD and DLR is presented. Research requirements for soliciting RPV prevention methodologies and technologies are laid down. New flight test techniques prediction tools and advanced technologies are proposed to improve RPC immunity. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT CONTROL; *FLIGHT TESTS; *HELICOPTERS; *PILOT INDUCED OSCILLATION
DE- AERODYNAMIC STABILITY; AIRCRAFT CONTROL; FLIGHT SAFETY; MAN MACHINE SYSTEMS; PILOT PERFORMANCE; REMOTELY PILOTED VEHICLES; TIME LAG
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02317529
AN- <AEROSPACE> N97-24964
TI- Evaluation of Transport Helicopter Piloting Capacity, Using In-Flight Tests of the ADS-33C Type: Formal Establishment of the Test Methodology and Instrumentation
TI- <ORIGINAL> Evaluation de la Pilotabilite des Helicopteres de Transport en Utilisant les Essais en Vol de Type ADS-33C: Formalisation de la Methodologie et de l'Instrumentation d'Essais
AU- FOURNIER, D.; PAPILLIER, D.
CS- Centre d'Essais en Vol, Istres (France).
CS- <CODE> CK478427
PY- 1997
PD- 199704
NT- In Centre d'Essais en Vol, Advances in Rotorcraft Technology p (SEE N97-24957 01-05)
LA- French
GL- France
CP- France
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9701
AB- Flight tests, of the type of those proposed by ADS033, are performed to evaluate piloting capacity during the developing and testing of transport helicopter. Based on the results of an experiment conducted on SA332 Super Puma MK 2 helicopter, this document attempts to present a methodology and the resources for the necessary tests. (Transl. by SCITRAN)
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER CONTROL; *HELICOPTER DESIGN; *HELICOPTERS; *MANEUVERABILITY; *PILOTS (PERSONNEL)
DE- CONTROLLABILITY; FLIGHT CHARACTERISTICS; HELICOPTER PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02317526
AN- <AEROSPACE> N97-24961
TI- An Investigation of Primary Flight Control Failure in a Piloted Helicopter
AU- GIBBARD, SCOTT R.; REID, L. D.
CS- Atlantis Aerospace Corp., Brampton (Ontario).
CS- <CODE> A6483763
PY- 1997
PD- 199704
NT- In Atlantis Aerospace Corp., Advances in Rotorcraft Technology p (SEE N97-24957 01-05)
LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9701
AB- The application of fly-by-wire techniques to helicopters allows for a number of advanced control schemes that can be used to enhance performance and safety. An experiment has been carried out in a manned helicopter simulator to evaluate the possibility of making use of such a system to allow the pilot to retain control over the helicopter following catastrophic failure of the lateral cyclic primary control. It was demonstrated that a pilot can switch to pedals as the lateral control input provided that the tail rotor is controlled by an autopilot mode. The feasibility of this process has been evaluated for a range of system configurations and the corresponding handling qualities ratings are reported. (Author)

DE- <MAJOR> *CONTROLLABILITY; *FLIGHT CONTROL; *FLIGHT HAZARDS; *FLIGHT
SAFETY; *FLY BY WIRE CONTROL; *HELICOPTER CONTROL; *HELICOPTERS; *LATERAL CONTROL; *MANUAL CONTROL; *PILOT PERFORMANCE; *SYSTEM FAILURES

DE- FLIGHT SIMULATORS; HELICOPTER PERFORMANCE; PEDALS; RECOVERABILITY;
SYSTEMS ENGINEERING; TAIL ROTORS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02315581
AN- <AEROSPACE> A97-41122
TI- Helicopter door and window jettison mechanisms for underwater escape - Ergonomic confusion
AU- Brooks, S. J.; Bohemier, A. P. (Defence and Civil Inst. of Environmental Medicine, North York, Canada)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 68, no. 9, Sept. 1997, p. 844-857.
PY- 1997
PD- 199709
RF- 15
SN- 0095-6562
LA- English
GL- Canada
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- There are 23 different door, hatch, and window release mechanisms identified in 35 types of helicopters that earn their living over water. There is no standardization of the mechanism within each cockpit or among helicopter types, nor is there any standardization of the location relative to the operation, whether the mechanism matches the task or in which direction the door/hatch/window is jettisoned. New regulations are needed by military and civilian authorities to address the ergonomic confusion. (Author)
DE- <MAJOR> *HELICOPTER PERFORMANCE; *DOORS; *WINDOWS; *UNDERWATER TESTS;
*ESCAPE; *HUMAN FACTORS ENGINEERING
DE- COCKPITS; STANDARDIZATION; HATCHES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02315525
AN- <AEROSPACE> A97-41066
TI- RAH-66 Comanche flight test crew station configuration
AU- Gracia, J. A. (Harris Corp., Harris Government Aerospace Systems Div., Melbourne, FL); Becker, J. V. (Applied Display Technology, Westlake Village, CA)
SO- In: Cockpit displays IV; Flat panel displays for defense applications; Proceedings of the Conference, Orlando, FL, Apr. 23-25, 1997 (A97-41051 11-31), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3057), 1997, p. 147-152.
PY- 1997
PD- 199700
RF- 2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- The No. 1 RAH-66 Comanche helicopter has been fitted with a dedicated multifunction Cockpit Instrumentation Display System (CIDS) to provide real-time telemetry/instrumentation data to the flight test crew. In each crew station, the CIDS provides a color Active Matrix Liquid Crystal Display (AMLCD) video terminal, two color AMLCD graphics terminals, switches, and Light Emitting Diode (LED) indicators as a complement to the 'production' AMLCDs driven by the installed Mission Equipment Package (MEP) avionics. The CIDS operates from the telemetry systems's Airborne Computer Units (ACUs) which are independent of the MEP. The real-time telemetry and instrumentation information facilitates the flight test crew's ability to diagnose flight anomalies and provides insight into the performance of numerous aircraft systems. The video terminal AMLCD supports the selection of multiple pages of information - customized instruments can be programmed overnight to support the next day's tests. The CIDS additionally provides a backup 'fly home' capability for the pilots should the MEP fall during flight tests. The CIDS has proven invaluable by providing the needed information to expedite performance of the flight test program. (Author)
DE- <MAJOR> *FLIGHT CREWS; *CREW WORKSTATIONS; *AH-64 HELICOPTER; *ACTIVE
MATRIX DISPLAYS; *LIQUID CRYSTALS; *COCKPITS
DE- FLIGHT TESTS; TELEMETRY; COMPUTER GRAPHICS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02315521
AN- <AEROSPACE> A97-41062
TI- An in-flight evaluation of stereoscopic imagery in helicopter cockpits
AU- Jennings, Sion; Baillie, Stewart W. (NRC of Canada, Flight Research Lab., Ottawa)
SO- In: Cockpit displays IV; Flat panel displays for defense applications; Proceedings of the Conference, Orlando, FL, Apr. 23-25, 1997 (A97-41051 11-31), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3057), 1997, p. 108-117.
PY- 1997
PD- 199700
RF- 9
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- A stereoscopic 3-D display format was tested to determine the feasibility of using pictorial and stereoscopic cues during helicopter instrument approach procedures (IAP). Three qualified test pilots flew a series of approach procedures using a modified conventional electronic flight instrumentation format, a pictorial display format, and a pictorial stereoscopic display format. The preliminary evaluation focused on the effect of display format on pilot performance during the approach task, from an approach intercept to the decision height. Performance criteria such as aircraft speed error, localizer error, and glide slope error were measured. Additionally, pilots answered a questionnaire on each display format and rated the workload required to fly the approaches using the Cooper-Harper scale. Pilots were able to complete approaches to safe landings using any of the display formats. Pilots reported that the pictorial format improved their situation awareness during the approach. Pilots also reported that the stereo cues incorporated in the display design did not significantly enhance their ability to perform IAP. The pictorial display contained several strong monocular depth cues such as occlusion, linear perspective, and motion flow; therefore the stereo cues were of limited value. Pilots most preferred the conventional display, which provided the most accurate tracking capabilities and lowest workload. (Author)
DE- <MAJOR> *COCKPITS; *STEREOSCOPY; *IN-FLIGHT MONITORING; *HELICOPTERS;
*IMAGERY; *FLIGHT TESTS
DE- PILOT TRAINING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02315152
AN- <AEROSPACE> A97-40693
TI- Rotary-wing biomedical and human factors research at the U.S. Army Aeromedical Research Laboratory
AU- Burt, Linda M.; Rash, Clarence E.; McEntire, B. J.
SO- Vertiflite (ISSN 0042-4455), vol. 43, no. 4, Aug. 1997, p. 42-46.
PY- 1997
PD- 199708
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- The U.S. Army Aeromedical Research Laboratory (USAARL), located at Fort Rucker, AL, has 35 years of experience in aviation and problem solving. The mission of the USAARL since its establishment in 1962 has been the support of Army aviation and airborne activities. This mission has since expanded to include medical research programs in acoustics and vision, and health-hazard assessments of rotary-wing aircraft, tactical ground vehicles, selected weapons systems, and airborne operations. A brief review of aviation-related programs and issues addressed by the USAARL in previous years is presented. Current research at the USAARL generally encompasses the areas of health hazards and combat crew effectiveness. Health hazard research projects address issues relating to potential or known risks to the health and safety of personnel who test, use, and maintain Army systems or components. Research into combat crew effectiveness encompasses performance degradation over the entire range of sensory input and responses, to include physical (e.g., visual, auditory, tactile, thermal, etc.) and physiological factors. Recent research and development activities by the USAARL involving the areas of health hazards and combat crew effectiveness are presented and discussed. (AIAA)
DE- <MAJOR> *ROTARY WINGS; *BIOMEDICAL DATA; *HUMAN FACTORS ENGINEERING;
*AEROSPACE MEDICINE; *RESEARCH AND DEVELOPMENT
DE- FLAT PANEL DISPLAYS; NOISE REDUCTION; HELMET MOUNTED DISPLAYS; ANECHOIC
CHAMBERS

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02315148
AN- <AEROSPACE> A97-40689
TI- Innovative initiatives
AU- Price, Antonia
SO- Aerospace International (ISSN 0305-0831), vol. 24, no. 9, Sept. 1997, p. 26-30.
PY- 1997
PD- 199709
SN- 0305-0831
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- The product cost is the determining factor behind what is developed and procured within the aerospace industry. The realization that affordability holds such sway has led to some far-reaching developments and departures in rotorcraft technology, such as tiltrotors and tiltwings. Technology has now reached the stage where these alternative configurations are becoming practical for commercial and military use. This article discusses these new vertical takeoff and landing designs, the advanced compound helicopter, next-generation rotor blade designs, smart or 'adaptive' materials for alleviating aeroelastic response problems, multirole air vehicle designs for the military, direct voice input for effective nap-of-the-Earth navigation, and rotorcraft interior noise control technologies. (AIAA)
DE- <MAJOR> *VERTICAL TAKEOFF; *VERTICAL LANDING; *TILT ROTOR AIRCRAFT; *ROTOR BLADES; *AEROELASTICITY
DE- STRUCTURAL DESIGN; COST ANALYSIS; HUMAN FACTORS ENGINEERING
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02314530
AN- <AEROSPACE> A97-40071
TI- The effects of the AH-64A Pilot's Night Vision System on the performance of seven simulated maneuver tasks
AU- Stewart, John E., II (U.S. Army, Research Inst., Fort Rucker, AL)
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 7, no. 3, 1997, p. 183-200.
PY- 1997
PD- 199700
RF- 11
SN- 1050-8414
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9711
AB- The Pilot's Night Vision System (PNVS) allows the pilot of the AH-64A Apache helicopter to fly and navigate effectively at night. The PNVS restricts field of view (FOV) and degrades visual acuity, two factors that should adversely affect pilot performance during night operations, especially for flight maneuvers that rely on peripheral cues. Participants, all AH-64A instructor pilots, flew a mission profile in a high-fidelity simulation of the AH-64A. The profile consisted of seven routine maneuvers that were flown first under daytime (baseline) conditions (using a rear projection display with a 174 deg FOV) then under night conditions (with a simulated PNVS display with a 40 deg FOV). Automated performance measures were the main dependent variables. It was expected that pilot performance degradation would be significant on hovering turns, takeoffs, and landings, and negligible on stationary hovering and hover taxiing. Significant performance degradations were found for all maneuver tasks. Applications of the findings to training and pilot workload standards are discussed. (Author)
DE- <MAJOR> *NIGHT VISION; *PILOT PERFORMANCE; *AH-64 HELICOPTER; *AIRCRAFT MANEUVERS
DE- FLIGHT SIMULATION; FIELD OF VIEW; RADAR DETECTION; HELMET MOUNTED DISPLAYS; PILOT TRAINING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02311645
AN- <AEROSPACE> A97-37186
TI- AIAA Modeling and Simulation Technologies Conference, New Orleans, LA, Aug. 11-13, 1997, Collection of Technical Papers
SO- Reston, VA, American Institute of Aeronautics and Astronautics, 1997, 605 p. (For individual items see A97-37187 to A97-37243).
PY- 1997
PD- 199700
RN- ISBN 1-56347-236-8
LA- English

GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9710
AB- The present volume on modeling and simulation technologies discusses motion systems, rotorcraft and air cushion vehicle dynamics and modeling, pilot training and low cost simulation, and weapon and engagement modeling and simulation. Attention is given to simulator network and information technologies; visual, radar, and environmental modeling and simulation; test and evaluation; and space systems. Other topics addressed include simulator fidelity; aircraft dynamics, modeling, and performance; simulator development and software reuse; human factors; and research and test facilities. (AIAA)
DE- <MAJOR> *CONFERENCES; *SPACECRAFT MODELS; *TECHNOLOGY ASSESSMENT; *FLIGHT SIMULATORS; *AIRCRAFT MODELS; *ENVIRONMENT SIMULATION
DE- AMERICAN INST AERONAUTICS & ASTRONAUTICS; MOTION SIMULATION; MILITARY OPERATIONS; PILOT TRAINING; LOW COST; SIMULATOR FIDELITY; WEAPON SYSTEMS; INFORMATION SYSTEMS; ENVIRONMENT MODELS; DATA SIMULATION; INVERSE DYNAMICS; SOFTWARE REUSE; HUMAN FACTORS ENGINEERING; TEST FACILITIES; AIRCRAFT CONTROL; RADAR EQUIPMENT; DATA BASES; SPACECRAFT CONTROL
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02310992
AN- <AEROSPACE> N97-24082
TI- Flightfax; Spatial Disorientation
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> A2213849
PY- 1997
PD- 199704
PG- 12P.
RN- AD-A323538; NIPS-97-25294
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9701
AB- Basic to any discussion of spatial-disorientation controls is recognizing that there are two types of SD. The challenge of Type 1 SD is to find a way to apply controls (the appropriate course of action) when you are unaware that you are in an SD situation. The challenge of Type 2 SD is to apply the right controls to the specific SD situation. Identifying appropriate controls for both types of SD was an issue at last fall's Tri-Service Spatial Disorientation in Rotary Wing Operations Conference held at Fort Rucker. This conference produced control proposals in four major categories: (1) education, (2) training, (3) research, and (4) equipment. What follows is a discussion of these proposals, modified slightly to include input from the Aviation Leaders' Training Conference and the Aviation Brigade Safety Officer Conference held in January 1997 and input from standardization pilots and human factors experts at Fort Rucker. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT SAFETY; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING
DE- CONFERENCES; DISORIENTATION; EDUCATION; ROTARY WINGS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02310683
AN- <AEROSPACE> N97-23764
TI- Flight Simulator Training. (Latest Citations from the NTIS Bibliographic Database)
CS- NERAC, Inc., Tolland, CT.
CS- <CODE> NW110776
PU- <PLACE> United States
PY- 1997
PD- 199703
PG- 2P.
RN- PB97-857197; NIPS-97-36700
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <OTHER> Issuing Activity (National Technical Information Service, 5285 Port Royal RD., Springfield, VA 22161, USA)
JA- STAR9701
AB- The bibliography contains citations concerning simulation methods and simulators for use in air flight training, with emphasis on military programs. Subjects include fidelity of the simulation, maneuvering, visual fields and perception, flight control, guidance, and motion

simulation. The citations explore aircraft, helicopter, and spacecraft simulators used for pilot training and upgrading of skills. References to training concepts and pilot performance are included. (NTIS)
DE- <MAJOR> *BIBLIOGRAPHIES; *FLIGHT CONTROL; *FLIGHT SIMULATORS; *FLIGHT TRAINING; *MOTION SIMULATION; *PILOT TRAINING; *TRAINING SIMULATORS
DE- EDUCATION; GUIDANCE (MOTION); HELICOPTERS; MANEUVERS; MILITARY OPERATIONS; PILOT PERFORMANCE; VISUAL FIELDS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02310563
AN- <AEROSPACE> A97-36897
TI- The NH90 helicopter development wind tunnel programme
AU- Hermans, Christophe; Hakkaart, Joost (NLR, Amsterdam, Netherlands); Panosetti, Giuseppina; Preatoni, Gaetano (Agusta S.p.A., Cascina Costa, Italy); Mikulla, Volker (Aerocopter Deutschland, Ottobrunn, Germany); Chery, Francois; Serr, Christophe (Eurocopter France, Marignane)
SO- In: Wind tunnels and wind tunnel test techniques; Proceedings of the Conference, Cambridge, United Kingdom, Apr. 14-16, 1997 (A97-36865 09-09), London, United Kingdom, Royal Aeronautical Society, 1997, p. 45.1-45.12.
PY- 1997
PD- 199700
LA- English
GL- France
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9709
AB- In the framework of the Design & Development (D&D) phase of the NH90 helicopter program, a wind tunnel test program is carried out using various subscale models to determine the aerodynamic behavior of the vehicle. The NH90 helicopter is being developed in a co-operative program by four European nations: France, Germany, Italy, and the Netherlands. Approximately 1900 hours of wind tunnel tests have been conducted since 1987 in the Netherlands and in France. Execution of these wind tunnel tests was a substantial contribution to the development risk reduction effort performed for the multinational NH90 helicopter program. One of the test activities performed in the D & D phase of the NH90 program included testing a scale 1:4 model equipped with a powered main rotor in the German-Dutch Wind tunnel DNW. The model comprises of a fuselage hull, powered main rotor, and engine air intake and exhaust systems. Powered tail rotor model tests were performed in the DNW-LST to assess the tail rotor efficiency at extreme sidewind conditions. Nine test campaigns are performed with a fuselage model in the DNW-LST. The paper gives an overview of the wind tunnel models applied. Model instrumentation and measurement techniques are highlighted. (Author)
DE- <MAJOR> *WIND TUNNEL TESTS; *HELICOPTER DESIGN
DE- INFRARED IMAGERY; EXHAUST GASES; FUSELAGES
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02305597
AN- <AEROSPACE> A97-33876
TI- Head-mounted displays II; Proceedings of the Conference, Orlando, FL, Apr. 21, 22, 1997
AU- Lewandowski, Ronald J. (Honeywell, Inc., Minneapolis, MN); Haworth, Loran A. (U.S. Army/NASA, Rotorcraft Div., Moffett Field, CA); Girolamo, Henry J. (U.S. Army, Soldier Systems Command, Natick, MA), EDS.
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 3058), 1997, 365 p. (For individual items see A97-33877 to A97-33906).
PY- 1997
PD- 199700
RN- SPIE-3058; ISBN 0-8194-2473-0; ISSN 0277-786X
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9708
AB- The present volume on head-mounted displays discusses human factors issues, helmet-mounded display (HMD) requirements and flat panel display requirements and testing, hardware descriptions and advanced technologies, and HMD flight test descriptions and test results. Attention is given to effects of system lag on head-tracked cursor control, integration of HMDs into a cockpit, content and media analysis of intelligent HMDs, and an HMD video display system. Other topics addressed include a maintenance and repair support system, eyeglass-based electronic displays, advances in HMD technology, and enhanced spatial-state feedback for night-vision goggle displays. (AIAA)
DE- <MAJOR> *CONFERENCES; *HEAD-UP DISPLAYS; *HELMET MOUNTED DISPLAYS; *AIRCRAFT PILOTS; *HUMAN FACTORS ENGINEERING; *FLAT PANEL DISPLAYS

DE- HARDWARE; PERFORMANCE TESTS; FLIGHT TESTS; COCKPITS; FLIGHT CONTROL;
VIDEO EQUIPMENT; SYSTEMS INTEGRATION; SMART STRUCTURES; SUPPORT SYSTEMS
; MAINTENANCE; TECHNOLOGY ASSESSMENT; FEEDBACK CONTROL; NIGHT VISION;
GOGGLES; FIELD OF VIEW; ROTORCRAFT AIRCRAFT; SPATIAL DISTRIBUTION;
ELECTRONIC EQUIPMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02304062
AN- <AEROSPACE> A97-32341
TI- Inside Rooivalk
AU- Cowan, Rory
SO- Defence Helicopter (ISSN 0963-116X), vol. 16, no. 2, Aug. 1997, p.
16-18, 20.
PY- 1997
PD- 199708
SN- 0963-116X
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9708
AB- Flying qualities and man-machine interface evaluations are presented
for the engineering development model of South Africa's Rooivalk attack
helicopter. The tandem cockpit is designed for a pilot and weapons
system operator; extensive use is made of multifunction displays that
are bordered by dedicated hard keys and definable 'soft' of 'firm'
keys. The displays are high resolution matrix color-CRTs. (AIAA)
DE- <MAJOR> *MILITARY HELICOPTERS; *COCKPITS; *WORKSTATIONS; *HUMAN FACTORS
ENGINEERING
DE- FLIR DETECTORS; DISPLAY DEVICES; PILOT PERFORMANCE
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02302677
AN- <AEROSPACE> N97-21085
TI- Stick and Feel System Design
TI- <ORIGINAL> Systemes de restitution des efforts au manche
AU- GIBSON, J. C. (Gibson, J. C., Saint Annes, England.); HESS, R. A.
(California Univ., Davis, CA.)
CS- Advisory Group for Aerospace Research and Development,
Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1997
PD- 199703
PG- 180P.
RN- AGARD-AG-332; ISBN-92-836-1051-2; NIPS-97-28898
LA- English
GL- United Kingdom
CP- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A09/MF A02
JA- STAR9701
AB- Since the earliest days of manned flight, designers have sought to
assist the pilot in the performance of tasks by using stick and feel
systems to bring these tasks within the bounds of human physical
capabilities. This volume describes stick and feel systems in two
parts. Part one describes the technologies which have been developed
throughout the history of 20th Century aviation. Part two describes how
modern systems dynamics interact with the human pilot. It is hoped that
the design lessons and approaches outlined in this volume will
contribute to a better understanding and appreciation of the importance
of force-feel system design in aircraft/rotorcraft flight control. (
Derived from text)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT CONTROL; *CONTROL STICKS; *CONTROL THEORY; *FLIGHT
CONTROL; *FLY BY WIRE CONTROL; *HUMAN FACTORS ENGINEERING; *MAN MACHINE
SYSTEMS; *PILOT PERFORMANCE
DE- CONTROL SIMULATION; CONTROL STABILITY; HUMAN PERFORMANCE; ROTARY WING
AIRCRAFT; SYSTEMS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02302402
AN- <AEROSPACE> N97-20810
TI- US Army Aviation Life Support Equipment Retrieval Program: Prediction
of Sitting Height Based on Stature for Mishap Injury Analysis
TI- <SUPPLEMENT> Final Report
AU- MASON, KEVIN T.; SHANNON, SAMUEL G.

CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1996
PD- 199609
PG- 12P.
RN- AD-A316598; USAARL-96-34; NIPS-97-01727
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9701
AB- During an analysis of injury patterns in OH-58 and UH-1 mishaps, the U.S. Army Aeromedical Research Laboratory (USAARL) found sitting height data was available only for aviators trained after 1986. Since many aviators flying during the study period were trained before 1986, a model was developed to predict sitting height based on some other measure. Stature was selected since it is measured annually, is consistent from year to year, and is available for all aviators in the study. The linear regression models were developed for each gender to predict sitting height from stature. Two cohorts of aircrew members were studied and compared; a 1988 anthropometry survey of Army aviators (487 males and 334 females), and an anthropometry dataset of 1988 aviator training applicants (6,071 males and 239 females) stored in the Aviation Epidemiology Data Register (AEDR). (DTIC)
SF- DTIC
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *ANTHROPOMETRY; *FLIGHT CREWS; *INJURIES; *LIFE SUPPORT SYSTEMS; *PORTABLE EQUIPMENT
DE- BODY SIZE (BIOLOGY); HUMAN FACTORS ENGINEERING; MATHEMATICAL MODELS; OH-58 HELICOPTER; UH-1 HELICOPTER
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02302287
AN- <AEROSPACE> N97-20564
TI- Penguin MK2 MOD7 Integration in the Sikorsky S-70B Helicopter Integration and Live Fire Testing
AU- SOLLIE, ARE CHRISTIAN; SPITZ, STEVE
CS- NFT, Kongsberg (Norway).
CS- <CODE> N1056020
PY- 1996
PD- 199611
NT- In NFT, Subsystem Integration for Tactical Missiles (SITM) and Design and Operation of Unmanned Air Vehicles (DOUAV) p (SEE N97-20563 01-01)
LA- English
GL- Norway
CP- Norway
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9701
AB- The paper describes the Penguin MK2 MOD7 (AGM-119B) anti-ship missile integration in the Sikorsky S-70B helicopter. Innovative design techniques allowed use of existing aircraft and missile hardware. Only software development was required to integrate the Penguin missile with the S-70B aircraft. The paper discusses briefly the system integration testing and presents some of the test results. The system integration testing was based on extensive simulation of mathematical models and a low-cost instrumentation of a captive carry flight test range in the Long Island Sound, USA. Finally, some test results from a live firing demonstration performed at USN NAWCAD, Patuxent River are given. (Author)
DE- <MAJOR> *AIR TO SURFACE MISSILES; *CAPTIVE TESTS; *COMPUTER PROGRAMS; *FLIGHT TESTS; *HELICOPTERS; *SIKORSKY AIRCRAFT; *SYSTEMS INTEGRATION
DE- COMPUTER PROGRAMMING; MATHEMATICAL MODELS; MISSILE TESTS; SHIPS; SOFTWARE ENGINEERING; TEST RANGES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02299603
AN- <AEROSPACE> A97-29219
TI- Developmental test and evaluation of helicopters using a precision differential global positioning system
AU- Hardesty, Mark; Metzger, Mark; Flint, Joe; Fredrickson, Daphne (McDonnell Douglas Helicopter Systems, Mesa, AZ)
SO- In: AHS, Annual Forum, 53rd, Virginia Beach, VA, Apr. 29-May 1, 1997, Proceedings. Vol. 1 (A97-29180 07-01), Alexandria, VA, American Helicopter Society, 1997, p. 474-485.
PY- 1997
PD- 199700
RF- 10
LA- English

GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9707
AB- Development of new and innovative applications for high precision differential global positioning systems (DGPS) has exploded in the last two years. Over the last two years, McDonnell Douglas Helicopter Systems has been developing the 'Portable Test Range' (PTR), a DGPS-based aircraft position and velocity data archiving tool. When required, the system provides the flight crew with 3D guidance and power cues integrated into a simple but highly effective flight director. The PTR has been used on numerous FAA certification flight test efforts, including noise certification, height-velocity curve development, and Category A profile development. In the fall of 1996, the PTR was used as a flight director for a variety of complex landing approach profiles at NASA Crow's Landing airfield. Certification of the PTR for all types of fixed wing and rotary wing flight test activities is ongoing. (Author)
DE- <MAJOR> *DIFFERENTIAL GLOBAL POSITIONING SYSTEM; *PERFORMANCE ASSESSMENT; *PERFORMANCE TESTS; *HELICOPTERS; *AIRCRAFT GUIDANCE
DE- PORTABLE EQUIPMENT; RESEARCH AND DEVELOPMENT; PRODUCT DEVELOPMENT; TEST RANGES
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 02299600
AN- <AEROSPACE> A97-29216
TI- Dynamic Interface flight tests and the pilot rating scale
AU- Williams, Suni L. (U.S. Naval Test Pilot School, Patuxent River, MD); Long, Kurtis R. (U.S. Navy, Naval Air Warfare Center, Patuxent River, MD)
SO- In: AHS, Annual Forum, 53rd, Virginia Beach, VA, Apr. 29-May 1, 1997, Proceedings. Vol. 1 (A97-29180 07-01), Alexandria, VA, American Helicopter Society, 1997, p. 438-449.
PY- 1997
PD- 199700
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9707
AB- The U.S. Navy (USN) conducts Dynamic Interface (DI) shipboard rotorcraft tests to improve all aspects of shipboard rotorcraft compatibility. This paper summarizes current USN DI shipboard test methodology, test coordination, and data collection, reduction, and analysis techniques, emphasizing the unique piloting and test procedural requirements imposed by adverse shipboard operational conditions. The paper highlights technical challenges encountered during recent DI test programs, and summarizes innovative test methodologies currently employed to resolve those challenges. The paper discusses the USN's DI Pilot Rating Scale (PRS), which is a simplified version of the Cooper-Harper Rating Scale. The PRS is used as the major basis for evaluation of shipboard helicopter operational flight tasks, since it more adequately addresses the complicated mission task element interactions that occur in the shipboard environment. DI PRS development history, PRS category definitions, and DI PRS test usage examples are also discussed. PRS and Cooper-Harper Rating Scales are compared, emphasizing the impact of each on both DI flight test operational efficiency and data validity. (Author)
DE- <MAJOR> *FLIGHT TESTS; *NAVY; *PILOT PERFORMANCE; *MILITARY HELICOPTERS ; *ROTARY WING AIRCRAFT
DE- ARMED FORCES (UNITED STATES); AIRCRAFT PILOTS; METHODOLOGY; PERFORMANCE ASSESSMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02299573
AN- <AEROSPACE> A97-29189
TI- Assessing crew information requirements for advanced diagnostic and prognostic systems - Implications for interface and training design
AU- Oser, Randall L.; Stout, Rene'e J.; Tyler, Robert (U.S. Navy, Naval Air Warfare Center, Orlando, FL)
SO- In: AHS, Annual Forum, 53rd, Virginia Beach, VA, Apr. 29-May 1, 1997, Proceedings. Vol. 1 (A97-29180 07-01), Alexandria, VA, American Helicopter Society, 1997, p. 97-108.
PY- 1997
PD- 199700
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9707
AB- Advanced diagnostic technologies that track and fuse sensor observables have been used to provide improved information for helicopter maintenance purposes. Because these systems can provide detailed information about emerging system anomalies, such systems have recently been considered for use during in-flight operations. While important progress has been made in the area of technologies that can provide diagnostic information, very little is known about what information is actually required by the aircrews. One reason for the lack of knowledge is because few systematic approaches exist to structure and design investigations of the dynamic processes used by aircrews during complex task performance. The current paper describes the concept of aircrew information requirements, discusses a methodology that can be used to structure and guide investigations of aircrew information requirements, presents results from a test of the methodology using operational aircrews, and outlines the implications of the methodology for future interface and training design. (Author)
DE- <MAJOR> *FLIGHT CREWS; *AIRCRAFT MAINTENANCE; *TRAINING ANALYSIS; *MAN MACHINE SYSTEMS; *HUMAN FACTORS ENGINEERING; *INFORMATION SYSTEMS
DE- USER REQUIREMENTS; MILITARY HELICOPTERS; METHODOLOGY; INFORMATION FLOW
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02299564
AN- <AEROSPACE> A97-29180
TI- AHS, Annual Forum, 53rd, Virginia Beach, VA, Apr. 29-May 1, 1997, Proceedings. Vol. 1
SO- Alexandria, VA, American Helicopter Society, 1997, 839 p. (For individual items see A97-29181 to A97-29246).
PY- 1997
PD- 199700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9707
AB- The present volume on helicopter technology discusses acoustics, crew stations and human factors, structures and materials, and test and evaluation. Attention is given to mlitary operations, aerodynamics,, affordability and performance in design, flight simulation, product support, and optimization and simulation in theory. Other topics addressed include caustics propagation in blade-vortex interaction noise, direct voice input for control of an avionics management system, Longbow Apache Test program successes, adaptive grid sequencing and interpolation schemes for accelerated rotor free-wake analyses, affordability and performance in rotorcraft design, and accurate Euler simulations of the parallel blade-vortex interaction. (AIAA)
DE- <MAJOR> *HELICOPTERS; *CONFERENCES
DE- AIRCRAFT NOISE; FLIGHT CREWS; MILITARY OPERATIONS; TECHNOLOGY ASSESSMENT; AERODYNAMICS; HELICOPTER DESIGN; FLIGHT SIMULATION; AEROACOUSTICS; OPTIMIZATION
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02297052
AN- <AEROSPACE> N97-17494
TI- Subjective Evaluation of the Communications Earplug with Flexible Harness (CEP/FH) Among CH-47D Crewmembers
TI- <SUPPLEMENT> Final Report
AU- RIBERA, JOHN E.; MOZO, BEN T.; MURPHY, BARBARA A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1996
PD- 199607
PG- 18P.
RN- AD-A312045; USAARL-96-29; NIPS-96-89911
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9701
AB- Noise levels in Army rotary-wing aircraft, particularly the CH-47D (Chinook), can reach as high as 115 dBA. Current aviator helmets provide adequate hearing protection. However, speech communication is less than optimum. The Communication Earplug with Flexible Harness (CEP/FH), developed at the United States Army Aeromedical Research Laboratory, may provide an answer to the problem. Seventeen aviators and crewmembers of a U.S. Army Reserve CH-47D unit field tested the CEP/FH and subsequently were queried. Results of the posttrial survey are presented and discussed. When compared with the standard issue SPH-4 series aviator helmet, crewmembers wearing the CEP/FH perceived improved speech clarity and reduced levels of noise. Based on

weaknesses relative to the harness and microphone components of the CEP/ FH, an advanced prototype of the CEP has evolved. It promises to be more compatible within the CH-47D environment, and more acceptable to crewmembers than the CEP/FH, while providing hearing protection and enhancing speech intelligibility in noise. (DTIC)
SF- DTIC
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT NOISE; *EAR PROTECTORS; *HARNESSES; *HELMETS; *NOISE INTENSITY; *ROTARY WING AIRCRAFT
DE- ACOUSTIC ATTENUATION; HEARING; HUMAN FACTORS ENGINEERING; NOISE REDUCTION; VOICE COMMUNICATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02296385
AN- <AEROSPACE> N97-16803
TI- Selection of Special Duty Aviators: Cognitive and Personality Findings
AU- PATTERSON, JOHN C.; SCHOFIELD, GARY L.; HOWE, BRIAN; BONNEY, JACQUELINE D.
CS- Armstrong Lab., Brooks AFB, TX.
CS- <CODE> AY761966
PY- 1996
PD- 199611
NT- In Armstrong Lab., Selection and Training Advances in Aviation p (SEE N97-16789 01-53)
LA- English
GL- United States
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9701
AB- This paper will describe a selection program for special duty aviators. Different from other selection programs, this program selects already trained pilots as well as other non trained crewmembers such as loadmasters and flight engineers for special aviation duty. These aviators are selected to fly for the U.S. Air Force Special Operations Command (AFSOC) in airframes such as the MH 53 helicopter. (Derived from text)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT PILOTS; *PERSONALITY; *PILOT PERFORMANCE; *PILOT SELECTION; *PILOT TRAINING
DE- AIRFRAMES; CREWS; HELICOPTERS; MILITARY OPERATIONS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02292507
AN- <AEROSPACE> N97-10573
TI- Research Applications and Capabilities of the NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL)
AU- AIKEN, EDWIN W.; JACOBSEN, ROBERT A.; HINDSON, WILLIAM S.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1996
PD- 199604
NT- In NASA Ames Research Center, Flight Simulation: Where are the Challenges? p (SEE N97-10546 01-09)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9701
AB- The Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) is a UH-60 Black Hawk helicopter that is being modified by NASA and the US Army for flight systems research. The principal systems that are being installed in the aircraft are a Helmet-Mounted Display (HMD) and associated imaging systems, and a programmable full-authority Research Flight Control System (RFCS). In addition, comprehensive instrumentation of both the rigid body of the helicopter and the rotor system is provided. This paper describes the design features of this modern rotorcraft in-flight simulation facility and their current state of development. A brief description of initial research applications is included. (Author)
DE- <MAJOR> *FLIGHT CONTROL; *FLIGHT CREWS; *FLIGHT SIMULATION; *HELICOPTER DESIGN; *HELMET MOUNTED DISPLAYS; *ROTARY WING AIRCRAFT
DE- IMAGING TECHNIQUES; RIGID STRUCTURES; ROTARY WINGS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02292497
AN- <AEROSPACE> N97-10563
TI- Piloted Simulation in Rotorcraft Design and Development: Eurocopter Experience and Future Trends
TI- <ORIGINAL> La Simulation Pilotee pour la Conception et le Developpement

des Appareils a Voilure Tournantes: L'Experience d'Eurocopter et les Tendances pour le Futur
AU- ROLLET, PHILIPPE
CS- Eurocopter France, Marignane (France).
CS- <CODE> E5674306
PY- 1996
PD- 199604
NT- In Eurocopter France, Flight Simulation: Where are the Challenges? p (SEE N97-10546 01-09)
LA- French
GL- France
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A04
JA- STAR9701
AB- Piloted simulation has largely been used in EUROCOPTER's developments for the last 10 years. For the TIGER attack helicopter, piloted simulation was extensively used from the very beginning of the development to the prototypes' nights. Today, the development of the NH-90 helicopter requires a lot of experimentations on the SPHERE simulator. Piloted simulation is also used for research related to handling qualities, such as the ACT European program, or to Man-Machine-Interfaces (MMI's). The implementation of demonstrators, such as the FBW DAUPHIN, as well as the study of the EUROFAR Tilt-Rotor have also largely involved piloted simulations. A significant experience in testing procedures has been acquired. Environmental and human factors appear to be of the greatest importance. In the future, evolutions are planned to further enhance the representativity of SPHERE simulator. The emergence of new design standards, such as ADS-33C, leads to envisage new applications of piloted simulation. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS; *ROTARY WING AIRCRAFT; *TILT ROTOR AIRCRAFT
DE- CONTROLLABILITY; EXPERIMENTATION; PROTOTYPES; SIMULATORS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02292485
AN- <AEROSPACE> N97-10551
TI- Yaw Motion Cues in Helicopter Simulation
AU- SCHROEDER, JEFFREY A.; JOHNSON, WALTER W.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1996
PD- 199604
NT- In NASA Ames Research Center, Flight Simulation: Where are the Challenges? p (SEE N97-10546 01-09)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9701
AB- A piloted simulation that examined the effects of yaw motion cues on pilot-vehicle performance, pilot workload, and pilot motion perception was conducted on the NASA Ames Vertical Motion Simulator. The vehicle model that was used represented an AH-64 helicopter. Three tasks were performed in which only combinations of vehicle yaw and vertical displacement were allowed. The commands issued to the motion platform were modified to present the following four motion configurations for a pilot located forward of the center of rotation: (1) only the linear translations, (2) only the angular rotation, (3) both the linear translations and the angular rotation, and (4) no motion. The objective data indicated that pilot-vehicle performance was reduced and the necessary control activity increased when linear motion was removed; however, the lack of angular rotation did not result in a measured degradation for almost all cases. Also, pilots provided subjective assessments of their compensation required, the motion fidelity, and their judgment of whether or not linear or rotational cockpit motion was present. Ratings of compensation and fidelity were affected only by linear acceleration, and the rotational motion had no significant impact. Also, when only linear motion was present, pilots typically reported the presence of rotation. Thus, linear acceleration cues, not yaw rotational cues, appear necessary to simulate hovering flight. (Author)
DE- <MAJOR> *AH-64 HELICOPTER; *CUES; *FLIGHT SIMULATION; *MOTION PERCEPTION; *MOTION SIMULATION; *VERTICAL MOTION SIMULATORS; *YAWING MOMENTS
DE- ANGULAR VELOCITY; COCKPITS; HOVERING; PILOT PERFORMANCE; TRANSLATING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02292483
AN- <AEROSPACE> N97-10549
TI- Visual Scenes for Battlefield Helicopter Operations: Evaluation of Requirements and How to Specify Them
AU- DEIGHTON, C. D. B.; WOODFIELD, ALAN A.
CS- Cranfield Univ., Bedford (England). Dept. of Applied Psychology
CS- <CODE> C7115656
PY- 1996
PD- 199604
NT- In Cranfield Univ., Flight Simulation: Where are the Challenges? p (SEE N97-10546 01-09)
LA- English
GL- United Kingdom
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9701
AB- The structured specification and evaluation of simulated visual scenes for training pilots in tasks such as Battlefield Helicopter operations is required to ensure that cost-effective flight simulator training is being achieved. Historically this has been a difficult process because of a lack of consistent and prioritized descriptions of different visual flight activities within the intended training missions; limited evaluations of the contributions and relative importance of different scene features within appropriate operational scenes; and a lack of any structured way of collating and presenting such information to those who specify and design visual scene databases for flight training simulators. A research program funded by the UK Defence Research Agency was conducted in collaboration with Cranfield University, UK to address these challenges. Specific aims were to identify and prioritize visual flight activities in the context of a battlefield nap-of-the-earth (NoE) attack mission; to determine the relative importance of visual scene components (e.g. woods, farm buildings, roads, livestock) to the achievement of visual flight activities: and to assess the impact of removing or adding information to the scene upon the achievement of visual flight activities in a mission simulator. The purpose of the paper is twofold: firstly to describe the human factors procedures and techniques used to address these aims and secondly to describe the proposed structure of a computer based relational database to integrate the results of the program. Selected findings from the study are used to highlight the structure of the database. (Author)
DE- <MAJOR> *COMBAT; *FLIGHT SIMULATORS; *FLIGHT TRAINING; *HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION; *VISUAL DISCRIMINATION; *VISUAL FLIGHT
DE- COST EFFECTIVENESS; HUMAN FACTORS ENGINEERING; TASKS; TRAINING SIMULATORS; VISUAL OBSERVATION; VISUAL PERCEPTION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02291644
AN- <AEROSPACE> A97-27495
TI- The VNAV Tutor - Addressing a mode awareness difficulty for pilots of glass cockpit aircraft
AU- Chappell, Alan R.; Crowther, Edward G.; Mitchell, Christine M.; Govindaraj, T. (Georgia Inst. of Technology, Atlanta)
SO- IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans (ISSN 1083-4427), vol. 27, no. 3, May 1997, p. 372-385.
PY- 1997
PD- 199705
RF- 37
SN- 1083-4427
CN- NCC2-824
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9706
AB- One of the major tasks of pilots of modern aircraft is monitoring and understanding the status and behavior of the auto flight system, i.e., mode awareness. In order to maintain mode awareness, pilots must be continuously vigilant of indications from several locations within the cockpit. Lacking accurate and complete system knowledge and interfaces that clearly present the system state and constraints, pilots may misunderstand the control modes. Pilots often cite vertical path navigation (VNAV) as a flight management system function that 'surprises' them. The VNAV Tutor, a computer-based training system, was developed to address this issue. The VNAV Tutor attempts to improve pilots' understanding of VNAV control modes and the interaction of the mode control panel functions with the flight management system during VNAV usage. Furthermore, it attempts to help pilots build a robust conceptual model of vertical navigation operation. An evaluation showed that the VNAV Tutor enhanced both the conceptual understanding and the operational use of the vertical navigation function by pilots transitioning to aircraft with sophisticated auto flight systems. (

Author)
DE- <MAJOR> *MAN MACHINE SYSTEMS; *AUTOMATIC FLIGHT CONTROL; *AIRCRAFT
CONTROL; *PILOT PERFORMANCE; *FLIGHT MANAGEMENT SYSTEMS; *VERTICAL
FLIGHT
DE- COGNITION; PILOT TRAINING; MAN-COMPUTER INTERFACE; FLIGHT SAFETY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02290446
AN- <AEROSPACE> A97-26297
TI- Aircraft Symposium, 34th, Tottori, Japan, Oct. 16-18, 1996, Proceedings
SO- Tokyo, Japan Society for Aeronautical and Space Sciences, 1996, 739 p.
(For individual items see A97-26298 to A97-26446).
PY- 1996
PD- 199600
LA- MULTIPLE
GL- Japan
CP- Japan
DT- CONFERENCE PROCEEDINGS
JA- IAA9706
AB- Papers are presented on aerodynamics, helicopter control, flight control technology, the low-speed aerodynamics of joined-wing and powered STOL aircraft, the supersonic aerodynamics of an oblique wing, the current research status of an advanced VTOL passenger transport, remotely piloted research vehicles, the wind tunnel testing of PAR-WIG, blade-vortex interaction (BVI) noise, helicopter blade noise reduction and predictions, bearingless rotor development for medium helicopters, tilt-rotor aircraft characteristics, rotor blade external loading, human factors in aircraft, an Enhanced Ground Proximity Warning System, rotor aerodynamics, and shock-wave/boundary-layer interactions. Papers are also presented on hypersonic wake visualization by the electric discharge radiation (EDR) method, the scramjet inlet flowfield measurement in a shock tunnel, aerodynamic heating, aerodynamics research studies, Mach 5 ramjet engine research, composite aircraft structures, aging aircraft testing, flight simulation, missile control, aircraft handling qualities, aircraft control simulation, SSTs, composite spacecraft structures, reentry vehicle aerothermodynamics, and high-strength alloys for aircraft construction. Further papers are presented which cover fracture mechanics of aircraft structures, computational aerodynamics, aerodynamic configurations, aircraft gas turbine engine technology, aircraft de-icing and anti-icing, air navigation technology, aircraft maintenance, the Boeing 777 aircraft, avionics technologies, cockpit display systems, flight tests, aviation meteorology, aerospaceplanes, low sonic boom technology research, synthetic vision systems, high speed commercial transports, and turbulence. Additional papers cover aircraft wakes, aircraft maneuvers, wind tunnel background noise reduction, sonic booms, automatic landing control, aircraft collision warning systems, flutter analysis, unsteady aerodynamics, the hypersonic flight experiment (HYFLEX), flow visualization, parachute dynamics, structural vibration analysis, structural analysis, transonic flutter, air cushion vehicle dynamics, air traffic control, and aircrew behavior. Abstracts are presented for papers on the modeling of steady spin regimes in a low-speed wind tunnel with horizontal flow and stationkeeping maneuvers for the China-Brazil Earth Resources Satellite (CBERS). (AIAA)
DE- <MAJOR> *CONFERENCES; *AIRCRAFT PERFORMANCE; *FLIGHT CONTROL; *AERODYNAMIC CHARACTERISTICS
DE- AIRCRAFT STRUCTURES; HELICOPTER PERFORMANCE; AIRCRAFT DESIGN; WING
PROFILES; PASSENGER AIRCRAFT; AIRCRAFT NOISE; PROPULSION SYSTEM
PERFORMANCE; STATE ESTIMATION; AIRCRAFT CONSTRUCTION MATERIALS; GROUND
OPERATIONS; AIRCRAFT ICING; CONTROL SYSTEMS DESIGN; WIND TUNNEL TESTS;
HYPERSONIC AIRCRAFT; COMPUTATIONAL FLUID DYNAMICS; FLUTTER ANALYSIS;
VIBRATION DAMPING; UNSTEADY AERODYNAMICS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02288969
AN- <AEROSPACE> N96-36603
TI- The VAAC Harrier Programme: Flying STOVL With 1-Inceptor Control
AU- SHANKS, G. T.; SCORER, F. J.
CS- Defence Research Agency, Bedford (England). Flight Dynamics and Simulation Dept.
CS- <CODE> DH032220
PY- 1996
PD- 199606
NT- In Defence Research Agency, Advanced Aero-Engine Concepts and Controls p (SEE N96-36571 12-07)
LA- English
GL- United Kingdom
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> CASI HC A03/MF A04
JA- STAR9612
AB- Active control technology (ACT), as applied to modern conventional take-off and landing (CTOL) aircraft has been extended to integrate the flight and propulsion control systems of a Harrier aircraft. This extension allows the direct control of all the forces generated on the aircraft, but it is the control concepts and management options, that are under investigation. An experimental integrated flight and propulsion system (IFPC) has completed Phase 1 flight trials and has demonstrated consistent pilot workload reduction for the recovery task. Comparisons between different methods of controlling the aircraft, including a 1-inceptor option, are presented and the implications for the technology on the engine power off-take for hover control is discussed. (Author)
DE- <MAJOR> *ACTIVE CONTROL; *AIRCRAFT CONTROL; *CONTROL SYSTEMS DESIGN;
*CONTROL THEORY; *HARRIER AIRCRAFT; *PROPULSION SYSTEM PERFORMANCE;
*V/STOL AIRCRAFT; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- CONTROL STABILITY; FLIGHT TESTS; HOVERING; PILOT PERFORMANCE
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 02287997
AN- <AEROSPACE> N96-35292
TI- Physiological workload reactions to increasing levels of task difficulty
TI- <SUPPLEMENT> Final Report
AU- GAILLARD, A.W.K.; VELTMAN, J. A.
CS- Institute for Human Factors TNO, Soesterberg (Netherlands).
CS- <CODE> IJ983373
PY- 1996
PD- 199606
PG- 28P.
CN- A91/KLU/314
RN- TM-96-A026; RP 96-0162; 789.4; NIPS-96-86738
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <OTHER> Issuing Activity(TNO Human Factors Research Inst., KampWeg 5, 3769 ZG Soesterberg, The Netherlands)
JA- STAR9612
AB- In complex systems, such as modern fighter jets and helicopters, operators have to manage several tasks at the same time; this has consequences for their mental workload. Before new systems are introduced, it is important to know what factors influence the mental workload and how this workload can be measured. This study is part of a project to gain insight into the concept of mental workload and develop measurement techniques for mental workload. The experiment described in this report, the fourth in the workload project, is designed to evaluate the sensitivity of physiological measures and their mutual relations. For the present experiment, pilots flew the simulator in two tasks: pursuit and tunnel task. In the pursuit task, subjects had to follow a target at at great distance. In the tunnel task,they had to fly thorough a tunnel and perform simultaneously an auditory memory task with four levels of difficulty. (Derived from text)
SF- NASA CASI
DE- <MAJOR> *AUDITORY TASKS; *COMPLEX SYSTEMS; *FLIGHT SIMULATORS; *MENTAL
PERFORMANCE; *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- BLINKING; CARDIOVASCULAR SYSTEM; FIGHTER AIRCRAFT; HELICOPTERS; PSYCHOMOTOR PERFORMANCE; RESPIRATORY RATE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02284555
AN- <AEROSPACE> N96-30526
TI- Ice Detector and Deicing Fluid Effectiveness Monitoring System
TI- <SUPPLEMENT> Patent
AU- SEEGMILLER, H. LEE B., inventor.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1996
PD- 199606
PG- 18P.;
RN- NASA-CASE-ARC-12045-1-GE; --; NIPS-96-62659
PI- US-PATENT-5,523,959; US-PATENT-APPL-SN-233676
LA- English
GL- United States
CP- United States
DT- PATENT
AV- <OTHER> US Patent and Trademark Office
JA- STAR9611
AB- An ice detector and deicing fluid effectiveness monitoring system for an aircraft is disclosed. The ice detection portion is particularly

suited for use in flight to notify the flight crew of an accumulation of ice on an aircraft lifting and control surfaces, or helicopter rotors, whereas the deicing fluid effectiveness monitoring portion is particularly suited for use on the ground to notify the flight crew of the possible loss of the effectiveness of the deicing fluid. The ice detection portion comprises a temperature sensor and a parallel arrangement of electrodes whose coefficient of coupling is indicative of the formation of the ice, as well as the thickness of the formed ice. The fluid effectiveness monitoring portion comprises a temperature sensor and an ionic-conduction cell array that measures the conductivity of the deicing fluid which is indicative of its concentration and, thus, its freezing point. By measuring the temperature and having knowledge of the freezing point of the deicing fluid, the fluid effectiveness monitoring portion predicts when the deicing fluid may lose its effectiveness because its freezing point may correspond to the temperature of the ambient. (NASA)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT STRUCTURES; *DEICERS; *DEICING; *DETECTION; *ELECTRODES; *TEMPERATURE SENSORS
DE- CONTROL SURFACES; FREEZING; PATENTS; ROTARY WINGS; TEMPERATURE MEASUREMENT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02283915
AN- <AEROSPACE> N96-29792
TI- Tactical situation displays: integrated versus separate information presentation
TI- <SUPPLEMENT> Interim Report
AU- PASSENIER, P. O.; VAN DELFT, J. H.
CS- Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Soesterberg (Netherlands). TNO Human Factors Research Inst.
CS- <CODE> O1457766
PY- 1995
PD- 199511
PG- 19P.
CN- A90/KLU/320
RN- TNO-TM 1995 A-73; TD 95-1491; NIPS-96-62119
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <OTHER> Issuing Activity (TNO Human Factors Research Institute, Kampweg 5, 3769 DE Soeterberg, Netherlands)
JA- STAR9611
AB- In the scope of a study on tactical situation displays in the cockpit of modern fighter aircraft, a simulator experiment has been conducted on integrated ('highway in the sky') versus separate presentation of flight information. Results of the experiment show that the 'highway in the sky' especially for 'slow' tasks (slow in relation to aircraft dynamics) leads to more accurate flight performance because of the integrated feedback of he aircraft state, when compared to separate information presentation. However, for 'rapid tasks', where the emphasis is on feedforward control, the separate information presentation is to be preferred because of the more constant preview as a result of the decoupling of the information presentation along different dimensions. (Author)
DE- <MAJOR> *COCKPIT SIMULATORS; *DISPLAY DEVICES; *FEEDFORWARD CONTROL; *FLIGHT CONTROL; *HUMAN FACTORS ENGINEERING; *INFORMATION ADAPTIVE SYSTEM; *KNOWLEDGE BASED SYSTEMS; *MULTISENSOR APPLICATIONS; *PILOT PERFORMANCE
DE- FIGHTER AIRCRAFT; FLIGHT CHARACTERISTICS; HELICOPTERS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02282307
AN- <AEROSPACE> N96-27869
TI- Flight Vehicle Integration Panel Working Group 21 on Glass Cockpit Operational Effectiveness
TI- <ORIGINAL> L'Efficacite operationnelle du poste de pilotage en verre
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Vehicle Integration Panel.
CS- <CODE> AD455458
PY- 1996
PD- 199604
PG- 192P.
RN- AGARD-AR-349; ISBN 92-836-1034-2; NIPS-96-50838
LA- English
GL- France
CP- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A09/MF A02
JA- STAR9610
AB- The members of AGARD FMP Working Group 21, representing aircraft

manufacturers, research institutions and operational organizations, met over a two year period, 1993-1995 to address the following objective: Summarize the status of current cockpits, highlight their benefits and weaknesses, and provide guidance for future cockpit design. This report, the result of those meetings, is structured around the series of questions listed below: (1) What are the pilot and crew required to do to complete a mission successfully; (2a) What do the current glass cockpits consist of; (2b) What are some of the technological highlights and trends of these cockpits; (3) What new technologies are becoming available; (4) How can we tailor the cockpit to be the most suitable for the human operator; (5) How can and how does the use of glass cockpits change the required aircrew training process; (6) What are the key problem issues with the current design process and what suggestions can be made to improve it and; (7) What are the cockpit concepts being considered to improve the operational effectiveness of future aircraft. With consideration of the human factors issues in design as a major basis for this report, this document provides an in depth discussion of the cockpit of today's aircraft and can serve as a foundation upon which to develop a more optimized pilot-vehicle-system interface of tomorrow. (Author)
DE- <MAJOR> *COCKPITS; *FIGHTER AIRCRAFT; *HELICOPTERS; *HUMAN FACTORS
ENGINEERING; *MAN MACHINE SYSTEMS
DE- DISPLAY DEVICES; FLIGHT CREWS; HELMET MOUNTED DISPLAYS; PILOTS (PERSONNEL); SYSTEM EFFECTIVENESS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02281530
AN- <AEROSPACE> N96-26715
TI- Aviator's Night Vision Imaging System HUD: An Analysis of Its Applications to Naval Helicopters
AU- PETERS. D.
CS- Naval Air Warfare Center, Patuxent River, MD. Aircraft Div.
CS- <CODE> NP157728
PY- 1995
PD- 199510
PG- 26P.
RN- AD-A301142; NAWCADPAX-95-100-TM; NIPS-96-30740
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9610
AB- Combat Search and Rescue (CSAR) helicopter pilots routinely utilize night vision goggles to enhance visual capabilities during night operations. The Aviator's Night Vision Imaging System (ANVIS) HUD, recently tested on the HH-60H Seahawk, provides the capability to display critical flight parameters to the pilots via goggle-mounted display units, thus minimizing head-down time in the cockpit. As more and more Naval helicopter missions diversify to include CSAR and CSAR support, devices which effectively enhance night mission performance should be made available to the mission pilots. This report describes the developmental testing results of the ANVIS HUD system and critically analyzes its advantages and limitations for use in Naval helicopters. In addition, ANVIS HUD symbology is examined from a human factors perspective with recommendations for symbology design and placement. (DTIC)
SF- DTIC
DE- <MAJOR> *GOGGLES; *HELICOPTERS; *HELMET MOUNTED DISPLAYS; *NIGHT VISION
; *PERFORMANCE TESTS
DE- HUMAN FACTORS ENGINEERING; IMAGING TECHNIQUES; NAVY; PILOT PERFORMANCE;
VISUAL ACUITY
SH- 7574 Optics (1975-)

AN- <DIALOG> 02279089
AN- <AEROSPACE> N96-23857
TI- Optimization of the terrain following radar flight director cues in special operations helicopters
AU- GARMAN, PATRICK J.; TRANG, JEFFREY A.
CS- Army Aviation Systems Command, Edwards AFB, CA. Airworthiness Qualification Test Directorate.
CS- <CODE> AZ152243
PY- 1995
PD- 199509
NT- In Army Aviation Systems Command, Report to the Aerospace Profession: 39th SETP Symposium p 420-434 (SEE N96-23831 08-05)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04

JA- STAR9608
AB- Over the past 18 months the Army has been developing a terrain following capability in it's next generation special operations aircraft (SOA), the MH-60K and the MH-47E. As two experimental test pilots assigned to the Army's Airworthiness Qualification Test Directorate (AQTD) of the US Army Aviation Technical Test Center, we would like to convey the role that human factors has played in the development of the MMR for terrain following (TF) operations in the SOA. In the MH-60K, the pilot remains the interface between the aircraft, via the flight controls and the processed radar data, and the flight director cues. The presentation of the processed radar data to the pilot significantly affects the overall system performance, and is directly driven by the way humans see, process, and react to stimuli. Our development has been centered around the optimization of this man-machine interface. (Author)
DE- <MAJOR> *AIRCRAFT CONTROL; *FLIGHT CONTROL; *HELICOPTERS; *HUMAN PERFORMANCE; *RADAR DATA; *TERRAIN FOLLOWING
DE- AIRCRAFT RELIABILITY; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02277100
AN- <AEROSPACE> A97-24881
TI- Operation Heli-STAR - A vertical flight short-haul transportation system
AU- McConkey, Edwin D. (Science Applications International Corp., Hampton, VA)
SO- In: International Powered Lift Conference, Jupiter, FL, Nov. 18-20, 1996, Proceedings (A97-24846 05-05), Warrendale, PA, Society of Automotive Engineers, Inc., 1996, p. 477-528.
PY- 1996
PD- 199600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9705
AB- This slide presentation on Operation Heli-STAR outlines heliport planning and development, heliports and route structure, operations centers, airborne and ground equipment, and cargo operations. It is shown that safe and effective helicopter cargo service can be operated in an urban area. Operation Tempo of Heli-STAR fully exercised the current FAA regulations regarding flight crew rest and duty time. (AIAA)
DE- <MAJOR> *SHORT HAUL AIRCRAFT; *HELIPORTS
DE- GLOBAL POSITIONING SYSTEM; AIR TRAFFIC CONTROL
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02275416
AN- <AEROSPACE> A97-23197
TI- Vertical flight in obstacle-rich environments
SO- Aerospace Engineering (ISSN 0736-2536), vol. 17, no. 3, Mar. 1997, p. 44-46.
PY- 1997
PD- 199703
SN- 0736-2536
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9705
AB- As more heliports and vertiports are located in city-center areas and the number of obstacles around them continues to increase, the proximity of obstacles will become a growing concern. The FAA has begun an investigation into pilot performance at facilities surrounded by many obstacles, or obstacle-rich environments (ORE). Upon initial analysis, the most effective means to collect data was seen to be a well-instrumented piloted visual simulator with the capability to vary the visual scene over a range of obstacle densities. The ORE study will assess pilot performance related to number, type, and placement of obstacles below and off to the side of the VFR imaginary surfaces. Basic performance questions in the study are pilot response, performance, risk assessment, and obstacle perception, and obstacle criteria around heliports. The simulation details are described. Flight performance will be tested through simulator and pilot control input variables. From these measures of pilot performance, the efficiency of flight during approach, landing, and departure are derived. Published results of this FAA study may be provided to industry in the summer of 1997. (AIAA)
DE- <MAJOR> *VERTICAL FLIGHT; *HELICOPTER CONTROL; *OBSTACLE AVOIDANCE; *PILOT TRAINING; *COCKPIT SIMULATORS; *PILOT PERFORMANCE
DE- FEDERAL AVIATION ADMINISTRATION; DISPLAY DEVICES; PERFORMANCE ASSESSMENT

SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02274550
AN- <AEROSPACE> A97-22331
TI- The Swiss entry into the 1996 International Aerial Robotics Competition
AU- Chapuis, Jacques; Eck, Christoph; Geering, Hans P.; Mudra, Regina; Schneuwly, Bruno; Sommerhalder, Rolf (Swiss Federal Inst. of Technology, Zurich, Switzerland)
SO- In: AUVSI '96; Proceedings of the 23rd Annual Association for Unmanned Vehicle Systems International Symposium and Exhibition, Orlando, FL, July 15-19, 1996 (A97-22281 05-66), McLean, VA, Association for Unmanned Vehicle Systems International, 1996, p. 947-953.
PY- 1996
PD- 199600
RF- 3
LA- English
GL- Switzerland
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9705
AB- In this paper, the salient features of the aerial robot of the team of the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, are presented. The flying robot is a model helicopter which can carry a payload of up to 10 kg. A schematic of the complete electronics system for sensing, communications, real-time computing, and control is shown and the individual instrumentation and control components are described. A safety feature is described along with search strategies and identification schemes. (AIAA)
DE- <MAJOR> *ROBOTICS; *REMOTELY PILOTED VEHICLES; *UNIVERSITY PROGRAM; *COMPETITION
DE- TAKEOFF; DIFFERENTIAL GLOBAL POSITIONING SYSTEM; ENGINE CONTROL; CONTROL SYSTEMS DESIGN
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 02273640
AN- <AEROSPACE> A97-21421
TI- Sustaining female helicopter pilot performance with Dexedrine during sleep deprivation
AU- Caldwell, J. A.; Caldwell, J. L.; Crowley, John S. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 7, no. 1, 1997, p. 15-36.
PY- 1997
PD- 199700
RF- 17
SN- 1050-8414
LA- English
GL- Albania
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9704
AB- To investigate the efficacy of Dexedrine for maintaining the performance of sleep deprived female aviators, six female UH-60 pilots were exposed to two 40-hr sleep deprivation periods during which they alternately received Dexedrine (three 10-mg doses) or placebo. Dexedrine improved six of nine flight simulator maneuvers and enhanced general levels of alertness as measured by EEG and Profile of Mood States assessments. The results from a cognitive test were negligible and inconsistent, probably because of the short test duration. Overall, it appeared that Dexedrine effectively sustained the performance, alertness, and mood of female UH-60 pilots despite short-term sleep loss. There were no problematic side effects. (Author)
DE- <MAJOR> *FEMALES; *AIRCRAFT PILOTS; *HELICOPTERS; *SLEEP DEPRIVATION; *DRUGS; *PILOT PERFORMANCE
DE- FLIGHT SIMULATORS; COGNITION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02269715
AN- <AEROSPACE> A97-17496
TI- One-engine inoperative procedures for multi-engine helicopters
AU- Iseler, Laura; Chen, Robert; Dearing, Munro; Decker, William; Hindson, William (NASA, Ames Research Center, Moffett Field, CA)
SO- Aerospace Engineering (ISSN 0736-2536), vol. 17, nos. 1, 2, Feb. 1997, p. 29-32.
PY- 1997
PD- 199702
SN- 0736-2536
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9703
AB- The response to an aircraft engine failure during takeoff or landing is addressed by procedures that minimize abrupt changes in pilot strategy from all-engines-operating to one-engine inoperative (OEI) conditions, using cockpit displays to reduce pilot workload. Two complementary approaches are brought to bear on OEI. The NASA six-degree-of-freedom vertical motion simulator has been used to implement an analytical approach to investigate OEI optimal control strategies and the associated optimal flight paths for a twin-engine helicopter in terminal-area operations. These simulations were used to check means for improving pilot performance and safety, investigating flight path trajectories, integrated display guidance, a collective stick shaker, and aural cues. (AIAA)
DE- <MAJOR> *HELICOPTER ENGINES; *SYSTEM FAILURES; *COMPUTERIZED SIMULATION
; *FLIGHT SIMULATORS; *DISPLAY DEVICES
DE- AIRCRAFT INSTRUMENTS; PILOT ERROR
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02263501
AN- <AEROSPACE> A97-11282
TI- Optimal fluorescence excitation wavelengths for detection of stress in vegetation
AU- Corp, L. A. (Science Systems & Applications, Inc., Lanham, MD); McMurtrey, J. E. (USDA, Remote Sensing and Modeling Lab., Beltsville, MD); Chappelle, E. W. (NASA, Goddard Space Flight Center, Greenbelt, MD); Kim, M. S. (Science Systems & Applications, Inc., Lanham, MD); Daughtry, C. S. T. (USDA, Remote Sensing and Modeling Lab., Beltsville, MD)
SO- In: IGARSS '96; International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996, Technical Papers. Vol. 3 (A97-11161 01-43), Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1996, p. 1812-1815.
PY- 1996
PD- 199600
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- Considerable efforts are being directed by many research groups toward the development of instrumentation to excite and remotely sense fluorescence of vegetation at the field and forest canopy levels. Currently, leaf level fluorescence emissions have been broken down into five primary regions of the spectrum, namely, UV, blue, green, red, and NIR. Optimal excitation wavelengths for the UV, blue, and green fluorescent areas are bands centered at 284, 340, and 380 nm respectively. The red and NIR fluorescent emissions can be excited within the broad wavelength region from 250 to 675 nm with excitation peaks at 430, 470, 600, and 660 nm. The ratio of red to NIR fluorescence excitation spectra produced a ratio spectrum. The relative differences between these two emission bands are not constant and depend on the wavelength of excitation. Fluorescence sensing systems based on the above emission bands are being developed for ground-based mobile vans, helicopters, and small aircraft. The goals of these efforts were to determine the optimal regions of the spectrum to excite vegetation in order to differentiate plant stress condition based on fluorescence emission bands. (Author)
DE- <MAJOR> *FLUORESCENCE; *PLANT STRESS; *EXCITATION; *WAVELENGTHS; *VEGETATION; *ULTRAVIOLET RADIATION
DE- CANOPIES (VEGETATION); NEAR INFRARED RADIATION
SH- 8743 Earth Resources & Remote Sensing (1987-)

AN- <DIALOG> 02263496
AN- <AEROSPACE> A97-11277
TI- Development and present configuration of the NASA GSFC/WFF helicopter-based Remote Sensing System
AU- Walthall, C. L. (USDA, Remote Sensing and Modeling Lab., Beltsville, MD); Williams, D. L.; Markham, B. L.; Kalshoven, J. E.; Nelson, R. F. (NASA, Goddard Space Flight Center, Greenbelt, MD)
SO- In: IGARSS '96; International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996, Technical Papers. Vol. 3 (A97-11161 01-43), Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1996, p. 1797-1799.
PY- 1996
PD- 199600
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701

AB- There is a need for calibrated remote sensing data from airborne platforms emphasizing spatial, spectral, temporal, bidirectional, and polarization information domains. A system developed by NASA/Goddard and Wallops Flight Facility utilizing a helicopter as the platform has proven to be a versatile means of acquiring such data. As the system evolved, it was used for the acquisition of data supporting field measurement campaigns such as an acid deposition effects study, the First International Satellite Land Surface Climatology Project Field Experiment, the Forest Ecosystems Dynamics Project, and the Boreal Ecosystem Atmosphere Study. The data collected with the helicopter system have been used to develop relationships between vegetative parameters and remotely sensed measurements, validate atmosphere and vegetation models, address scaling issues, and provide low altitude data for instrument calibration studies. Off-the-shelf field and experimental instrumentation has been flown as part of the system. Most recently, gyro-stabilized, pointable mounts, and an automatic sun-tracking sun photometer were specifically designed and fabricated for the system. The stages of development of the helicopter system over a 12-yr period are described; they illustrate the advantages and limitations afforded to investigators using helicopter-based systems. (Author)
DE- <MAJOR> *REMOTE SENSING; *NASA PROGRAMS; *UH-1 HELICOPTER
DE- PHOTOSYNTHESIS; SOFTWARE TOOLS
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02262967
AN- <AEROSPACE> A97-10748
TI- Measuring blade-vortex interaction noise using the YO-3A Acoustics Research Aircraft
AU- McCluer, Megan; Dearing, Munro (NASA, Ames Research Center, Moffett Field, CA)
SO- In: European Rotorcraft Forum, 22nd, Brighton, United Kingdom, Sept. 17-19, 1996, Proceedings. Vol. 2 (A97-10676 01-05), London, Royal Aeronautical Society, 1996, p. 82.1-82.12.
PY- 1996
PD- 199600
RF- 19
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- The YO-3A Acoustics Research Aircraft is a quiet airplane used by NASA for acquiring in-flight measurements of rotorcraft noise. Microphones mounted on the YO-3A wing tips and vertical tail measure noise when the airplane is flown in formation with a test rotorcraft. The In-flight Rotorcraft Acoustics Program (IRAP) was established in 1991 with the goal of using in-flight acoustic data as a validation of wind tunnel measurements. These data provide information on the adequacy of wind tunnel acoustic testing to accurately simulate the 'real-world' noise environment. Since IRAP began, four flight test programs have been performed using the S-76C, BO 105, and UH-60A helicopters, and the XV-15 tiltrotor. The BO 105 and S76C flight test data were compared to full-scale rotor data acquired in NASA's 40- by 80-foot and 80- by 120-foot wind tunnels, respectively. This paper presents a brief history of in-flight acoustic tests performed between 1979 and 1984; describes the current NASA YO-3A aircraft, instrumentation, and flight test procedures; and summarizes the IRAP flight tests performed between 1991 and 1995. (Author)
DE- <MAJOR> *BLADE-VORTEX INTERACTION; *NOISE MEASUREMENT; *RESEARCH
AIRCRAFT; *TILT ROTOR AIRCRAFT; *AEROACOUSTICS
DE- UH-60A HELICOPTER; FLIGHT TESTS
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 02262961
AN- <AEROSPACE> A97-10742
TI- Prediction of pilot workload in helicopter low level flying tasks through the application of adaptive wavelet decomposition
AU- Jones, J. G.; Padfield, G. D.; Charlton, M. T. (Defence Research Agency, Bedford, United Kingdom)
SO- In: European Rotorcraft Forum, 22nd, Brighton, United Kingdom, Sept. 17-19, 1996, Proceedings. Vol. 2 (A97-10676 01-05), London, Royal Aeronautical Society, 1996, p. 76.1-76.10.
PY- 1996
PD- 199600
RF- 8
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- As part of a program of research to improve mission effectiveness by studying pilot workload and task performance in mission-oriented flight

tasks, a methodology has been developed in which wavelet analysis is used to extract information from records of vehicle response and of pilot control activity. By decomposing the records into discrete wavelets, components of vehicle agility and pilot workload are derived in the form of wavelet-based 'quickness' parameters for vehicle agility and so-called 'attack' parameters for pilot workload. It is shown how individual wavelet components in the records of pilot control activity, referred to as 'worklets', can be associated with the subtasks of 'guidance' and 'stabilization'. It is demonstrated how these concepts can be applied to quantify changes in pilot control activity associated with increasing task difficulty or changes in aircraft handling qualities. Two examples are presented, one from a flight trial in which the task difficulty was increased by changes in a prescribed ground track and the other from a simulation trial in which an increased time delay was introduced into the response of the flight control system. (Author)

DE- <MAJOR> *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *WAVELET
ANALYSIS; *FLIGHT SIMULATORS
DE- POWER SPECTRA; ADAPTIVE CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02262922
AN- <AEROSPACE> A97-10703
TI- An appreciation of where human action results in errors prejudicial to the safety of offshore helicopter operations and the application of future technologies to prevent such incidents
AU- Ingram, D. B. (GKN Westland Helicopters, Ltd., Yeovil, United Kingdom); Henley, A. J. M.; Martin, J. H. (GEC-Marconi Avionics, Ltd., Rochester, United Kingdom)
SO- In: European Rotorcraft Forum, 22nd, Brighton, United Kingdom, Sept. 17-19, 1996, Proceedings. Vol. 1 (A97-10676 01-05), London, Royal Aeronautical Society, 1996, p. 32.1-32.12.
PY- 1996
PD- 199600
RF- 3
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- With the aim of significantly reducing offshore accidents in the future Shell Aircraft Limited (SAL) has sponsored a pilot study, the subject of this paper, to identify which technologies have the potential to prevent or circumvent incidents in which human action results in errors prejudicial to the safety of offshore helicopter operations. The study was fundamentally a two-stage process in which the most critical problems facing offshore helicopter crews were assessed, followed by an appraisal of which technological solutions gave the largest potential improvement to safety. Ease of implementation of each solution was considered such that the practicality of achieving a given safety benefit could be assessed. This paper concludes with a discussion on the best solutions, with emphasis on those that are not already being studied yet may be available in the short term as a retrofit to current aircraft. (Author)
DE- <MAJOR> *FLIGHT SAFETY; *OFFSHORE PLATFORMS; *HUMAN FACTORS ENGINEERING
; *AIRCRAFT ACCIDENTS; *AIRCRAFT RELIABILITY; *HELICOPTERS
DE- RESEARCH AND DEVELOPMENT; AIR TRAFFIC CONTROL
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02262921
AN- <AEROSPACE> A97-10702
TI- Cause-factor analysis of helicopter accident rate
AU- Volodko, A. M. (Research Inst. of Aircraft Maintenance, Moscow, Russia)
SO- In: European Rotorcraft Forum, 22nd, Brighton, United Kingdom, Sept. 17-19, 1996, Proceedings. Vol. 1 (A97-10676 01-05), London, Royal Aeronautical Society, 1996, p. 31.1-31.13.
PY- 1996
PD- 199600
LA- English
GL- Russia
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- A unique data base on flight accidents and serious failures of the Mi-2, Mi-6, Mi-8, Mi-14, Mi-17, and Mi-26 Russian helicopters over 20 years in both civil and military aviation has been systematized and analyzed. The main groups of unfavorable factors are determined. The paper contains distributions of flight accidents connected with unsatisfactory actions of the pilots, complex meteorological conditions, and flight accidents caused by unsatisfactory aeronautical engineering. The data presented in the paper have proved known world statistics. At the same time the relative accident rates for

helicopters of different weight (light, medium, and heavy) and for similar helicopters that are being used simultaneously for both military and civilian purposes are of great importance. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AERONAUTICAL ENGINEERING; *RELIABILITY ENGINEERING
DE- PILOT PERFORMANCE; TAKEOFF; AIRCRAFT LANDING
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02262911
AN- <AEROSPACE> A97-10692
TI- UH-60A helicopter airloads measured in flight
AU- Kufeld, Robert M. (NASA, Ames Research Center, Moffett Field, CA); Bousman, William G. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
SO- In: European Rotorcraft Forum, 22nd, Brighton, United Kingdom, Sept. 17-19, 1996, Proceedings. Vol. 1 (A97-10676 01-05), London, Royal Aeronautical Society, 1996, p. 20.1-20.14.
PY- 1996
PD- 199600
RF- 37
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9701
AB- The flight test phase of the NASA/Army UH-60A Airloads Program was completed in February 1994. The objective of the project was to measure the airloads in flight on an UH-60A Black Hawk using 221 blade pressure transducers installed in nine radial arrays. In addition, 21 transducers were installed along the blade leading edge to better identify blade-vortex interaction phenomena. This paper briefly describes the program's background and history, instrumentation, and data acquisition. Airloads data are presented for two test conditions with different levels of complexity: steady, level flight and a diving turn. These flight data provide useful information on relatively simple and complex nonlinear flow for the validation of theoretical analyses. Evidence of shock waves, reverse flow, dynamic stall, and blade vortex interactions are presented. (Author)
DE- <MAJOR> *UH-60A HELICOPTER; *ROTARY WINGS; *AERODYNAMIC LOADS
DE- STRAIN GAGES; ACCELEROMETERS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02260433
AN- <AEROSPACE> A96-45714
TI- The 1996 MIT/Boston University/Draper Laboratory Autonomous Helicopter System
AU- Johnson, E. N.; DeBitetto, P. A. (Charles Stark Draper Lab, Inc., Cambridge, MA); Trott, C. A. (MIT, Cambridge, MA); Bosse, M. C. (Boston Univ., MA)
SO- In: AIAA/IEEE Digital Avionics Systems Conference (DASC), 15th, Atlanta, GA, Oct. 27-31, 1996, Proceedings. (A96-45660 12-01), Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1996, p. 381-386.
PY- 1996
PD- 199600
RF- 3
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- The Massachusetts Institute of Technology, Boston University, and Draper Laboratory have cooperated to develop an autonomous aerial vehicle that won the 1996 International Aerial Robotics Competition. This paper describes the approach, system architecture, and subsystem designs for the entry. This entry represents a combination of many technology areas: navigation, guidance, control, vision processing, human factors, packaging, power, real-time software, and many others. The aerial vehicle, an autonomous helicopter, performs navigation and control functions using multiple sensors: differential GPS, inertial measurement unit, sonar altimeter, and a flux compass. The aerial transmits video imagery to the ground. A ground-based vision processor converts the image data into target position and classification estimates. The system was designed, built, and flown in less than one year, and has provided many lessons about autonomous vehicle systems, several of which are discussed. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *AUTONOMY
DE- UNIVERSITIES; AVIONICS; COMPUTERIZED SIMULATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02260127
AN- <AEROSPACE> A96-45408

TI- SH-60B human factors systems safety analysis
AU- Schmidt, John K. (U.S. Navy, Naval Safety Center, Norfolk, VA); Winsko, Stanley J. Jr. (U.S. Navy, Naval Air Warfare Center, Warminster, PA)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 1168-1171.
PY- 1995
PD- 199500
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- A Human Factors System Safety Analysis of the Navy's SH-60B helicopter was run that examined emergency procedures, survival training, crewstation design, and protective gear using the SHEL system model. Further, SH-60B mishaps were studied to determine their impact on crash survival. Results show system components meet specifications, but are not optimal and/or well integrated. Aircrew egress difficulties include reaching exits, actuating releases, opening hatches, and clearing them. These problems are exacerbated by inrushing water, no visual reference, confusion, and disorientation. Improved procedures, tailored training, enhanced lifespace integrity, direct actuating mechanism access, illuminated reference points, and enlarged exits are recommended. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *FLIGHT SAFETY; *HELICOPTERS
DE- CREW WORKSTATIONS; COCKPITS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02260126
AN- <AEROSPACE> A96-45407
TI- Single pilot helicopter cockpit resource management
AU- Mayes, Bruce J. (Century Flight Management, Inc., Honolulu, HI)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 1164-1167.
PY- 1995
PD- 199500
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- According to the Flight Safety Foundation, the U.S. helicopter accident rate for the period 1980-1993 is just under 11 accidents per 100,000 flight hours and 6.69 accidents per 100,000 flight hours for turbine helicopters. The National Transportation Safety Board reports show that in calendar year 1993 there were 130 single-pilot helicopter accidents, resulting in 52 fatalities in the U.S. In 1994 there were 11 helicopter accidents in Hawaii, resulting in four fatalities. The unprecedented number of accidents, most in the air tour industry, prompted the FAA to issue Special Federal Aviation Regulation (SFARS) 71 - Special Operating Rules for Air Tour Operators in the State of Hawaii. The SFARs in the Grand Canyon and Hawaii resulted from public misconception that a significant increase in the accident rate had occurred and that most of the accidents were caused by preventable pilot errors. The dramatic increase in helicopter tour aircraft as well as the accompanying increase in flight hours over the last 10 years was not considered in the FAA rulemaking process. The basic problem of human factors accidents will not be resolved with the SFARs. (Author)
DE- <MAJOR> *HELICOPTERS; *AIRCRAFT PILOTS; *COCKPITS; *RESOURCES MANAGEMENT
DE- FLIGHT SAFETY; ABILITIES
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02260123
AN- <AEROSPACE> A96-45404
TI- The profile of the IAF pilots based on the result of the Pauli test
AU- Prasetyo, Mr. (Indonesian Air Force, Psychology Inst., Bandung, Indonesia)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 1148-1151.
PY- 1995
PD- 199500
RF- 7
LA- English
GL- Indonesia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9612
AB- Indonesian Air Force pilots have to fulfill all the requirements for pilots, like quick reactions and accuracy in decision-making, good judgment, bravery, and endurance against stress. One of the methods for learning IAF pilots' characteristics is by conducting the Pauli test. It is expected that the result of the research will show the profile of the fighter, transport, and helicopter pilots based on their Pauli test results; these factors of the profiles are significantly different. If the result of the research is significantly positive, it can be used as the basis for further psychological research in general. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *PERSONALITY
DE- STRESS (PSYCHOLOGY); DECISION MAKING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02260081
AN- <AEROSPACE> A96-45362
TI- The sustainment of helicopter pilot performance with dexedrine during continuous operations
AU- Caldwell, John A., Jr. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 920-925.
PY- 1995
PD- 199500
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- Dexedrine (3, 10-mg doses) or placebo was administered to six male helicopter pilots (at 2400, 0400, and 0800 hours) during two separate sleep deprivation periods. Performance effects were assessed throughout the night and during the subsequent day at 0100, 0500, 0900, 1300, and 1700 hours. During each session, subjects flew a standardized profile in a UH-60 simulator and completed a variety of other tests including resting EEGs. Dexedrine improved aviator control on every flight maneuver with the exception of the hovering turns and the formation flight. Performance on the stationary hovers, the low-level navigation, the climbs and descents, straight-and-level segments, standard-rate turns, and the left-descending turn all manifested at least one Dexedrine-related enhancement. The times of day at which Dexedrine facilitated flight performance most noticeably were 0500, 0900, and 1700 hours. Analyses of the EEG and mood data showed that alertness was sustained significantly by Dexedrine. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *HELICOPTERS; *DRUGS; *SLEEP DEPRIVATION
DE- FLIGHT SIMULATORS; UH-60A HELICOPTER
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02260079
AN- <AEROSPACE> A96-45360
TI- Variables contributing to the increase in accident likelihood between the ages of thirty-five and forty-four
AU- Yates Harkey, Julie A.; McCurry, William K. (Indiana State Univ., Terre Haute)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 908-913.
PY- 1995
PD- 199500
RF- 15
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- The likelihood of a pilot being involved in an aviation accident increases after the age of 40. A comparison of the accident data and numbers of pilots holding medical certificates points out a significant relationship between pilot age and an increase in the occurrence of accidents. When the percentage of pilots holding valid medical certificates in each age range is compared with the percentage of pilots who were involved in an aviation accident, the increased likelihood of having an accident becomes evident. When pilots turn 40, one or more variables (type of operation, pilot certificate held, currency of biennial flight review, type of medical certificate, total flight time, flight time in the accident make and model, maintenance factors, whether the pilot is current to carry passengers, sex, and pilot profession) may in turn affect the human performance factors of information processing and psychological or emotional response. This is a descriptive study designed to define these changes, or critical differences, between the 35-39 and 40-44 age groups. This study is

limited to general aviation pilots and flight crew, and to aircraft and helicopters. The National Transportation Safety Board is the source of data. The phenomena of the increased accident rate associated with change of age group were investigated by looking at accident frequencies and pilot population data. (Author)
DE- <MAJOR> *AGE FACTOR; *AIRCRAFT ACCIDENTS; *AIRCRAFT PILOTS
DE- GENERAL AVIATION AIRCRAFT; PILOT ERROR
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02260060
AN- <AEROSPACE> A96-45341
TI- Aeronautical decision making - The expertise method
AU- Kochan, Janeen A. (Ohio State Univ., Columbus)
SO- In: International Symposium on Aviation Psychology, 8th, Columbus, OH, Apr. 24-27, 1995, Proceedings. Vol. 2 (A96-45198 12-53), Columbus, OH, Ohio State University, 1995, p. 801-803.
PY- 1995
PD- 199500
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- This report presents a study designed to create a model of expert decision making in general aviation pilots. The purpose of the model is to provide a guide for the development of better intervention strategies for improving pilot performance. The FAA has been involved in the development and implementation of training programs for aeronautical decision making (ADM) since 1973. The first-generation ADM materials focused on teaching from an awareness point of view. The students were introduced to the subject of decision making followed by discussions of hazardous thoughts, error chains, and risk assessment. Training manuals were provided with ADM applications to student, instructor, commercial, instrument, and helicopter pilots. An application of ADM for multiperson crews was provided in a CRM training manual as well. This study, based on the expertise model, represents the initial step in the development of the next generation of ADM training. The goals of this initial step are to determine (1) the distinguishing characteristics of an expert, as differentiated from competent pilot, (2) how these qualities were acquired, and (3) how they can be taught to other, less expert pilots. (Author)
DE- <MAJOR> *DECISION MAKING; *AIRCRAFT PILOTS; *GENERAL AVIATION AIRCRAFT
DE- AERONAUTICS; RISK ASSESSMENT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02259735
AN- <AEROSPACE> A96-45016
TI- Vertical flight in an obstacle-rich environment
AU- Sawyer, Brian M.; Bolz, Eric H. (SAIC, Arlington, VA); Zmroczek, Leon A. (Boeing Defence & Space Group, Philadelphia, PA); Kramer, Arthur F. (Illinois, Univ., Urbana)
SO- SAE and AIAA, World Aviation Congress, 1st, Los Angeles, CA, Oct. 21-24, 1996, 9 p..
PY- 1996
PD- 199610
RF- 7
RN- SAE Paper 965614
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- Over the last several years, the FAA and the rotorcraft industry have maintained a dialogue regarding minimum airspace requirements at visual flight rule (VFR) heliports. The industry is anxious to locate heliports in strategic downtown city-center areas and wants to size heliport airspace to fit these constrained geometries. The FAA, on the other hand, is concerned that the minimum recommended airspace for VFR heliports or vertiports must be sufficient to ensure safety of operations. Prior FAA studies and testing on this issue have been concerned with a very limited number of obstacles in the vicinity of a specific heliport. No consideration has been given to the psychological effect of a large number of obstacles, or an obstacle-rich environment, in the vicinity of a heliport or vertiport on pilot performance. This research project is designed to explore and investigate what part obstacles play in pilot performance and perception. (Author)
DE- <MAJOR> *VERTICAL FLIGHT; *OBSTACLE AVOIDANCE; *VISUAL FLIGHT RULES;
*HELICOPTER DESIGN; *USER REQUIREMENTS
DE- FEDERAL AVIATION ADMINISTRATION; AIRPORTS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02259646
AN- <AEROSPACE> A96-44927
TI- Designing the conceptual flight deck for a short haul civil transport/civil tiltrotor
AU- Wilkins, Robert R., Jr. (Boeing Defense & Space Group, Seattle, WA)
SO- SAE and AIAA, World Aviation Congress, 1st, Los Angeles, CA, Oct. 21-24, 1996, 26 p..
PY- 1996
PD- 199610
RF- 18
RN- SAE Paper 951997
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9612
AB- A short haul civil transport (SHCT) tiltrotor is a VSTOL transport-type aircraft with performance equivalent to that of a medium-performance transport turboprop aircraft having the additional unique capability to land and takeoff vertically. The SHCT flight deck (or crew system design) has as its end requirement the implementation of those systems required to operate a functional commercially viable SHCT in the national and international airspace systems. Short haul transport flight deck/crew systems design and integration must consider the mission requirements, unique aerodynamic characteristics, and performance requirements and capabilities (flight profiles) of the aircraft to be used. The SHCT must demonstrate capabilities such as the ability to use narrowly defined but obstacle-rich CTR navigation corridors, provide rapid reconfiguration from airplane to helicopter (vertical-flight VSTOL) modes, and execute steep/slow approaches to a hover or near-hover rolling vertical landing. It must address the career origin of proposed flight crew members and answer questions raised by learning and habit transfer of flight crews assigned to fly the aircraft, whether from the rotary-wing (helicopter) or fixed-wing (commuter/regional) communities. Electronic flight information system displays and controls must provide for intuitive systems analysis and efficient aircraft operation, increasing rather decreasing the situational awareness. The design of the flight deck has and will, wherever possible and sensible, make use of existing proven concepts and designs, building on the experience and intelligence of others. (Author)
DE- <MAJOR> *FLIGHT DECKS; *SHORT HAUL AIRCRAFT; *TILT ROTOR AIRCRAFT; *TRANSPORT AIRCRAFT; *CIVIL AVIATION; *AIRCRAFT DESIGN
DE- V/STOL AIRCRAFT; AIR TRAFFIC CONTROL; V-22 AIRCRAFT; FLIGHT CONTROL; DISPLAY DEVICES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02255314
AN- <AEROSPACE> A96-40595
TI- Conceptual design and proposed development of the GAP-4 multi-purpose small utility helicopter
AU- Schrage, Daniel P. (Georgia Inst. of Technology, Atlanta); Yillikci, Y. K. (Istanbul Technical Univ., Turkey); Phillips, Jerry W. (AeroSystems, Inc., Roswell, GA); Mavris, Dimitri N. (Georgia Inst. of Technology, Atlanta)
SO- In: ICAS, Congress, 20th, Naples, Italy, Sept. 8-13, 1996, Proceedings. Vol. 1 (A96-40526 11-01), Reston, VA, American Institute of Aeronautics and Astronautics, Inc., 1996, p. 601-610.
PY- 1996
PD- 199600
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9611
AB- This paper presents the GAP-4 helicopter's conceptual design and discusses a planned university/industry/government collaborative development program in both Turkey and the U.S. that will complete the design of the GAP-4 and demonstrate its capabilities for manufacture in Turkey. A major objective of this program will be to foster the development of a helicopter industry in the Republic of Turkey. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *FEASIBILITY ANALYSIS; *PISTON ENGINES; *COMPUTER AIDED DESIGN; *MARKET RESEARCH
DE- TURKEY; AEROELASTICITY; FLIGHT CONTROL; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02255245
AN- <AEROSPACE> A96-40526
TI- ICAS, Congress, 20th, Naples, Italy, Sept. 8-13, 1996, Proceedings.

Vol. 1
SO- Reston, VA, American Institute of Aeronautics and Astronautics, Inc., 1996, 1459 p. (For individual items see A96-40527 to A96-40678).
PY- 1996
PD- 199600
RN- ISBN 1-56347-219-8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9611
AB- The present volume on aeronautical sciences discusses CFD development, fluid physics, flight at high angle of attack, and environmental issues. Attention is given to structural design, pilot assistance, aerodynamics, unsteady aerodynamics, and aerospace flight dynamics. Other topics addressed include flight control, unmanned air vehicles, finite element modeling, and flow interactions. Also considered are flight dynamics and control, boundary layer stability and transition, rotorcraft, reliability and maintainability, wind tunnel analysis and instrumentation, and supersonic transport aircraft. (AIAA)
DE- <MAJOR> *CONFERENCES; *AERONAUTICAL ENGINEERING; *AIRCRAFT PERFORMANCE; *FLIGHT MECHANICS
DE- ANGLE OF ATTACK; COMPUTATIONAL FLUID DYNAMICS; STRUCTURAL DESIGN; AIRCRAFT PILOTS; BOUNDARY LAYER STABILITY; ROTORCRAFT AIRCRAFT; BOUNDARY LAYER TRANSITION; AIRCRAFT RELIABILITY; AERODYNAMIC CHARACTERISTICS; SUPERSONIC TRANSPORTS; VIBRATION DAMPING; ACTIVE CONTROL; WIND TUNNEL APPARATUS; UNSTEADY AERODYNAMICS; AEROELASTICITY; AIRFOIL PROFILES; AIR TRAFFIC CONTROL; FLIGHT CONTROL
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02255013
AN- <AEROSPACE> A96-40294
TI- Helicopter unique instrument approaches - Trajectories, flying qualities, controls and displays
AU- Green, David L. (Starmark Corp., Arlington, VA); Kimberlin, Ralph D. (Tennessee, Univ., Knoxville)
SO- In: SAE 1994 Transactions, Journal of Aerospace. Section 1 - Vol. 103 (A96-40177 11-31), Warrendale, PA, Society of Automotive Engineers, Inc., 1995, p. 2189-2200.
PY- 1995
PD- 199500
RF- 15
RN- SAE-942165
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9611
AB- The paper presents an argument for combining the precision of GPS with robust slow speed agility of the helicopter to support the wide implementation of a helicopter precision track GPS (HPT-GPS) instrument approach. The autonomous nature of the approach suggests that it is particularly suited for use at small airports and heliports. This capability is then characterized as providing an affordable way to facilitate the integration of rotorcraft into the National Airspace System to facilitate commerce and emergency medical service to areas that are otherwise poorly served by aviation during inclement weather. The paper defines a new minimum approach airspeed (V(MAP)) which applies to the last segment of the approach. This segment involves a descent to a minimum descent altitude and continued flight to a Helicopter Visual Descent Point which is expected to be located 150 ft or more above or beyond the runway threshold. A series of charts is used to explain the relationship between V(MAP) and the current minimum airspeed for instrument flight. The paper concludes with a justification for displaying both ground speed and airspeed and suggests formats for both. (Author)
DE- <MAJOR> *INSTRUMENT APPROACH; *HELICOPTERS; *DISPLAY DEVICES; *FLIGHT PATHS; *FLIGHT CHARACTERISTICS; *GLOBAL POSITIONING SYSTEM
DE- WORKLOADS (PSYCHOPHYSIOLOGY); DIFFERENTIAL GLOBAL POSITIONING SYSTEM; PILOT PERFORMANCE; AIRCRAFT MANEUVERS; AIRSPEED
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02254433
AN- <AEROSPACE> A96-39714
TI- Depth sounding lidar-performance and models
AU- Steinvall, Ove; Koppari, Kurt (Swedish Defence Research Establishment, Linkoping, Sweden); Lejdebrink, Ulf; Winell, Johan; Nilsson, Magnus (National Maritime Administration, Norrkoping, Sweden); Elssen, Rutger (Naval Aviation, Harsfjarden, Sweden); Gjellan, Einar (Defence Materiel Administration, Linkoping, Sweden)

SO- In: Laser radar technology and applications; Proceedings of the Meeting, Orlando, FL, Apr. 10, 11, 1996 (A96-39715 10-36), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2748), 1996, p. 18-38.
PY- 1996
PD- 199600
RF- 27
LA- English
GL- Sweden
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- This paper describes depth-sounding activities in Sweden. These include the development of a helicopter-borne lidar called FLASH, as well as instrumentation (HOSS) for in-situ measurement of the optical water parameters. The FLASH system has been further developed into two operational systems called Hawk Eye, with Saab Dynamics as the main contractor and Optech Inc. as the main subcontractor. Data collection and evaluation from Hawk Eye will be discussed. The Swedish Defence Research Establishment (FOA) is a member of the Hawk Eye project team together with the National Maritime Administration, the Royal Swedish Navy, and the Defence Material Administration. Together with the Swedish Maritime Administration, FOA has been engaged in the analysis of lidar data to determine system performance and possible ways in which to optimize it in relation to lidar parameters and the anticipated bottom depth and topography. Examples from that analysis are presented. The test analysis so far strongly supports depth-sounding lidar technology as being a rapid and accurate sounder fulfilling the requirement of the International Hydrographic Office on depth accuracy. (Author)
DE- <MAJOR> *OPTICAL RADAR; *SHALLOW WATER; *DEPTH MEASUREMENT; *BATHYMETERS; *RADAR MEASUREMENT; *REMOTE SENSING
DE- AIRBORNE RADAR; UNDERWATER OPTICS; IN SITU MEASUREMENT; COST EFFECTIVENESS
SH- 7536 Lasers & Masers (1975-)

AN- <DIALOG> 02253843
AN- <AEROSPACE> A96-39124
TI- Vehicle structural fatigue issues in rotorcraft flying qualities testing
AU- Martyn, A. W.; Charlton, M. T.; Padfield, G. D. (Defence Research Agency, Bedford, United Kingdom)
SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 3 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. XII.4.1-XII.4.14.
PY- 1995
PD- 199500
RF- 14
LA- English
GL- United Kingdom
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- This paper reviews the use and importance of vehicle structural Fatigue and Usage Monitoring (FUM) during flying qualities testing, particularly when using the new rotorcraft handling qualities methodology, ADS-33D. The paper covers the rationale for FUM, FUM instrumentation, the rules used for monitoring on the Defence Research Agency (DRA) Aeromechanics Lynx Control and Agility Testbed (ALYCAT), and experience during DRA testing on both ALYCAT and Puma research helicopters. In particular, the paper reviews incidents when conducting both ADS-33 open- and closed-loop testing that highlight the potential to approach and exceed vehicle limits and accrue longer term usage penalties when using the ADS. The position and importance of FUM, when using the testing techniques outlined in ADS-33, are then reviewed, and several questions that come to the fore when FUM problems are experienced are discussed. The paper concludes by considering the role of advanced control concepts to mitigate usage penalties while optimizing mission effectiveness. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *FLIGHT CHARACTERISTICS; *FATIGUE TESTS;
*CONTROLLABILITY; *AIRCRAFT STRUCTURES
DE- S-N DIAGRAMS; AIRCRAFT MANEUVERS; DAMAGE; REAL TIME OPERATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02253841
AN- <AEROSPACE> A96-39122
TI- Experimental evaluation of the nonlinearities in a helicopter ground vibration test
AU- Cenedese, Fausto (Agusta S.p.A., Cascina Costa di Samarate, Italy)
SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 3 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. XII.1.1-XII.1.12.
PY- 1995

PD- 199500
RF- 10
LA- English
GL- Italy
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- This paper summarizes the experimental modal analysis of a normal production helicopter with the aim of investigating experimentally the dynamic behavior of such aerospace structures and to set a general methodology when the structure presents nonlinearities. This is done in order to have high quality data for a successive analytical ground stability analysis comparison. The excitation was limited to one single location of the structure, at the mast of the helicopter, in two directions: lateral and longitudinal. The choice of the excitation signal is one of the factors that can affect the quality of the FRFs obtained, so the stepped sine excitation was used to minimize the errors and to detect the nonlinearities. The main purpose of the paper is to show that many structures, such as a helicopter, are nonlinear, and that the excitation, instrumentation, and estimation can accentuate or obscure the nonlinear response if not properly used. (Author)
DE- <MAJOR> *NONLINEARITY; *GROUND TESTS; *VIBRATION TESTS; *HELICOPTERS; *STRUCTURAL ANALYSIS; *FINITE ELEMENT METHOD
DE- FREQUENCY RESPONSE; SUSPENDING (HANGING); TRANSDUCERS; LANDING GEAR; COMPUTERIZED SIMULATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02253833
AN- <AEROSPACE> A96-39114
TI- Cockpit layout - Operational aspects
AU- Lande, K. (Helikopter Service A.S., Stavanger, Norway)
SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 3 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. IX.3.1-IX.3.36.
PY- 1995
PD- 199500
RF- 5
LA- English
GL- Norway
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- The development of aircraft instrumentation and cockpit layout has followed the guidelines and ideas of design engineers and manufacturers and, to some degree, the specifications of the armed services. This has resulted in a somewhat arbitrary development of cockpit layout which has mostly followed trends and fashions rather than scientific guidelines. This has caused operational problems for commercial operators, especially smaller helicopter companies which have to satisfy market demands. In order to stay competitive, these operators are forced to let pilots be qualified on several different types of helicopters. Since all these helicopter types have different cockpit layout, operational safety problems are created for the operators. The European Helicopter Association (EHA) has recognized this problem and has developed an EHA Cockpit Layout Guidelines paper which may be a future tool for manufacturers and operators in developing more user-friendly cockpits. (Author)
DE- <MAJOR> *COCKPITS; *AIRCRAFT INSTRUMENTS; *AIRCRAFT DESIGN; *DISPLAY DEVICES; *HELICOPTERS; *LAYOUTS
DE- AIRSPEED; ALTIMETERS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02253821
AN- <AEROSPACE> A96-39102
TI- Investigation on helicopter steep approach - Flight path on-board planning and control
AU- Hepp, H.; Reichert, G. (Braunschweig, Technical Univ., Germany)
SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 2 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. VII.5.1-VII.5.13.
PY- 1995
PD- 199500
RF- 22
LA- English
GL- Germany
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- In takeoff and landing situations, a well planned safe flight path reduces pilot workload and safety risk. The 'steep' approach is a

favorable alternative to the 'normal' flat approach when helicopter-specific characteristics are used. Conditional upon their hovering possibility and their vertical descent and climb ability, helicopters can fly both straight-lined and curved flight paths. There are various approaches which are restricted by flight-mechanical boundaries and certification requirements. Strict flight-mechanical boundaries are the vortex-ring state and the autorotation boundary. Further limitations may be the unsafe area of the height-velocity diagram, passenger comfort, and cockpit view. This paper presents a code which calculates a safe trajectory from an arbitrary point in the air to an arbitrary landing point, with consideration placed on the described boundaries. Because there are various boundaries and requirements depending on the height above ground, the approach path is split up into several segments. A landing system giving information about the helicopter's present position and altitude is necessary to follow these trajectories. For curved flight paths, the MLS and the GPS are two especially suitable landing systems. An input-output interface for these systems is implemented in the code. With reference to a survey among pilots, a flight guidance display was developed. Supplementary to a pilot-controlled flight, it is possible to automate helicopter steep approaches. A control concept with predetermined controls and an attitude flight path controller is presented. (AIAA)

DE- <MAJOR> *FLIGHT PATHS; *TAKEOFF; *AIRCRAFT LANDING; *FLIGHT SAFETY; *FLIGHT CONTROL; *APPROACH

DE- WORKLOADS (PSYCHOPHYSIOLOGY); VORTEX RINGS; SEGMENTS; PILOT PERFORMANCE

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02253804

AN- <AEROSPACE> A96-39085

TI- Flying qualities evaluation of the UK Attack Helicopter contenders using the ADS-33 methodology - Clinical criteria and piloted simulation trials

AU- Padfield, G. D.; Charlton, M. T. (Defence Evaluation and Research Agency, Bedford, United Kingdom); Mace, T. (Defence Evaluation and Research Agency, Boscombe Down, United Kingdom); Morton, R. (Ministry of Defence, Attack Helicopter Project Office, United Kingdom)

SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 2 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. IV.2.1-IV.2.20.

PY- 1995

PD- 199500

RF- 19

LA- English

GL- United Kingdom

CP- Netherlands

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9610

AB- Contenders for the UK Army's Attack Helicopter (AH) competition were subjected to a Technical Assessment during the period November 1993 to December 1994. The Defence Research Agency's Flight Dynamics and Simulation Department (FDS) were Lead Assessors for the flight control system and handling qualities aspects of the assessments. FDS carried out a program of off-line and piloted simulation activities in support of the handling qualities assessments, using the DRA's HELISIM simulation model. A piloted simulation evaluation was completed using the DRA's Advanced Flight Simulator, where the objective was to evaluate the contenders' handling qualities and agility in the context of the AH mission. This paper describes the test techniques and procedures used in the tests and discusses the background details of the handling qualities assessment methodology, presenting results in general terms. (Author)

DE- <MAJOR> *MILITARY HELICOPTERS; *FLIGHT CONTROL; *FLIGHT CHARACTERISTICS ; *FLIGHT SIMULATORS; *PILOT PERFORMANCE; *AIRCRAFT MANEUVERS

DE- UNITED KINGDOM; FLIGHT TESTS

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02253792

AN- <AEROSPACE> A96-39073

TI- Evaluation of the effect of pilotage sensor field of view and location on the performance of disparate flying tasks

AU- De Maio, J. (U.S. Army, Aeroflightdynamics Directorate; NASA, Ames Research Center, Moffett Field, CA); Schwirzke, M.; Matsumoto, J.; Hennessy, R. (Monterey Technologies, Inc., Carmel, CA)

SO- In: European Rotorcraft Forum, 21st, St. Petersburg, Russia, Aug. 30-Sept. 1, 1995, Proceedings. Vol. 1 (A96-39051 10-01), Amsterdam, Netherlands, NLR, 1995, p. III.2.1-III.2.10.

PY- 1995

PD- 199500

RF- 7

LA- English

GL- United States

CP- Netherlands

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9610
AB- The purpose of this study was to investigate the effect of pilotage sensor FOV size and location on pilot performance. Eight pilots performed disparate flying tasks in the Crew Station Research and Development Facility (CSRDF) advanced rotorcraft simulator. Sensor FOV size and location was examined in a four (FOV) by two (sensor location) by two (replications) within-subjects factorial design. The four main FOV sizes were 20, 35, 60, and 100 deg horizontal with vertical FOV size held constant at 40 deg. Sensor location was either at the pilot's cyclopean eye point or on the nose of the aircraft. A control condition and two special cases were also examined. Summarizing the objective data, three variables showed reliable effects of varying FOV on performance of two flight tasks. Performance benefits derived from increasing FOV from 50 to 80 deg varied from just under 10 percent to over 25 percent. Pilot workload ratings also showed a significant effect of FOV size on flight performance for all the maneuvers. Workload ratings were reliably higher in the 20 x 40 deg FOV condition and lower in the 100 x 400 deg condition. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *HELMET MOUNTED DISPLAYS; *FIELD OF VIEW;
*SENSORS; *FACTORIAL DESIGN
DE- TASKS; FORWARD FLIGHT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02250870
AN- <AEROSPACE> A96-36151
TI- Head-mounted displays; Proceedings of the Meeting, Orlando, FL, Apr. 8-10, 1996
AU- Lewandowski, Ronald J. (Honeywell, Inc., Minneapolis, MN); Haworth, Loran A.; Stephens, Wendell; Girolamo, Henry J. (U.S. Army, Washington, DC), EDS.
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2735), 1996, 275 p. (For individual items see A96-36152 to A96-36177).
PY- 1996
PD- 199600
RN- SPIE-2735; ISBN 0-8194-2116-2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9609
AB- Various papers on head-mounted displays (HMDs) are presented. Individual topics addressed include: JAST/IHAVS project overview, system design and aircraft integration, Integrated Helmet Audiovisual System (IHAVS) flight test plan and data collection, advanced helmet tracking technology developments for naval aviation, helmet display symbology development for the JAST/IHVS flight demonstration, IHAVS NITE Hawk SC targeting FLIR sytem, headgear system development and monocular display validation for the dismounted soldier, first-generation VGA electroluminescent display for head-mounted applications, human factors of two-primary-color AMLCDs, development and testing of HMD display formats for M1A2 tank commanders, prime color light source development for HMDs. Also discussed are: effects of aircraft windscreen on HMD/tracker aiming accuracy, breaking down the barriers of cockpit metal in magnetic head tracking, attitude symbology issues for HMDs, characterization of IHADSS performance, CONDOR Advanced Visionics System, HMD (day/night), update of the AN/AVS-7 Head-Up Display program, sensor-based automated obstacle-avoidance system for nap-of-the-Earth rotorcraft missions, evaluation of vector length depiction in helmet-display resident target locator line symbology, Swedish approach to integrated helmet system, new image generation principle. (AIAA)
DE- <MAJOR> *CONFERENCES; *HEAD-UP DISPLAYS; *TECHNOLOGY ASSESSMENT; *MAN
MACHINE SYSTEMS; *HELMET MOUNTED DISPLAYS
DE- SYSTEMS INTEGRATION; AUDIO VISUAL EQUIPMENT; HARDWARE; PANELS; FLAT
PLATES; PERFORMANCE TESTS; HUMAN FACTORS ENGINEERING; DESIGN ANALYSIS;
CERTIFICATION; OBSTACLE AVOIDANCE; ROTORCRAFT AIRCRAFT; OPTICAL EQUIPMENT; IMAGE INTENSIFIERS; NIGHT VISION; FIELD OF VIEW; VALIDATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02249720
AN- <AEROSPACE> A96-35001
TI- AIAA Flight Simulation Technologies Conference, San Diego, CA, July 29-31, 1996, Technical Papers
SO- Reston, VA, American Institute of Aeronautics and Astronautics, 1996, 761 p. (For individual items see A96-35002 to A96-35083).
PY- 1996
PD- 199600
RN- ISBN 1-56347-216-3
LA- English
GL- United States

CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9609
AB- The present conference discusses reconfigurable simulators and their development programs, motion systems, rotorcraft and air cushion vehicle dynamics, civil aviation simulations, avionics, weapons and engagement modeling and simulation, simulation of space systems, the modeling of aircraft dynamics, hardware/software technologies for modeling, advanced modeling concepts and their applications, networked simulation technologies and their applications, virtual reality and low cost simulation methods, and human factors and pilot cueing in flight simulation. Attention is given to software design for reconfigurable simulators, sensitivity in simulator motion base sensitivity design, detailed dynamic coupling analysis of helicopter rotor/propulsion systems, flight simulation cueing quality, many-on-many air engagement models, a simulation training facility for Shuttle/Mir docking, object-oriented flight simulator technology, flight hardware emulation in the Space Station Training Facility, latency reduction in distributed flight simulation, and advanced human-computer interfaces for air traffic management. (AIAA)
DE- <MAJOR> *CONFERENCES; *FLIGHT SIMULATION; *TECHNOLOGY ASSESSMENT
DE- MOTION SIMULATION; REAL TIME OPERATION; CIVIL AVIATION; AVIONICS; SPACE STATIONS; FLIGHT MECHANICS; AIRCRAFT PERFORMANCE; SOFTWARE TOOLS; HARDWARE; FLIGHT TRAINING; VALIDATION; VIRTUAL REALITY; DATA BASES; MAN-COMPUTER INTERFACE; HUMAN FACTORS ENGINEERING; TEST FACILITIES; TRAINING DEVICES; NASA PROGRAMS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02249260
AN- <AEROSPACE> A96-34541
TI- K-MAX improved handling qualities with cargo hook trolley
AU- Orkin, Kurtis; Haliscak, George (Kaman Aerospace Corp., Bloomfield, CT)

SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 1557-1568.
PY- 1996
PD- 199600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- In addition to providing exceptional lilting performance for many rigorous applications, the K-MAX was also designed to minimize pilot workload for the repetitive loading cycles of the commercial external-lift helicopter market. Both characteristics are essential to the helicopter's acceptability. During 1995, Kaman significantly advanced the helicopter's handling qualities by developing a cargo hook trolley system. The trolley feature enhances the K-MAX handling qualities by focusing the external load through the center of gravity of the aircraft. The improved alignment reduces the offset (moment arm) between the external load vector and the aircraft center of gravity in the lateral plane. (Author)
DE- <MAJOR> *LIFTING BODIES; *CARGO AIRCRAFT; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *FLIGHT CONTROL
DE- CENTER OF GRAVITY; LATERAL STABILITY
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02249232
AN- <AEROSPACE> A96-34513
TI- CSRDF evaluation of flight performance in MOPP IV gear
AU- Schwirzke, Martin F. J.; Sharkey, Tom J. (Monterey Technologies, Inc., Moffett Field, CA)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 1197-1203.
PY- 1996
PD- 199600
RF- 14
CN- NAS2-14113
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- As part of the Air Warrior (AW) evaluation, flight task performance in simulated combat missions was investigated using four helicopter pilots wearing both protective flight gear mission-oriented protective posture (MOPP IV) as well as unencumbered. The experiment was conducted using

the U.S. Army's Crew Station Research and Development Facility rotorcraft simulator. In each session, pilots flew simulated missions in which they performed tasks which required them to push touch sensitive keys and displacement-type switches. Analysis of the objective data indicated that data entry on a key pad required an average of 80 percent more time for pilots wearing MOPP IV gear. The subjective results indicated that pilots reported greater performance decrements while wearing MOPP IV gear. Pilots felt that MOPP IV gear effects on flight task performance were significantly detrimental even when the objective measured effect was marginal or nonexistent. (Author)

DE- <MAJOR> *PILOT PERFORMANCE; *MILITARY HELICOPTERS; *COMBAT; *COMPUTERIZED SIMULATION; *PROTECTIVE CLOTHING

DE- COCKPITS; HELMET MOUNTED DISPLAYS

SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02249231

AN- <AEROSPACE> A96-34512

TI- Evaluation of Air Warrior baselines in a Longbow Apache helicopter crewstation in a MIDAS simulation

AU- Atencio, Adolph, Jr.; Shively, R. J. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); Shankar, Renuka (Sterling Federal Systems, Palo Alto, CA)

SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 1186-1196.

PY- 1996

PD- 199600

RF- 21

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9609

AB- The U.S. Army's Air Warrior program will develop and integrate an improved Mission Oriented Protective Posture (MOPP) ensemble for helicopter aircrews. The MOPP clothing and equipment worn at present is restrictive, bulky and uncomfortable which can lead to performance degradation and even flight safety issues. The Air Warrior program will address these deficiencies by designing mission-tailorable MOPP with better component integration to improve performance and survivability of the aircrew in battlefield conditions. Simulation is being used extensively to test concepts and crew performance before release of the RFP for system development. The computer simulation reported established baseline performance measurements with and without current MOPP equipment. These measurements were performed in MIDAS (Man-machine Integrated Design and Analysis System), an integrated suite of software components for design and analysis of human-machine systems under development by the Army and NASA-Ames. (Author)

DE- <MAJOR> *CREW WORKSTATIONS; *AH-64 HELICOPTER; *HUMAN FACTORS ENGINEERING; *COMPUTER AIDED DESIGN; *MAN MACHINE SYSTEMS; *COMPUTERIZED SIMULATION

DE- COCKPITS; ERROR ANALYSIS; WORKLOADS (PSYCHOPHYSIOLOGY)

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02249230

AN- <AEROSPACE> A96-34511

TI- In-flight simulation of visionic field-of-view restrictions on rotorcraft pilot's workload, performance and visual cueing

AU- Haworth, Loran; Szoboszlay, Zoltan; Kasper, Eugene; De Maio, Joe (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); Halmos, Zsolt (Raytheon Aerospace Co., Lexington, MA)

SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 1155-1185.

PY- 1996

PD- 199600

RF- 12

LA- English

GL- United States

CP- United States

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA9609

AB- Pilot FOV was physically restricted during flight tests to simulate current and next generation Helmet Mounted Display FOVs for night vision pilotage systems. This study, which was initiated by the Aeroflightdynamics Directorate of the U.S. Army, documented the effects of limiting a rotorcraft pilot's FOV on performance, workload and visual cueing. A helmet FOV restricter was constructed for this test to limit the horizontal peripheral limits of the rectangular shaped FOV to 100, 80, 60, 40, and 20 deg. The vertical limits and overlap were held constant at 40 deg (except for the overlap for 20 deg FOV). Ten pilots executed a series of prescribed low altitude maneuvers at the NASA-operated Crows Landing Airfield in the FLITE facility, an

instrumented Cobra helicopter. The aircraft flight path was measured with a ground-based laser tracker. On-board data was recorded, as well as pilot handling quality ratings and visual cue ratings. Test data collected in flight was reduced into performance curves for illustrating performance versus FOV. (Author)
DE- <MAJOR> *FLIGHT SIMULATION; *FIELD OF VIEW; *ROTORCRAFT AIRCRAFT; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *HELMET MOUNTED DISPLAYS
DE- NIGHT VISION; AIRCRAFT MANEUVERS; FLIGHT CONDITIONS; DATA REDUCTION; HOVERING; FLIGHT SAFETY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02249229
AN- <AEROSPACE> A96-34510
TI- Tools and methods for helicopter user interface development and test
AU- Dennison, Thomas W. (Sikorsky Aircraft, Stratford, CT); Gawron, Valerie J. (Calspan Corp., Buffalo, NY)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 1141-1154.
PY- 1996
PD- 199600
RF- 38
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- We describe human factors tools and test methods used in the development and design of helicopters; the inventory of these tools is presented within a framework based on the iterative and recursive nature of the design process, not step-by-step instructions. We have included strengths and limitations of each tool, some sources, cost, and references that will help the person who wants to learn more about them. We take a broad view of testing. The test methods and tools may he used in all phases of the development of helicopters from the earliest exploration of concepts to the final product evaluations. They are applied by manufacturers, as well as by military customers who oversee systems development from phase to phase. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *HELICOPTER DESIGN; *MAN MACHINE SYSTEMS; *COMPUTER AIDED DESIGN; *COMPUTERIZED SIMULATION
DE- ITERATIVE SOLUTION; RECURSIVE FUNCTIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02249219
AN- <AEROSPACE> A96-34500
TI- An acclerometer-based instrumentation system for measurement of helicopter rotor motion and loads
AU- McKillip, Robert M., Jr. (Continuum Dynamics, Inc., Princeton, NJ)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 979-995.
PY- 1996
PD- 199600
RF- 14
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- Results from a recent Navy-sponsored study directed at an accelerometer-based instrumentation system for the measurement of helicopter rotor motion and loads are described. Background for the requirements and needs of the measurement system are provided; attention is given to a novel scheme that incorporates blade-mounted accelerometer sensors with a simplified signal processing scheme to extract rotor motion measurements and, to a limited extent, blade loading information. Issues regarding sensitivity of the system to modeling errors, nonlinearities and sensor bias errors are examined through detailed simulation and analysis. Finally, a demonstration of the system performance for reconstructing flapping motion measurements is provided using Froude-scaled model rotor test results. Conclusions from this work and some preliminary implementation issues leading to prototype development for this new system are presented. (Author)
DE- <MAJOR> *ACCELEROMETERS; *ROTARY WINGS; *AERODYNAMIC LOADS; *FLIGHT TRAINING; *COMPUTERIZED SIMULATION; *MOTION CONTROL
DE- ERROR ANALYSIS; PREFLIGHT OPERATIONS; HOVERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02249218
AN- <AEROSPACE> A96-34499
TI- Civil single pilot IFR certification - Procedures and pitfalls
AU- Kimberlin, Ralph D. (Tennessee, Univ., Tullahoma)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 2 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 971-978.
PY- 1996
PD- 199600
RF- 4
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- We describe the procedures used and problems encountered during the certification of a McDonnell-Douglas MD-369E helicopter for single pilot instrument flight. To maximize the utilization of the private helicopter, it should be certified for all weather operation. It can be accomplished for a single pilot without all axis stability augmentation, provided that adequate instrument displays are used and that human factors are considered to reduce pilot workload. This project demonstrated that current IFR certification regulations are not formulated for light helicopters and may present roadblocks to certification. However, it also demonstrated that single pilot IFR certification with minimum stability augmentation is possible and can offer potential safety benefits. (Author)
DE- <MAJOR> *CERTIFICATION; *PILOT SELECTION; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *WORKLOADS (PSYCHOPHYSIOLOGY); *CIVIL AVIATION
DE- MCDONNELL DOUGLAS AIRCRAFT; FLIGHT TESTS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02249167
AN- <AEROSPACE> A96-34448
TI- Design integration of the AH-64D Longbow air vehicle
AU- Clark, Jerry; Wilson, John (McDonnell Douglas Helicopter Systems, Mesa, AZ)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 1 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 277-306.
PY- 1996
PD- 199600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- This paper deals with the Integrated Product Definition (IPD) process and its application to the air vehicle configuration development of the Preproduction AH-64D Longbow Apache. The elements of IPD are discussed in the context of the Longbow program timeline. IPD is a process which enhances all phases of a product's life cycle from concept definition through production and subsequent support. The IPD process utilizes many tools and processes, some of which are: multi-disciplined teams, the Electronic Development Fixture, requirements management, and integrated scheduling. The Longbow program is currently in the last months of the Engineering, Manufacturing, and Development (EMD) phase which began in 1989, during which MDHS developed and tested six prototype aircraft. As part of the production transition, MDHS has decided to remanufacture one of the initial six prototype aircraft into a Preproduction aircraft. This project is commonly known as the EMD Initiatives. All the Initiative activities were mutually agreed to with the Army through a Cooperative Research and Development Agreement (CRADA). The schedule for the EMD Initiative and production transition is shown. (Author)
DE- <MAJOR> *HELICOPTER DESIGN; *AH-64 HELICOPTER; *SYSTEMS INTEGRATION; *HUMAN FACTORS ENGINEERING; *CREW WORKSTATIONS
DE- GLOBAL POSITIONING SYSTEM; INERTIAL NAVIGATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02249151
AN- <AEROSPACE> A96-34432
TI- Noise certification of the MD900 Explorer Helicopter
AU- O'Connell, James; JanakiRam, Ram; Hardesty, Mark (McDonnell Douglas Helicopter Systems, Mesa, AZ)
SO- In: AHS, Annual Forum, 52nd, Washington, DC, June 4-6, 1996, Proceedings. Vol. 1 (A96-34426 09-05), Alexandria, VA, American Helicopter Society, 1996, p. 80-91.
PY- 1996
PD- 199600
RF- 2

LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- McDonnell Douglas Helicopter Systems received a type certificate from the FAA for its NOTAR system-equipped MD900 Explorer helicopter in December 1994. To demonstrate compliance with FAA and international noise regulations for civil helicopters, noise measurements were obtained during level flyovers in accordance with the alternative noise certification flight test procedures specified in FAR 36 Appendix J for light helicopters. The more comprehensive FAR 36-H test provided the opportunity to examine the noise characteristics of the MD900 in detail, and facilitated direct comparison with the same type of data obtained for the smaller MD500N helicopter in 1991. This paper examines the noise control features incorporated into the MD900 design based on experiences with the MD500N. Noise certification test results are presented for both helicopters. It also includes a discussion on a simplified alternative procedure used for conducting the level flight test condition during the Appendix H test and comments regarding MDHS's first experience with a differential GPS to provide pilot guidance and helicopter position information. The alternative test procedures, combined with the differential GPS, contributed toward significant reductions in flight time and costs traditionally associated with noise certification testing. (Author)
DE- <MAJOR> *NOISE MEASUREMENT; *AIRCRAFT NOISE; *HELICOPTERS; *CERTIFICATION; *NOISE REDUCTION
DE- ROTARY WINGS; FLIGHT TESTS; PILOT PERFORMANCE; TAKEOFF
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02248939
AN- <AEROSPACE> A96-34220
TI- Flight test results of the Fuzzy Logic Adaptive Controller-Helicopter (FLAC-H)
AU- Wade, Robert L. (U.S. Army, Missile Command, Redstone Arsenal, AL); Walker, Gregory W. (Aerobotics Corp., Yorktown, VA)
SO- In: Navigation and control technologies for unmanned systems; Proceedings of the Conference, Orlando, FL, Apr. 8, 9, 1996 (A96-34201 09-63), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2738), 1996, p. 200-208.
PY- 1996
PD- 199600
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9609
AB- The Fuzzy Logic Adaptive Controller for Helicopters (FLAC-H) demonstration is a cooperative effort between the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM), the U.S. Army Aviation and Troop Command (ATCOM), and the U.S. Army Missile Command (MICOM) to demonstrate a low-cost drone control system for both full-scale and subscale helicopters. FLAC-H was demonstrated on one of STRICOM's fleet of full-scale rotary-winged target drones. FLAC-H exploits fuzzy logic in its flight control system to provide a robust solution to the control of the helicopter's dynamic nonlinear system. Straightforward common-sense fuzzy rules governing helicopter flight are processed instead of complex mathematical models. This has resulted in a simplified solution to the complexities of helicopter flight. Incorporation of fuzzy logic reduced the cost of development and should also reduce the cost of maintenance of the system. An adaptive algorithm allows the FLAC-H to 'learn' how to fly the helicopter, enabling the control system to adjust to varying helicopter configurations. The adaptive algorithm, based on genetic algorithms, alters the fuzzy rules and their related sets to improve the performance characteristics of the system. This learning allows FLAC-H to automatically be integrated into a new airframe, reducing the development costs associated with altering a control system for a new or heavily modified aircraft. Successful flight tests of the FLAC-H on a UH-1H target drone were completed in September 1994 at the White Sands Missile Range, NM. This paper discusses the objective, design, and performance of the system. (Author)
DE- <MAJOR> *PILOTLESS AIRCRAFT; *FLIGHT TESTS; *FUZZY CONTROL; *ADAPTIVE CONTROL; *GENETIC ALGORITHMS; *HELICOPTER CONTROL
DE- TARGET DETECTION; LOGIC DESIGN; MILITARY HELICOPTERS; FLIGHT CONTROL; ROBOTICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02247934
AN- <AEROSPACE> A96-33215
TI- Overview of the development of aircraft flight test technology

AU- Chen, Qishun; Yan, Jinglin; Quan, Changye (Chinese Flight Test Establishment, China)
SO- In: NPU/AIAA Atmospheric Flight Mechanics Conference, Xian, China, June 11-14, 1996, Proceedings (A96-33176 08-08), Xian, China, Northwestern Polytechnical University, 1996, p. 250-255.
PY- 1996
PD- 199600
RN- NPU/AIAA AFM 96-039
LA- English
GL- China
CP- China
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9608
AB- This paper summarizes the worldwide research on flight tests and development of flight test technology. It emphasizes the flight test efforts and technology development in China, including research on flight test technology by means of test-research aircraft, flight simulation technology, model free-flying technology, helicopter flight test, airworthiness certification flight test of civil transport airplanes, instrumentation and data processing, organization and management of flight tests, etc. The disparities between our level and the world state-of-the-art level in flight test research and technology, and our research highlights in the coming years are also briefly described. (Author)
DE- <MAJOR> *FLIGHT TESTS; *TECHNOLOGY ASSESSMENT; *RESEARCH AND DEVELOPMENT; *GENERAL OVERVIEWS
DE- CHINA; FLIGHT SIMULATION; FREE FLIGHT; CIVIL AVIATION; CERTIFICATION; HELICOPTERS; TRANSPORT AIRCRAFT; AIRCRAFT INSTRUMENTS; DATA PROCESSING; DATA MANAGEMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02247625
AN- <AEROSPACE> A96-32906
TI- Half-dome screen visual system for a flight simulator and pilot's evaluations
AU- Kawahara, H.; Wakairo, K.; Watanabe, A.; Funabiki, K. (National Aerospace Lab., Tokyo, Japan)
SO- In: Aircraft Symposium, 33rd, Hiroshima, Japan, Nov. 8-11, 1995, Proceedings (A96-32875 08-31), Tokyo, Japan Society for Aeronautical and Space Sciences, 1995, p. 127-130. In Japanese.
PY- 1995
PD- 199500
LA- Japanese
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9608
AB- A half-dome screen visual system was installed for helicopter simulation in 1995. This paper presents the functions and characteristics of the new visual system and evaluation results by NAL research pilots and airplane manufacturers' engineering pilots. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *DISPLAY DEVICES; *VIDEO EQUIPMENT; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE
DE- PILOT PERFORMANCE; SCREENS; AIRCRAFT PRODUCTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02244735
AN- <AEROSPACE> N96-19117
TI- Validation of crew coordination training and evaluation methods for Army aviation
TI- <SUPPLEMENT> Final Research Note, Feb. - Dec. 1992
AU- SIMON, ROBERT A.; GRUBB, GARY N.; LEEDOM, DENNIS K.
CS- Dynamics Research Corp., Wilmington, MA.
CS- <CODE> D9080510
PY- 1995
PD- 199508
PG- 211P.
CN- MDA903-92-D-0025; DA PROJ. 060-3007-A
RN- AD-A298921; E-785U; ARI-RN-95-45
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A10/MF A03
JA- STAR9605
AB- At the request of the U.S. Army Aviation Center (USAAVNC), the Army Research Institute Rotary-Wing Aviation Research Unit (ARIRWARU) developed field exportable training and evaluation materials for aircrew coordination. A testbed of the materials was implemented with the cooperation of the 101st Aviation Brigade. Sixteen aircrews

participated. Using a UH-60 flight simulator, aircrews were evaluated while executing a comprehensive tactical mission. Evaluation data were collected before and after aircrew coordination training was provided. Evaluation measures included attitude, behavior, task performance, and mission performance. Results showed that (1) the training had positive effects on all of the measures and (2) the measures are sensitive to changes in performance. The impact on safety of flight was also assessed. The report concludes with recommendations and suggested areas for future research. (DTIC)
SF- DTIC
DE- <MAJOR> *AVIATION PSYCHOLOGY; *COORDINATION; *FLIGHT CREWS; *FLIGHT TRAINING; *MILITARY PSYCHOLOGY; *PILOT PERFORMANCE; *TRAINING EVALUATION
DE- COMMUNICATING; DECISION MAKING; FLIGHT SAFETY; FLIGHT SIMULATION; PILOT ERROR
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02239793
AN- <AEROSPACE> N96-15994
TI- Influence of the helicopter environment on patient care capabilities: Flight crew perceptions
AU- MEYERS, K. JEFFREY; RODENBERG, HOWARD (Florida Univ., Gainesville, FL.) ; WOODARD, DANIEL
CS- Bionetics Corp., Cocoa Beach, FL.
CS- <CODE> BO812526
PY- 1994
PD- 199406
PG- 9P.
RN- NASA-TM-110607; NAS 1.15:110607
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A01
JA- STAR9603
AB- Flight crew perceptions of the effect of the rotary wing environment on patient care capabilities have not been subject to statistical analysis. We hypothesized that flight crew perceived significant difficulties in performing patient care tasks during air medical transport. A survey instrument was distributed to a convenience sample of flight crew members from twenty flight programs. Respondents were asked to compare the difficulty of performing patient care tasks in rotary wing and standard (emergency department or intensive care unit) settings. Demographic data collected on respondents included years of flight experience, flights per month, crew duty position, and primary aircraft in which the respondent worked. Statistical analysis was performed as appropriate using Student's t-test, type 111 sum of squares, and analysis of variance. Alpha was defined as p is less than or equal to .05. Fifty-five percent of programs (90 individuals) responded. All tasks were rated significantly more difficult in the rotary wing environment. Ratings were not significantly correlated with flight experience, duty position, flights per month, or aircraft used. We conclude that the performance of patient care tasks are perceived by air medical flight crew to be significantly more difficult during rotary wing air medical transport than in hospital settings. (Author)
DE- <MAJOR> *AIR TRANSPORTATION; *EMERGENCIES; *FLIGHT CREWS; *HELICOPTERS; *PATIENTS
DE- ANALYSIS OF VARIANCE; HOSPITALS; STATISTICAL ANALYSIS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02239207
AN- <AEROSPACE> N96-15259
TI- A comparison of two alternative velocity vector cue combinations for the AH-64D integrated helmet and display sight subsystem
TI- <SUPPLEMENT> Final Report, Jul. 1994 - Jan. 1995
AU- STEWART, JOHN E.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> A2025595
PY- 1995
PD- 199506
PG- 46P.
RN- AD-A298320; ARI-RR-1681
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9603
AB- The AH-64A employs an integrated helmet and display sight subsystem which presents night vision system and flight data to the pilot's right

eye. Velocity vector and acceleration cues tell the pilot when the aircraft is accelerating, its speed, and vector. A 6 kt cue is used for hovering; a 60 kt cue for transition. A single 20 kt cue was proposed for the AH-64D. The requirement was dropped, but the question remained as to whether the 20 kt cue provided any advantage. The experiment was conducted to answer this question. Ten AH-64A pilots performed a mission consisting of seven Aircrew Training Manual (ATM) tasks, under 1-day and 2-night conditions (6/60 kt and 20/60 kt cues) in the simulator training research advanced testbed for aviation (STRATA). The STRATA copilot-gunner station was used with a rear-projection display. Of 210 task events, 209 met ATM standards. Performance across all tasks was better in the 6/60 than in the 20/60 condition (P is less than .04, two-tailed). Performance on stationary hover reached significance (P is less than .05) and approached significance for three other hovering tasks. Results supported retention of the 6 and 60 kt cues. (DTIC)

SF- DTIC

DE- <MAJOR> *CUES; *HELMET MOUNTED DISPLAYS; *NIGHT VISION; *PILOT PERFORMANCE; *TRANSFER OF TRAINING; *VISUAL PERCEPTION

DE- ATTACK AIRCRAFT; FLIGHT CLOTHING; FLIGHT SIMULATION; FLIGHT TRAINING; MILITARY HELICOPTERS; SPEED INDICATORS; TRAINING SIMULATORS

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02238435

AN- <AEROSPACE> N96-14406

TI- Summary of the Marine Aerosol Properties and Thermal Imager Performance trail (MAPTIP) organized by NATO AC/243 Panel 4/RSG.8 on Atmospheric Propagation Effects on Electro-Optical Systems, 11 October - 5 November 1993

AU- JENSEN, D. R.; DELEEUW, G. (Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, The Hague, Netherlands.); VANEIJK, A. M. J. (Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, The Hague, Netherlands.)

CS- Naval Command, Control and Ocean Surveillance Center, San Diego, CA. Ocean and Atmospheric Sciences Div.

CS- <CODE> NQ039385

PY- 1995

PD- 199502

NT- In AGARD, Propagation Assessment in Coastal Environments 10 p (SEE N96-14391 03-32)

CN- N00014-91-J-1948

LA- English

GL- United States

CP- International Organization

DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> CASI HC A02/MF A03

JA- STAR9603

AB- During the fall of 1993 a field experiment entitled Marine Aerosol Properties and Thermal Imager Performance Trial (MAPTIP) was conducted by NATO AC/243 Panel 04/RSG.8 and 04/RSG.5 in the Dutch coastal waters. The objectives of the trial were (1) to improve and validate vertical marine aerosol models by providing an extensive set of aerosol and meteorological measurements, within a coastal environment, at different altitudes and for a range of meteorological conditions; (2) to make aerosol and meteorological observations in the first 10 m of the ocean surface with a view to extending existing aerosol models to incorporate near-surface effects; and (3) to assess marine boundary layer effects on thermal imaging systems. Calibrated targets at different altitudes were observed to the maximum observable range under a wide variety of conditions in both the 3-5 and 8-12 micron bands. These data will be used for the development and validation of IRST models and IR ship signature models with the view of determining the effects of marine-generated aerosols, turbulence, and meteorological profiles on their performance. Aerosol and meteorological instruments, as well as thermal imagers and calibrated targets, were utilized on the Dutch Meetpost Noordwijk (MPN) tower, at a Katwijk Beach Station, the Hr. Ms. Tydeman oceanographic vessel, on a Lynx helicopter, on a Dutch P3 Orion, on the NCCOSC RDT&E DIV (NRaD) airborne platform, and on buoy systems. This network of instrumentation has provided a comprehensive data base of aerosol size distribution profiles and relevant meteorological variables throughout the marine atmospheric boundary layer. Thermal imagery was included to provide ground truth for assessing the low-level propagation effects near the ocean surface. Measurements were made of atmospheric turbulence and refractivity effects in the IR and RF bands to assess the marine boundary layer effects on the degradation of thermal images. Calibrated targets at different altitudes were observed to the maximum observable range under a wide variety of conditions in both the 3-5 and 8-12 micron bands. These data are to be used for the development and validation of IRST models and IR ship signature models for determining the effects of marine-generated aerosols, turbulence, and meteorological profiles on their performance. (Author)

DE- <MAJOR> *AEROSOLS; *AIRBORNE RADAR; *ATMOSPHERIC MODELS; *ATMOSPHERIC REFRACTION; *COASTS; *IMAGING TECHNIQUES; *INFRARED RADAR; *INFRARED

TRACKING; *MARINE METEOROLOGY; *METEOROLOGICAL PARAMETERS; *OCEAN
SURFACE; *TEMPERATURE EFFECTS; *THERMAL MAPPING
DE- AIR WATER INTERACTIONS; ATMOSPHERIC BOUNDARY LAYER; ATMOSPHERIC EFFECTS
; ATMOSPHERIC TURBULENCE; COASTAL WATER; INFRARED SIGNATURES; TURBULENCE EFFECTS; WEATHER
SH- 7547 Meteorology & Climatology (1975-)

AN- <DIALOG> 02237676
AN- <AEROSPACE> A96-27412
TI- Self-reported aircraft desirability, fit and safety concerns of U.S. Air Force and U.S. Army rated men and women aircrew
AU- Voge, Victoria M. (U.S. Navy, Naval School of Health Sciences Bethesda Detachment, Fort Sam Houston, TX)
SO- SAFE Journal (ISSN 0191-6319), vol. 26, no. 1, Jan. 1996, p. 44-48.
PY- 1996
PD- 199601
RF- 6
SN- 0191-6319
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9606
AB- We conducted a comprehensive anonymous questionnaire survey of all U.S. Army and USAF rated female aircrew, with age and duty matched males. We are reporting on part of the general aircraft information section of the questionnaire, which sought information on aircraft desirability, fit, and safety concerns. A total of 1164 questionnaires were sent out, with a 56-57 percent return rate. Overall, about 60 percent of men and women wanted to be assigned to their current aircraft. More women wanted to remain in their current aircraft than men. Army men and women preferred helicopters (regular or attack), while Air Force women preferred transports, fighters, and trainers, and Air Force males preferred fighters and transports. Greater than 80 percent of all aircrew felt their current aircraft 'fit' them, significantly more men than women. When a fit problem was manifested, Army and Air Force males complained their legs were too long or the seats were not adjustable enough, and Army males also complained their arms were too long. Air Force and Army women complained their legs and arms were too short and the seats were not adjustable enough, while some Army females also complained their legs and arms were too long for the aircraft assigned. Slightly more women than men had safety concerns with their primary aircaft, significantly more in the Air Force than the Army. Men and women were suprisingly similar in most areas. (Author)
DE- <MAJOR> *ARMED FORCES (UNITED STATES); *FLIGHT CREWS; *HUMAN REACTIONS;
*HUMAN FACTORS ENGINEERING; *SURVEYS
DE- PSYCHOLOGICAL EFFECTS; MAN ENVIRONMENT INTERACTIONS; EMOTIONAL FACTORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02235828
AN- <AEROSPACE> A96-25564
TI- Changes of human thermoregulation during combined heat, noise and vibration stress
AU- Ren, Zhaosheng; Ouyang, Hua; Li, Wei (Chinese Air Force, Inst. of Aviation Medicine, Beijing, China)
SO- Chinese Journal of Aviation Medicine (ISSN 1001-6589), vol. 6, no. 4, Dec. 1995, p. 205-208. In Chinese.
PY- 1995
PD- 199512
RF- 10
SN- 1001-6589
LA- Chinese
GL- China
CP- China
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9606
AB- Changes in human thermoregulation during combined heat, noise, and vibrational stress were studied. Experimental results conducted on 11 human subjects showed that the combined factors caused remarkable increases in mean skin temperature (Tsk), rectal temperature (Tre), and sweat quantity (Qsw). Heat and noise played a synergistic effect on Tsk, Tre, and Qsw. Vibration had a synergistic effect on Tre but an antagonistic effect with high temperature on Tsk and Qsw. Of the three factors, heat was the main factor affecting thermoregulation. It is concluded that reducing heat, noise, and low frequency vibrational stress in helicopter cabins is helpful in maintaining pilot health and flight safety. (AIAA)
DE- <MAJOR> *THERMOREGULATION; *STRESS (PHYSIOLOGY); *VIBRATION; *TEMPERATURE EFFECTS; *NOISE (SOUND); *FLIGHT SAFETY

DE- SKIN TEMPERATURE (BIOLOGY); VIBRATION DAMPING; AIRCRAFT COMPARTMENTS;
PILOT PERFORMANCE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02227048
AN- <AEROSPACE> A96-20253
TI- Collision avoidance - A helicopter simulator study
AU- Kruk, R. (CAE Electronics, Ltd., Saint-Laurent, Canada); Regan, D. (York Univ., North York, Canada)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 67, no. 2, Feb. 1996, p. 111-114.
PY- 1996
PD- 199602
RF- 23
SN- 0095-6562
CN- F49620-94-1-0083
LA- English
GL- Canada
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9604
AB- Six pilots flew a helicopter flight simulator with a helmet-mounted display. The pilot's task was to judge the time to collision with a second helicopter that disappeared at either 2, 2.5, or 3 s before collision. The field of view (FOV) was 66 (vertical) x 127 deg, or 19 x 25 deg, or 3 x 3 deg. With a stationary target and ownship forward speed of 60 kt, pilots estimated that collision with a stationary target would occur roughly 200 ms before the actual time to collision in the large and intermediate FOV conditions. In the case of ownship stationary and the target approaching at 60 kt, estimates of collision time showed considerably less lead in the large and intermediate FOV conditions. When the smallest FOV was used, estimates were the same whether closing speed was produced entirely by ownship motion or entirely by target motion. We suggest that the too-early errors in estimating time to collision were caused by the impression of self-motion produced by stimulating the peripheral retina with a radially-expanding flow pattern. (Author)
DE- <MAJOR> *COLLISION AVOIDANCE; *HELICOPTERS; *FLIGHT SIMULATORS; *HELMET
MOUNTED DISPLAYS; *FIELD OF VIEW
DE- PILOT PERFORMANCE; DATA BASES
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02224921
AN- <AEROSPACE> A96-18126
TI- Progress toward a reduced blade-vortex-interaction rotor
AU- Nelson, Carter; Traub, Lance W.; Rediniotis, Othon K. (Texas A & M Univ., College Station)
SO- AIAA, Aerospace Sciences Meeting and Exhibit, 34th, Reno, NV, Jan. 15-18, 1996, 15 p..
PY- 1996
PD- 199601
RF- 33
CN- DAAL03-92-G-0123
RN- AIAA Paper 96-0150
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9603
AB- A comprehensive effort to study techniques aimed at rotorcraft blade-vortex interaction (BVI) reduction and the alleviation of the associated impulsive noise was recently initiated in the Aerospace Engineering Department at Texas A & M University. This is a multidisciplinary effort that seeks to exploit advances in the areas of aerodynamics, active materials, instrumentation, and conventional, as well as knowledge-based, aerodynamic system identification and control to benefit an application of high aerodynamic complexity and top importance in rotorcraft. This work reports to the community our progress to date, scientific findings, proposed designs and their implementations, and how all these pieces fit together in our ongoing effort of implementing a reduced BVI rotor. (Author)
DE- <MAJOR> *BLADE-VORTEX INTERACTION; *NOISE REDUCTION; *ROTOR BODY
INTERACTIONS; *AERODYNAMIC CHARACTERISTICS; *VORTEX BREAKDOWN; *PARTICLE IMAGE VELOCIMETRY
DE- SYSTEM IDENTIFICATION; KNOWLEDGE BASED SYSTEMS
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 02223543
AN- <AEROSPACE> A96-16748
TI- Performance assessment of the V-22 aircraft crashworthy crew seat with

various size and gender aircrew using the Articulated Total Body (ATB) computer simulation model
AU- Rapaport, Martin B. (U.S. Navy, Naval Air Warfare Center, Warminster, PA); Yeiser, Charles W.; Oslon, Mitchell B. (Conrad Technologies, Inc., Paoli, PA)
SO- In: SAFE Association, Annual Symposium, 33rd, Reno, NV, Oct. 23-25, 1995, Proceedings (A96-16716 03-54), Cottage Grove, OR, SAFE Association, 1995, p. 279-304.
PY- 1995
PD- 199500
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9603
AB- The military services are encountering a number of new issues regarding recent expansions at the lower end of the aircrew population weight range. The potential for an increase in the risk of injury during a helicopter crash, specifically, spinal injury, in operational crashworthy crew seats, is paramount. Computer simulations and analyses are performed in order to assess the potential for an increase in the risk of injury. Data trends between the existing and the expanded aircrew populations, invoking maximum pelvic accelerations, maximum spinal (T12/L1) compressive forces, and the Eiband criterion, are explored. Eiband criterion margin-of-success and margin-of-failure analyses are performed. A crew seat designed for the expanded population weight range is analyzed in order to assess the potential for a reduction in the risk of spinal injury. (Author)
DE- <MAJOR> *PERFORMANCE ASSESSMENT; *V-22 AIRCRAFT; *CRASHWORTHINESS; *FLIGHT CREWS; *SEATS; *HUMAN FACTORS ENGINEERING; *COMPUTERIZED SIMULATION
DE- HUMAN BODY; SPINE; BIOLOGICAL MODELS (MATHEMATICS); RISK ASSESSMENT; DATA PROCESSING; PELVIS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02222612
AN- <AEROSPACE> A96-15817
TI- EH101 icing trials
AU- Tracy, Jeremy P. (Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: 1995 report to the aerospace profession; SETP Symposium, 39th, Beverly Hills, CA, Sept. 1995, Proceedings (A96-15798 02-01), Lancaster, CA, Society of Experimental Test Pilots, 1995, p. 281-291.
PY- 1995
PD- 199500
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- The icing trials on the EH101 and the research work that preceded these trials are discussed. The aircraft configuration, flight crew involvement, instrumentation standard, specific icing concerns, sortie profile, and hot blade tests are described. The initial trials with the EH101 demonstrated the capability that the aircraft was designed to meet. The fuselage showed that the catch efficiency was low in critical areas and resulted in only minor changes to fairings and ducts that had displayed higher catch efficiencies. The heated blade system confirmed that the heater mats associated with the control system algorithm met the requirements for handling assessments. The low mass flow sideways facing intake design is shown to be benign even in the delayed intervention and failure modes. (AIAA)
DE- <MAJOR> *ICE FORMATION; *EH-101 HELICOPTER; *FLIGHT TESTS
DE- PRODUCT DEVELOPMENT; AIRCRAFT SAFETY; FLIGHT SAFETY
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02221514
AN- <AEROSPACE> A96-14719
TI- Impact of vertical situation information on vertical mode awareness in advanced autoflight systems
AU- Vakil, Sanjay S.; Hansman, R. J., Jr.; Midkiff, Alan H. (MIT, Cambridge, MA)
SO- In: AIAA/IEEE Digital Avionics Systems Conference (DASC), 14th, Cambridge, MA, Nov. 5-9, 1995, Proceedings (A96-14701 02-01), New York, Institute of Electrical and Electronics Engineers, Inc., 1995, p. 106-111.
PY- 1995
PD- 199500
RF- 6
CN- NAG1-1581
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- An examinatiom of autoflight systems in modern aircraft was made, with emphasis on the complex mode structure which is suspect in several recent accidents. Aviation Safely Reporting System reports and Flight Mode Annunciator conventions are examined. Principal results identify the lack of a consistent global model of the Autoflight System architecture and identify the vertical channel as requiring enhanced feedback. Functional requirements for an Electronic Vertical Situation Display were created based on established conventions and identified mode awareness problems. A preliminary version of this display was prototyped and an evaluation methodology was proposed. A set of experimental scenarios based on various types of mode awareness problems was established and is discusscd. (AIAA)
DE- <MAJOR> *AUTOMATIC PILOTS; *VERTICAL FLIGHT; *DISPLAY DEVICES; *AVIONICS; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING
DE- USER REQUIREMENTS; PROTOTYPES
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02221496
AN- <AEROSPACE> A96-14701
TI- AIAA/IEEE Digital Avionics Systems Conference (DASC), 14th, Cambridge, MA, Nov. 5-9, 1995, Proceedings
SO- New York, Institute of Electrical and Electronics Engineers, Inc., 1995, 528 p. (For individual items see A96-14702 to A96-14783).
PY- 1995
PD- 199500
RN- ISBN 0-7803-3050-1
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9602
AB- Various papers on digital avionics systems are presented. The general topics addressed include: Ada, aeronautical data link communications, airport surface operations, avionics modernization, commercial avionics and air traffic control, commercial standards for military avionics, commercial warning and advisory avionics, fault tolerant subsystems and algorithms, fault-tolerant systems, general aviation, GPS, human factors, integrated avionics, modular avionics, open systems architectures, operator interface, rotorcraft avionics, software engineering, spacecraft avionics and space systems, systems engineering, electronic upset of avionics. (AIAA)
DE- <MAJOR> *CONFERENCES; *DIGITAL ELECTRONICS; *AVIONICS
DE- AIRCRAFT COMMUNICATION; DATA LINKS; SATELLITE COMMUNICATION; AIRPORTS;
AIRFIELD SURFACE MOVEMENTS; AIR TRAFFIC CONTROL; MILITARY AIRCRAFT;
STANDARDS; COLLISION AVOIDANCE; WARNING SYSTEMS; FAULT TOLERANCE;
GENERAL AVIATION AIRCRAFT; ELECTRONIC MODULES; ROTORCRAFT AIRCRAFT;
SOFTWARE ENGINEERING; SPACECRAFT ELECTRONIC EQUIPMENT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02220922
AN- <AEROSPACE> A96-14127
TI- Visual performance effects and user acceptance of the M43A1 aviation protective mask frontserts
AU- Wildzunas, Robert M. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 66, no. 12, Dec. 1995, p. 1136-1143.
PY- 1995
PD- 199512
RF- 24
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- This study evaluated visual performance affects and user acceptance of the M43A1 mask with frontsert correction modifications. The investigation was divided into three phases: (1) a helicopter simulator evaluation designed to experimentally test the suitability of the M43A1 frontserts, both in single vision and bifocal forms, for use in the aviation environment; (2) a static cockpit evaluation, designed to identify aircraft-specific problems with the frontsert system; and (3) an inflight evaluation to examine the stability and usability of the frontserts under actual flight conditions. The subjects were 30 U.S. Army aviators (28 men and 2 women). Objective data from flight simulation evaluations suggested there were no significant differences

between flight performance with and without the mask, despite refractive status. Subjective data from static and flight evaluations reflected positive user acceptance of the new mask and frontserts. Problems may exist in smaller cockpits, but evidence suggested that this may have been an artifact resulting from testing the mask while wearing protective body armor. (Author)
DE- <MAJOR> *MASKS; *PROTECTIVE CLOTHING; *VISUAL TASKS; *AIRCRAFT PILOTS;
*HUMAN FACTORS ENGINEERING; *EYEPIECES; *HUMAN PERFORMANCE
DE- HUMAN REACTIONS; AIRCRAFT MANEUVERS; STATIC TESTS; FLIGHT TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02219970
AN- <AEROSPACE> A96-13175
TI- Cockpit motion in helicopter simulation
AU- Bray, Richard S. (Sverdrup Technology, Inc., Moffett Field, CA)
SO- In: Vertical flight training (A96-13165 02-09), Washington, DC, NASA/FAA, 1995, p. 247-255.
PY- 1995
PD- 199500
LA- English
GL- United States
CP- United States
DT- ANALYTIC OF COLLECTED WORK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- The currently proposed requirements for cockpit motion in helicopter training simulators, levels B through D, are obviously holdovers from those specified for transport aircraft simulators. Within the aviation community, controversy continues regarding the value of the motion systems that are required to meet those specifications. The intention to establish another set of specifications for helicopter simulators presents the opportunity, and the obligation, to consider the true value of such motion systems in the context of civil helicopter operations. This chapter is an attempt to put simulator cockpit motion in a realistic perspective. The limitations inherent in efforts to reproduce cockpit motions and their effects on pilot performance are described, and means of dealing with a lack of motion cues in the simulator are suggested. (Author)
DE- <MAJOR> *COCKPITS; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE; *PILOT
TRAINING; *AIRCRAFT CONTROL
DE- AIRCRAFT MODELS; ROTARY WINGS; FLIGHT SIMULATORS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02219967
AN- <AEROSPACE> A96-13172
TI- Training device manufacturing
AU- Carlton, John; Francis, Stephen (Thomson Training & Simulation, Crawley, United Kingdom)
SO- In: Vertical flight training (A96-13165 02-09), Washington, DC, NASA/FAA, 1995, p. 146-177.
PY- 1995
PD- 199500
LA- English
GL- United Kingdom
CP- United States
DT- ANALYTIC OF COLLECTED WORK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- The role of the manufacturers of flight training equipment in the field of rotary-wing aircraft flight-crew training is described. It draws upon the experiences gained in both rotary- and fixed-wing simulation in which the aim has traditionally been to duplicate the flight deck and its functions and to provide the best compromise in motion-cue and visual-scene presentation. This enables a trainee to practice both normal and abnormal procedures in a highly realistic environment under the supervision of an experienced instructor. Unlike the actual aircraft, however, this simulated environment is tolerant of pilot errors, enabling flight envelope limits to be safely approached and experienced. Moreover, maneuvers can be practiced in a simulator that are either unacceptably dangerous in the aircraft or that require flying conditions that do not prevail at the time of training. More recently, systematic training analysis and performance validation have demonstrated that valuable training and checking can be effectively carried out in a training device that is considerably simpler than the traditional high-fidelity simulator. (Author)
DE- <MAJOR> *ROTARY WINGS; *TRAINING DEVICES; *PRODUCT DEVELOPMENT; *FLIGHT
TRAINING; *FLIGHT CREWS
DE- MANUFACTURING; FLIGHT ENVELOPES; FLIGHT SIMULATORS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02219814
AN- <AEROSPACE> A96-13019

TI- Human factors issues in Night Airborne Mine Countermeasures operations
AU- Ruffner, John W.; Tullos, Richard E. (DCS Corp., Alexandria, VA); Muldoon, Richard C. (U.S. Navy, Naval Air Warfare Center, Patuxent River, MD)
SO- In: Human Factors and Ergonomics Society Annual Meeting, 39th, San Diego, CA, Oct. 9-13, 1995, Proceedings. Vol. 1 (A96-13001 02-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1995, p. 84-88.

PY- 1995
PD- 199500
RF- 11
CN- N00014-91-C-2155
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9602
AB- The U.S. Navy's Airborne Mine Countermeasures (AMCM) mission, performed by the MH-53E helicopter, is characterized by long-duration flight at low altitudes and low airspeeds over the water while towing a variety of devices. This mission imposes substantial demands on the pilots and mission crew. Because of its complexity and potential hazards, the AMCM mission is currently performed only during the daytime. The Navy identified a requirement to perform AMCM operations at night and sponsored research to investigate the system and procedural modifications required to accomplish night AMCM operations safely and effectively. This paper discusses the human factors issues identified as part of this research effort and provides specific examples from the AMCM mission environment. A thorough understanding of these issues and how they will impact night AMCM operations is essential for a successful transition from day to night operations. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *COUNTERMEASURES; *NIGHT FLIGHTS (AIRCRAFT); *HELICOPTERS
DE- WORKLOADS (PSYCHOPHYSIOLOGY); VISIBILITY; ALERTNESS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02212176
AN- <AEROSPACE> A95-45916
TI- Methods for correlating visual scene elements with simulator sickness incidence
AU- Kennedy, Robert S.; Berbaum, Kevin S.; Smith, Martin G.
SO- In: Designing for diversity; Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, Seattle, WA, Oct. 11-15, 1993. Vol. 2 (A95-45861 12-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1993, p. 1252-1256.
PY- 1993
PD- 199300
RF- 21
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9512
AB- Simulator sickness occurs in a large number of Army, Navy, and Marine Corps simulators, and is most prevalent in moving-base, rotary-wing devices which employ cathode ray tube video displays as opposed to fixed-wing dome-display trainers with no motion base. Based on data from a factor analysis of over 1000 Navy and Marine Corps pilot simulation exposures, a new scoring procedure was applied to two helicopter simulators with similar rates of simulator sickness incidence. Based on the factor analytic scoring key, the two simulators showed slightly different sickness profiles. Preliminary work was begun to record the visual scene by video frame-by-frame decomposition, and automated scoring algorithms were developed. The findings are discussed from the standpoints of (1) recommendations for future design and use of simulators, and (2) metric advantages and other merits of the 'field experiment' methodology to address human factors problems with simulator sickness. (Author)
DE- <MAJOR> *ROTARY WINGS; *CATHODE RAY TUBES; *DISPLAY DEVICES; *SIMULATORS; *VISUAL PERCEPTION
DE- DATA CORRELATION; EYE (ANATOMY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02212150
AN- <AEROSPACE> A95-45890
TI- Subjective estimates of velocity, distance and time - Implications in helicopter navigation
AU- Sebald, Colleen A.; Wickens, Christopher D. (Illinois, Univ., Savoy)
SO- In: Designing for diversity; Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, Seattle, WA, Oct. 11-15, 1993. Vol. 1 (A95-45861 12-54), Santa Monica, CA, Human Factors and Ergonomics Society, 1993, p. 152-156.
PY- 1993

PD- 199300
RF- 10
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9512
AB- This study assessed the sorts of biases induced in a pilot's estimates of velocity, elapsed time, and distance traveled in a flight simulation environment. The validity of an 'internal equation' relating the concepts of subjective distance, velocity, and time was assessed. Pilots flew a series of flight legs which varied in their distance, time, and velocity, during which they were asked to make judgments of time passage (group 1), speed (group 2), and distance traveled (group 3). These judgments were made under both single and dual task conditions. There was little consistent effect of task loading on any of the subjective estimates, but variations in interval duration, speed, and distance effected the subjective estimates of these quantities in different ways. There was no evidence found for support of an internal equation. (Author)
DE- <MAJOR> *HELICOPTERS; *AIRSPEED; *DISTANCE; *FLIGHT TIME; *PILOT PERFORMANCE
DE- DISPLAY DEVICES; AIRCRAFT CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02211454
AN- <AEROSPACE> A95-45194
TI- Development of an Intelligent Flight Trainer for primary helicopter training
AU- Dohme, Jack (U.S. Army, Research Inst., Fort Rucker, AL); Couch, Mike (Anacapa Sciences, Inc., Fort Rucker, AL)
SO- SAE, Aerotech '95, Los Angeles, CA, Sept. 18-21, 1995, 9 p..
PY- 1995
PD- 199509
RF- 6
RN- SAE Paper 952035
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9512
AB- The Intelligent Flight Trainer (IFT) was developed to use concepts from Expert System and Intelligent Tutoring System (ITS) technologies to adaptively train ab initio Army Student Pilots (SPs) in the basic skills and maneuvers that serve as the foundation for successful helicopter pilotage. The IFT concept seeks to provide flexible, individually-tailored instruction in the basic helicopter flight skills using automated training technology in lieu of a dedicated Instructor Pilot. Research is underway to evaluate the effectiveness of the IFT in training SPs in hovering flight and traffic pattern flight as a precursor to their first flights in an Army training helicopter. (Author)
DE- <MAJOR> *PILOT TRAINING; *FLIGHT TRAINING; *MILITARY HELICOPTERS; *TRAINING DEVICES; *FLIGHT SIMULATORS
DE- ARTIFICIAL INTELLIGENCE; ARMED FORCES (UNITED STATES); HUMAN FACTORS
ENGINEERING; EXPERT SYSTEMS; PRODUCT DEVELOPMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02211158
AN- <AEROSPACE> A95-44898
TI- Field experience versus theory in turbine engine deterioration
AU- Pettigrew, James L. (Howell Instruments, Inc., Fort Worth, TX)
SO- ASME, International Gas Turbine and Aeroengine Congress & Exposition, Houston, TX, June 5-8, 1995, 12 p..
PY- 1995
PD- 199506
RF- 6
RN- ASME Paper 95-GT-161
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9512
AB- This paper describes observations and analysis of data recorded on operating helicopter engines using advanced technology data recording systems. The US Army began the test on T53 engines in 1986 and expanded it to their T55, T63, T700, and T703 helicopter engines in 1990. These engines have a gas generator with a free turbine for power production. A portable instrumentation system is used to do inflight helicopter engine tests and electronically record performance information. A PC-based data analysis system uses artificial intelligence to change

the data into diagnostic information for the test engine's capability to perform the missions. The data output presents this information in an easily understandable format that allows the decision maker to see differences in the condition of individual engines and rank them on their relative capability. The resulting database clearly shows each engine's on-condition status. Rejection criteria for installed engine deterioration does not fully agree with observed operational behavior. (Author)
DE- <MAJOR> *TURBINE ENGINES; *ENGINE FAILURE; *HELICOPTER ENGINES; *ENGINE TESTS; *ENGINE MONITORING INSTRUMENTS
DE- TECHNOLOGY UTILIZATION; ELECTRONIC EQUIPMENT
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 02210338
AN- <AEROSPACE> A95-44078
TI- Sustaining helicopter pilot performance with Dexedrine during periods of sleep deprivation
AU- Caldwell, John A.; Caldwell, J. L.; Crowley, John S.; Jones, Heber D. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 66, no. 10, Oct. 1995, p. 930-937.
PY- 1995
PD- 199510
RF- 15
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9512
AB- Flight performance was quantified and scored by computer to determine how accurately aviators controlled a UH-60 simulator during periods of sleep loss both with and without Dexedrine. Analysis of the resulting data supports recent findings that dextroamphetamine is helpful in overcoming pilot fatigue during extended flight missions. During short periods of sleep deprivation in this study, performance was significantly improved on the left descending turn, the straight-and-level segments, and right standard-rate turns, and the straight descents. Dexedrine-related enhancements on three maneuvers were noteworthy particularly at 0500 and 0900, when the effects of the previous night's sleep loss were most severe. There were no significant differences between Dexedrine and placebo either earlier in the night or later in the day. (AIAA)
DE- <MAJOR> *PILOT PERFORMANCE; *HELICOPTERS; *SLEEP DEPRIVATION; *AMPHETAMINES; *AEROSPACE MEDICINE; *ALERTNESS
DE- ELECTROENCEPHALOGRAPHY; PSYCHOLOGICAL FACTORS; AVIATION PSYCHOLOGY; FLIGHT SIMULATORS; MOODS; PSYCHOLOGICAL TESTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02208030
AN- <AEROSPACE> A95-41770
TI- Application of SLMC - TRC control of a helicopter in hover
AU- Pieper, J. K. (Calgary, Univ., Canada)
SO- In: 1995 American Control Conference, 14th, Seattle, WA, June 21-23, 1995, Proceedings. Vol. 2 (A95-41649 11-63), Piscataway, NJ, Institute of Electrical and Electronics Engineers, 1995, p. 1191-1195.
PY- 1995
PD- 199500
RF- 13
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9511
AB- The paper presents the solution of the particular helicopter flight control design problem of translational raw commanded control of the aircraft in hover. This mode of control is appropriate for high precision maneuvering in extremely adverse environments including poor visual cues and instrumentation. Controller design is accomplished via sliding mode control whereby the controlled system is constrained to lie in a subspace characterized by the intersection of hyperplanes. The paper discusses methods for designing hyperplanes in order to meet handling qualities specifications for the aircraft. Extensive simulations demonstrate the effective control. (Author)
DE- <MAJOR> *HELICOPTER CONTROL; *HOVERING; *FLIGHT CONTROL; *CONTROLLERS; *CONTROL SYSTEMS DESIGN; *SLIDING MODE CONTROL; *ACTIVE CONTROL; *FLY BY WIRE CONTROL
DE- AIRCRAFT MANEUVERS; HYPERPLANES; CONTROLLABILITY; FLIGHT SIMULATION; FLIGHT CONDITIONS; BELL AIRCRAFT

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02207900
AN- <AEROSPACE> A95-41640
TI- Full mission simulation in a research environment
AU- Offerman, H. A. J. M. (National Aerospace Lab., Amsterdam, Netherlands)

SO- In: Flight simulation technology, capabilities and benefits; Proceedings of the Conference, London, United Kingdom, May 17, 18, 1995 (A95-41629 11-01), London, Royal Aeronautical Society, 1995, p. 11.1-11.13.
PY- 1995
PD- 199500
RF- 3
LA- English
GL- Netherlands
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9511
AB- The Dutch National Aerospace Laboratory has developed during the last three years an advanced full mission simulation capability for fast jet fixed wing and rotary wing aircraft. This full mission simulator, named the National Simulation Facility, is created for research in training methodologies, investigation of simulation and simulator requirements for specific training tasks, and to support industrial development of cockpit and aircraft systems. The current capability of the simulator focuses on the F-16 Mid-Life Update configuration, but will be extended to accommodate manned helicopter simulation later this year. The latter will be directed towards the Boeing CH-47D Chinook medium-heavy transport helicopter, and the McDonnell Douglas AH-64D Apache attack helicopter. This paper addresses the various technical aspects of the National Simulation Facility. (Author)
DE- <MAJOR> *F-16 AIRCRAFT; *FLIGHT SIMULATORS; *PILOT PERFORMANCE; *QUEUEING THEORY
DE- WORKLOADS (PSYCHOPHYSIOLOGY); SOFTWARE TOOLS; COCKPITS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02206443
AN- <AEROSPACE> A95-40183
TI- Pilot intervention times
AU- Smith, P. R.; Chapellow, J. W. (RAF, Inst. for Aviation Medicine, Farnborough, United Kingdom)
SO- In: Human factors in aviation operations; Proceedings of the 21st Conference of the European Association for Aviation Psychology (EAAP), Trinity College, Dublin, Ireland, 1994. Vol. 3 (A95-40158 11-53), Brookfield, VT, Avebury Aviation, 1995, p. 243-248.
PY- 1995
PD- 199500
RF- 2
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9511
AB- Results of tests to provide detailed information on which to base recommendations regarding certification requirements for helicopters are presented. A Chinook Mk1 and an S61N simulator were used in the trial. Visual, auditory, and kinaesthetic cues, initial conditions, and reaction times were examined. It took pilots, on average, 1.13 s to detect total power failure in the Chinook simulator and 1.15 s to respond to it. S61N pilots took significantly longer both to detect and respond to the same emergency. It is argued that aircraft designers and certifiers should consider not mean response times but the tail of the distribution, i.e., those pilots whose response times are longer than average. Whether or not a 10 percent failure rate is acceptable depends to some extent on the probability of a total power failure occurring. (AIAA)
DE- <MAJOR> *PILOT PERFORMANCE; *EMERGENCIES; *AIRCRAFT ACCIDENTS
DE- AIRSPEED; FLIGHT SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02206441
AN- <AEROSPACE> A95-40181
TI- Pilots, performance and hypoxia - A review of some research into the effects of mild hypoxic hypoxia
AU- Henderson, Robert; McCarthy, Dianne (Auckland, Univ., New Zealand); St. George, Ross (Massey Univ., Palmerston North, New Zealand)
SO- In: Human factors in aviation operations; Proceedings of the 21st Conference of the European Association for Aviation Psychology (EAAP), Trinity College, Dublin, Ireland, 1994. Vol. 3 (A95-40158 11-53), Brookfield, VT, Avebury Aviation, 1995, p. 223-228.
PY- 1995
PD- 199500

RF- 12
LA- English
GL- New Zealand
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9511
AB- The study of the effects of hypoxia on human physiology and behavior has accompanied aviation since its inception with ballooning and predates both fixed and rotary wing flight. In 1875, Tissandier, Croche, and Sivel ascended to 8784 m in a balloon equipped with crude oxygen equipment. Although they had been trained to use the equipment, they delayed using the oxygen to conserve their supply. Hypoxia overcame them, they lapsed into unconsciousness, and when the balloon eventually returned to the ground only Tissandier was alive. By contrast, in 1993 Harry Taylor completed the 8848 m ascent of Mount Everest without oxygen. He achieved this through careful acclimatization over an extended period. The effects of hypoxia are different for flight crews and their passengers. Because of the rate at which their ascent is made, there is often insufficient time available for the acclimatization necessary for survival and well-being at altitude. (Author)
DE- <MAJOR> *PILOT PERFORMANCE; *HYPOXIA; *PHYSIOLOGICAL EFFECTS
DE- HUMAN FACTORS ENGINEERING; PRESSURIZING
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02202555
AN- <AEROSPACE> A95-38371
TI- Color AMLCD displays for the EH-101 helicopter
AU- Prince, J. C.; Farrell, J.; Woo, H.; Yu, P.; Leerentveld, R. (Litton Systems Canada, Ltd., Etobicoke)
SO- In: Cockpit displays II; Proceedings of the Meeting, Orlando, FL, Apr. 19-21, 1995 (A95-38346 10-06), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2462), 1995, p. 234-240.
PY- 1995
PD- 199500
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9510
AB- A variety of Active Matrix Liquid Crystal Displays, AMLCDs, are now being deployed in a broad range of aircraft. The most familiar applications are for flight deck instrumentation and passenger entertainment where the benefits of size, weight and legibility of the flat panel display technology are exploited. These benefits are particularly significant in rotor-wing aircraft where weight is of paramount importance and specifically in those helicopters whose role requires the use of mission displays, this class of display generally being larger than those used for flight deck instrumentation. This paper will describe the features of a set of mission displays which are rendered with AMLCD technology and which are being deployed in the EH-101 helicopter. (Author)
DE- <MAJOR> *EH-101 HELICOPTER; *DISPLAY DEVICES; *LIQUID CRYSTALS; *FLIGHT INSTRUMENTS; *VIDEO SIGNALS
DE- COLOR VISION; ARCHITECTURE (COMPUTERS)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02202530
AN- <AEROSPACE> A95-38346
TI- Cockpit displays II; Proceedings of the Meeting, Orlando, FL, Apr. 19-21, 1995
AU- Hopper, Darrel G., ED. (USAF, Wright Lab., Wright-Patterson AFB, OH)
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2462), 1995, 359 p. (For individual items see A95-38347 to A95-38384).
PY- 1995
PD- 199500
RN- SPIE-2462; ISBN 0-8194-1815-3
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9510
AB- Various papers on cockpit displays are presented. Individual topics addressed include: crewman's associate advanced technology demonstration, enhanced vision simulator for human factors evaluations, comparison of semiconductor technologies used in display fabrication, field emitter displays (FEDs) for future avionics applications, FED technology, collimated autostereoscopic displays for cockpit applications, greyscale and color in ferroelectric LCDs, flat panel planar optic display, RAH-66 crew station display system, requirements for AMLCDs in U.S. military applications, air transport common cockpit,

JAS 39 cockpit display system, improving AMLCD durability under high solar loads, integrating cockpit display and video recorder systems, large-area high-definition cockpit displays. Also discussed are: practical application of AMLCDs for tactical fighter aircraft, multimission helicopter information display technology, color AMLCD displays for the EH-101 helicopter, Common Avionics Display Processor, high-performance large-area AMLCD avionic display module, manufacturing considerations for AMLCD cockpit displays, CdSe TFT AMLCDE manufacturing process, new approach to high performance backlights, temperature-compensated 8-bit column driver for AMLCD, void formations in LCDs. (AIAA)
DE- <MAJOR> *CONFERENCES; *COCKPITS; *DISPLAY DEVICES
DE- TECHNOLOGY UTILIZATION; LIQUID CRYSTALS; CATHODE RAY TUBES; HELICOPTER
PERFORMANCE; FIGHTER AIRCRAFT; FLAT PLATES; FLIGHT INSTRUMENTS; AVIONICS; COMPUTER GRAPHICS; IMAGING TECHNIQUES; FIELD EMISSION; DESIGN
ANALYSIS; SYSTEMS INTEGRATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02202411
AN- <AEROSPACE> A95-38227
TI- Synthetic vision for vehicle guidance and control; Proceedings of the Conference, Orlando, FL, Apr. 17, 18, 1995
AU- Verly, Jacques G., ED. (MIT, Lexington, MA)
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2463), 1995, 274 p. (For individual items see A95-38228 to A95-38250).
PY- 1995
PD- 199500
RN- SPIE-2463; ISBN 0-8194-1816-1
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9510
AB- The present volume on synthetic vision for vehicle guidance and control discusses sensors and image processing, synthetic vision for helicopters and VTOL aircraft, synthetic vision for air vehicles, simulation and human factors for avionic synthetic vision, and sensing and synthetic vision for cars, boats, and robots. Attention is given to a passive mm-wave camera for vehicle guidance in low-visibility conditions, advanced techniques for ladar sensors, a square tracking sensor for autonomous helicopter hover stabilization, an electrooptic precision approach and landing system, synthetic vision experiments for approach and taxiing in poor visibility, and application of an autonomous landing guidance system for civil and military aircraft. Other topics addressed include a generic view simulation system for vehicle simulators and synthetic vision, modeling of pilot's visual behavior for low-level flight, autonomous road navigation for unmanned ground vehicles, and an unmanned guided vehicle system. (AIAA)
DE- <MAJOR> *CONFERENCES; *COMPUTER VISION; *FLIGHT VEHICLES; *AIRCRAFT
GUIDANCE; *FLIGHT CONTROL; *SURFACE VEHICLES
DE- IMAGE PROCESSING; MICROWAVE SENSORS; HELICOPTER CONTROL; ELECTRO-OPTICS
; VERTICAL TAKEOFF AIRCRAFT; AIRCRAFT LANDING; AVIONICS; HUMAN FACTORS
ENGINEERING; DISPLAY DEVICES; ROBOT CONTROL; DATA SIMULATION; PATTERN
RECOGNITION; HOVERING STABILITY; RADAR ANTENNAS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <AEROSPACE> N95-25935
TI- Configuration and other differences between Black Hawk and Seahawk helicopters in military service in the USA and Australia
TI- <SUPPLEMENT> Abstract Only
AU- JACKSON, R. W.
CS- Aeronautical Research Labs., Melbourne (Australia). Airframes and Engines Div.
CS- <CODE> AF441057
PY- 1993
PD- 199312
PG- 1P.
RN- AR-008-386; ARL-GD-43
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity (Aeronautical Research Labs., Melbourne, Australia)
JA- STAR9508
AB- Various versions of Black Hawk and Seahawk helicopters have been produced to match the requirements of different operators. Some of the differences between these versions, particularly those relevant to the

dynamic system, are briefly reviewed. (Author)
DE- <MAJOR> *AERODYNAMIC CONFIGURATIONS; *AVIONICS; *H-60 HELICOPTER
DE- COMPARISON; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02198205
AN- <AEROSPACE> A95-36989
TI- Helicopter rotor measuring instruments and testing methods in the ONERA S1 wind tunnel
AU- Drevet, J.-P. (ONERA, Centre de Modane-Avrieux, Modane, France)
SO- La Recherche Aerospatiale (ISSN 0034-1223), no. 3, 1995, p. 199-208.
PY- 1995
PD- 199500
RF- 11
SN- 0034-1223
LA- English
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- A test rig called BERH (French acronym for Helicopter Rotor Test Rig) has been in use in the large ONERA S1 facility in Modane (France) since 1987. The quality of the tests depends both on the instrumentation and on the testing method. The method used was completely redesigned in 1988. It has two major features: first, it permits a direct rotor performance comparison without going through a multiinterpolation process; second and foremost, it allows local measurements such as dynamic pressures or stresses and acoustic measurements to be compared directly at constant rotor performance. A measurement channel switching system was developed by ONERA for highly instrumented rotors. The system can handle over 400 on-board measurements. Some tests were performed with an in the test section acoustic lining. This treatment was designed to cancel noise reflections off the wall. The efficiency of the system was demonstrated especially at the high advance ratios achievable in the S1 tunnel. (Author)
DE- <MAJOR> *ROTARY WINGS; *MEASURING INSTRUMENTS; *WIND TUNNEL TESTS
DE- FRANCE; ROTOR DYNAMICS; AERODYNAMIC CHARACTERISTICS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02197413
AN- <AEROSPACE> A95-36197
TI- Experimental exploration of compressor-face boundary conditions for unsteady inlet flow computations
AU- Sajben, Miklos; Freund, Donald D. (Cincinnati, Univ., OH)
SO- AIAA, ASME, SAE, and ASEE, Joint Propulsion Conference and Exhibit, 31st, San Diego, CA, July 10-12, 1995, 14 p..
PY- 1995
PD- 199507
RF- 27
RN- AIAA Paper 95-2886
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- This paper is a progress report on an experimental study currently under way at the University of Cincinnati (UC). The purpose of the study is to create an experimental foundation for boundary condition models to be used in unsteady inlet flow computations, and to develop such models from experimental data. The work has the ambitious goal to affect the formulation of most future unsteady inlet flow computations. The experiment uses novel concepts to create well-characterized disturbances in a simple inlet attached to a GE T-58 helicopter engine. The initial disturbance is planar, purely acoustic and has a duration of less than one ms. Using fast-response instrumentation, the propagation of the disturbance to the compressor face and the resultant disturbances and reflections, representing the short-term engine response, are recorded. The data will be analyzed to arrive at a boundary condition that models the observed behavior. (Author)
DE- <MAJOR> *UNSTEADY FLOW; *INLET FLOW; *BOUNDARY CONDITIONS; *COMPUTATIONAL FLUID DYNAMICS; *HELICOPTER ENGINES; *COMPRESSORS
DE- ATMOSPHERIC CIRCULATION; PULSE GENERATORS; DUCT GEOMETRY; SHOCK TUBES
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 02195757
AN- <AEROSPACE> A95-34541
TI- OH-58D(I) Kiowa Warrior transient powertrain speed characteristics test in the frequency domain
AU- Williams, Jeffrey N.; Howard, Jacob M. (U.S. Army, Aviation Technical Test Center, Fort Rucker, AL); Fletcher, Jay W. (NASA, Ames Research Center, Moffett Field, CA)

SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 2 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 1512-1533.
PY- 1995
PD- 199500
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- A new application for frequency domain system identification technology used in the identification of the OH-58D(I) Kiowa Warrior rotorcraft engine governing system dynamics is presented. The Airworthiness Qualification Test Directorate of the U.S. Army Aviation Technical Test Center conducted a flight test at Edwards AFB, CA, to investigate the OH-58D(I) Kiowa Warrior transient powertrain speed characteristics in powered flight. Of particular interest was the dynamic response of the digital Electronic Supervisory Control to its multiple inputs and the impact of that response on rotor speed governing. This paper documents the test planning and execution with emphasis on the methodology in the areas of measurement selection, instrumentation, test input design, and safety. Additionally, preliminary frequency response and modeling results are presented and applications of the results are discussed. The engine governing system frequency response identification is a new application for the developing technology of frequency domain flight testing. (Author)
DE- <MAJOR> *OH-58 HELICOPTER; *PERFORMANCE TESTS; *AIRCRAFT PERFORMANCE; *AIRCRAFT RELIABILITY; *FREQUENCY DOMAINS; *DYNAMIC RESPONSE
DE- ROTORCRAFT AIRCRAFT; ARMED FORCES (UNITED STATES); DIGITAL SYSTEMS; METHODOLOGY; FREQUENCY RESPONSE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02195752
AN- <AEROSPACE> A95-34536
TI- Human factors evaluation of visual field-of-view effects of partial binocular overlap designs in helmet-mounted displays
AU- Klymenko, Victor (UES, Inc., Fort Rucker, AL); Rash, Clarence E. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 2 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 1450-1465.
PY- 1995
PD- 199500
RF- 34
CN- DAMD17-91-C-1081
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- The Helmet Integrated Display Sight System (HIDSS) is a new binocular helmet-mounted display (HMD) under development by the U.S. Army for the RAH-66 Comanche helicopter. The HIDSS design uses a partial binocular overlap FOV instead of a full overlap FOV where each of the two eyes sees the entire FOV. A full overlap FOV would have been an ideal optical display design configuration; however, technical and human factor considerations have limited the size of the FOV for each eye. The partial overlap display design overcomes this limitation by sharing the larger sensor FOV between the two eyes. Here a portion of the outside scene is displayed to both eyes, and each eye independently sees an additional portion. This has led to a number of visual human factor issues including the effect of this display design on the appearance of the FOV, on target detectability, and on the binocular alignment of the two images. We review ongoing work conducted in our lab on the perceptual and performance effects of partial binocular overlap designs. (Author)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *HELMET MOUNTED DISPLAYS; *BINOCULAR VISION; *AH-66 HELICOPTER; *VISUAL PERCEPTION; *HUMAN PERFORMANCE
DE- FIELD OF VIEW; ARMED FORCES (UNITED STATES); TECHNOLOGY ASSESSMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02195749
AN- <AEROSPACE> A95-34533
TI- Field experience shows modern test equipment helps contain costs
AU- Pettigrew, James L. (Howell Instruments, Inc., Fort Worth, TX)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 2 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 1404-1416.
PY- 1995

PD- 199500
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- The U.S. Army began testing advanced technology instrumentation with recording capability on T53 engines in 1986. In 1990, use of this technology was expanded to T55, T63, T700, and T703 helicopter engines. Each test produces data that are more comprehensive than that obtained from a test cell. AI programming processes the data into diagnostic information about the engine under test. The decision maker, using the program's output, can see differences in the condition of individual engines and rank them on their relative capability. The resulting data base from these tests clearly shows each engine's on-condition status. The value of this information as the basis for decisions used to direct the limited resources to the least capable engines is obvious. Cost reductions and operability improvements associated with the use of a modern test instrument package have been significant. (Author)
DE- <MAJOR> *COST REDUCTION; *HELICOPTER ENGINES; *TEST FACILITIES
DE- T-55 ENGINE; T-53 ENGINE; ARMED FORCES (UNITED STATES); DATA BASES
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02195725
AN- <AEROSPACE> A95-34509
TI- Piloted simulator investigation of Category A civil rotorcraft terminal area cockpit displays
AU- Iseler, Laura (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 2 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 1074-1093.
PY- 1995
PD- 199500
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- A piloted simulation experiment was conducted in the NASA Ames Research Center Vertical Motion Simulator to investigate the use of integrated cockpit displays in terminal area operations for Category A civil rotorcraft. The UH-60 Black Hawk model was used for the simulation with some modifications made to the power available to simulate a civil rotorcraft. Hovering backups were flown from a confined area, raised vertiport site to a takeoff decision point (TDP), followed by normal flyout. Pilots flew the task with the standard Black Hawk instrument set or with one of two integrated formats presented on a color panel-mounted display. Engine failures were randomly inserted between takeoff and the TDP region both slightly before, and slightly after, the TDP. For an engine failure occurring prior to the TDP, the pilot made a visual landback to the pad. For one occurring after the TDP, the pilot continued the flyout. Evaluations were conducted with six pilots. Objective and subjective data describing task performance and pilot workload were collected. The pilots were able to maintain more precise flight path control during the backup with the integrated display. This precise control placed the pilot in a better situation from which to handle an engine failure. Pilot recognition of the TDP location was also highly improved with an integrated display. (Author)
DE- <MAJOR> *FLIGHT SIMULATORS; *ROTORCRAFT AIRCRAFT; *COCKPITS; *DISPLAY DEVICES; *TERMINAL FACILITIES; *PILOT PERFORMANCE; *AIRCRAFT LANDING
DE- CIVIL AVIATION; SYSTEMS INTEGRATION; UH-60A HELICOPTER; VISUAL FLIGHT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02195724
AN- <AEROSPACE> A95-34508
TI- Rotorcraft Integrated Fire and Flight Control (IFFC) mission simulation
AU- Gold, Phillip J.; Moore, Lloyd W.; Fowler, Donald W. (Sikorsky Aircraft, Stratford, CT)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 2 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 1062-1073.
PY- 1995
PD- 199500
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509

AB- The technical approach for the IFFC Phase II contract involved the development of real-time simulation and pilot evaluation of rotorcraft IFFC concepts. The candidate mission tailored control laws and helmet mounted display symbology were based on the Phase I IFFC architectures. The RAH-66 Comanche helicopter was used as the baseline advanced armed rotorcraft. Real-time, piloted simulation/evaluation of FFC control laws, fire control/target sensor/weapon interfaces, and cockpit displays was conducted for proof of concept in terms of mission effectiveness in the context of air-to-air and air-to-ground mission scenarios. The formal IFFC simulation experiment was conducted during April 1994 with two Sikorsky and two U.S. Army pilots. The experiment collected quantitative weapon launch data and qualitative pilot assessments of the IFFC modes, IFFC automation, display symbology, and pilot workload. The results from the data analysis indicate significant reductions in engagement timelines (time to get on target and launch a weapon), aiming errors, and workload with IFFC as compared to the baseline (no IFFC) rotorcraft. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *SYSTEMS INTEGRATION; *FIRE CONTROL; *FLIGHT CONTROL; *FLIGHT SIMULATORS; *PILOT PERFORMANCE; *COCKPITS
DE- DISPLAY DEVICES; AH-66 HELICOPTER; SIKORSKY AIRCRAFT; TECHNOLOGY ASSESSMENT
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02195698
AN- <AEROSPACE> A95-34482
TI- Current and planned capabilities of the NASA/Army Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL)
AU- Jacobsen, Robert A.; Rediess, Nicholas A.; Hindson, William S.; Aiken, Edwin W. (NASA, Ames Research Center, Moffett Field, CA); Bivens, Courtland C. (U.S. Army, Aviation and Troop Command, Moffett Field, CA)

SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 1 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 758-771.
PY- 1995
PD- 199500
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- The Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) is a UH-60 Black Hawk helicopter that is being modified by NASA and the U.S. Army for flight systems research. The principal systems that are being installed in the aircraft are a Helmet-Mounted Display and associated imaging systems, and a programmable full-authority Research Flight Control System. In addition, comprehensive instrumentation of both the rigid body of the helicopter and the rotor system is provided. This paper describes the design features of this modern rotorcraft in-flight simulation facility and their current state of development. A brief description of initial research applications is included. (Author)
DE- <MAJOR> *NASA PROGRAMS; *MILITARY TECHNOLOGY; *ROTORCRAFT AIRCRAFT; *FLIGHT CREWS; *AIRBORNE EQUIPMENT; *HELMET MOUNTED DISPLAYS
DE- FLIGHT CONTROL; FLIGHT SIMULATORS; CATHODE RAY TUBES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02195665
AN- <AEROSPACE> A95-34449
TI- Carefree manoeuvring in helicopter flight control
AU- Howitt, Jeremy (Defence Research Agency, Bedford, United Kingdom)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 1 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 287-298.
PY- 1995
PD- 199500
RF- 10
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- This paper describes a ground-based piloted simulation study of a novel carefree maneuvering control law designed to balance the conflicting requirements of stability, control, handling qualities, and limit protection. The key to achieving this balance in the heave axis is an adaptive flight control system mode which blends between collective blade pitch command, torque command, and rotorspeed command as a function of collective position. This allows the pilot to command the full range of available performance up to, and including, the maximum transient limits in a safe and predictable manner. The results of the

simulation study have shown that control modes designed specifically to protect flight envelope limits can: improve limit protection in high aggression, large amplitude maneuvers; reduce task time in such maneuvers by allowing the pilot to command maximum available performance; and reduce workload and improve situational awareness by relieving the pilot of the need to monitor cockpit instruments. Achieving carefree maneuvering in future military helicopters therefore offers potential for enhanced combat capability and hence mission effectiveness. (Author)
DE- <MAJOR> *AIRCRAFT MANEUVERS; *HELICOPTER CONTROL; *FLIGHT CONTROL;
*FLIGHT ENVELOPES; *CONTROL SYSTEMS DESIGN; *PILOT PERFORMANCE
DE- COMPUTERIZED SIMULATION; MATHEMATICAL MODELS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02195661
AN- <AEROSPACE> A95-34445
TI- Measuring the benefits of a complex system - The Rotorcraft Pilot's Associate Evaluation Program
AU- Robertson, Greta A. (McDonnell Douglas Helicopter Systems, Mesa, AZ); Arthur, Keith A. (U.S. Army, Aviation and Troop Command, Fort Eustis, VA)
SO- In: AHS, Annual Forum, 51st, Fort Worth, TX, May 9-11, 1995, Proceedings. Vol. 1 (A95-34426 09-01), Alexandria, VA, American Helicopter Society, 1995, p. 259-265.
PY- 1995
PD- 199500
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- The Rotorcraft Pilot's Associate (RPA) program is developing a cognitive decision aiding system that will be an intelligent associate and aid to helicopter crew members. RPA builds on future avionic subsystems, fuses battlefield information, reasons about threat intent, develops and continuously updates mission plans, provides recommendations, and takes authorized actions. The evaluation team's charter is to create and apply an evaluation methodology to measure the benefits of the RPA technology. We believe that the benefits of RPA can best be measured at multiple levels of the battlefield, from the individual crew through the higher echelons. During our early analysis of scout/attack missions and the RPA concept, we focused on how RPA will help the crew to do their job better. Benefits of RPA are reflected in more timely and accurate information for commanders, flexibility and responsiveness to changing situations, and efficient and effective mission task execution. Maneuver force commanders will receive a clear view of the battlefield from a more responsive asset. Our evaluation plan encompasses several platforms, facilities, and evaluation methods. Our approach to human-centered design, the definition of an associate, and the linking of RPA behaviors to measurements is described. The process of mapping RPA concepts into the aviation mission down to actions taken by RPA is also discussed. Preliminary design and diagnostic information is provided. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *ROTORCRAFT AIRCRAFT; *PILOT PERFORMANCE;
*EVALUATION
DE- FLIGHT TESTS; COCKPITS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02195565
AN- <AEROSPACE> A95-34349
TI- UH-60A airloads data acquisition and processing system
AU- Leung, Joseph G. M.; Wei, Mei Y.; Aoyagi, Michio (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AIAA/IEEE Digital Avionics Systems Conference, 13th, Phoenix, AZ, Oct. 30-Nov. 3, 1994, Proceedings (A95-34316 09-06), New York, Institute of Electrical and Electronics Engineers, Inc., 1994, p. 206-211.
PY- 1994
PD- 199400
RF- 4
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9509
AB- NASA/Ames recently completed the joint NASA/Army UH-60A Airloads Program. The objective of this program was to make in-flight measurements of rotor blade airloads, blade vortex interaction, and blade acoustics. An advanced digital instrumentation system capable of synchronous acquisition of several hundred HF pressure channels was designed and developed to gather the required airloads data. The

instrumentation system was designed to operate on the rotor hub of a Blackhawk helicopter acquiring data, in flight, from pressure transducers, strain gauges, and accelerometers embedded in the rotor blade built under contract by Sikorsky Aircraft. A parallel effort was initiated to develop a ground telemetry system with the capability to handle the 7.5 megabits per second PCM-encoded telemetry data, generated by the instrumentation system, in real time. The purpose of this paper is to describe the design and performance of the rotary data acquisition system which was used to digitally acquire high speed rotor blade pressure data. These data were found to achieve the flight test research objectives of the UH-60A Airloads Program. (Author)
DE- <MAJOR> *UH-60A HELICOPTER; *AERODYNAMIC LOADS; *DATA ACQUISITION;
*DATA PROCESSING; *BLADE-VORTEX INTERACTION; *ROTARY WINGS
DE- FREQUENCY RESPONSE; TELEMETRY
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02192713
AN- <AEROSPACE> N95-19931
TI- Using the backward transfer paradigm to validate the AH-64 Simulator Training Research Advanced Testbed for Aviation
TI- <SUPPLEMENT> Final Report, Jan. 1993 - Oct. 1993
AU- STEWART, JOHN E., II
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> A2025595
PY- 1994
PD- 199409
PG- 44P.
RN- AD-A285758; ARI-RR-1666
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9506
AB- The Simulator Training Research Advanced Testbed for Aviation (STRATA) is a modular simulation system for the AH-64 helicopter. The Adams and McAbee backward transfer of training paradigm was used to determine if AH-64 piloting skills transfer to STRATA. Ten AH-64 pilots participated in the experiment. They were asked to fly a mission scenario consisting of 13 single-pilot aircrew training manual (ATM) tasks. No orientation or practice sessions were given. Most participants rated STRATA as highly similar to the AH-64 in handling, but believed the visual display system had limitations for extremely low-altitude tasks like hovering. Performance ratings during the experiment by a senior instructor pilot (IP) indicated that of the total 130 task events, 88.5% were performed to ATM standards. After the experiment, four independent judges, all aviators, rank-ordered participant performance on the stationary hover task using output from STRATA's automated performance measurement system. Rankings showed agreement between judges and high correlation with IP ratings made during the experiment. (DTIC)
SF- DTIC
DE- <MAJOR> *AH-64 HELICOPTER; *FLIGHT SIMULATORS; *PILOT PERFORMANCE;
*TRAINING ANALYSIS; *TRANSFER OF TRAINING
DE- AIRCRAFT PILOTS; FLIGHT SIMULATION; HOVERING; LOW ALTITUDE
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02192643
AN- <AEROSPACE> A95-33979
TI- Effect of Field-of-View restriction on rotorcraft pilot workload and performance - Preliminary results
AU- Szoboszlay, Zoltan; Haworth, Loran; Reynolds, Thomas (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); Lee, Alan; Halmos, Zsolt (Serv-Air, Mountain View, CA)
SO- In: Helmet- and head-mounted displays and symbology design requirements II; Proceedings of the Conference, Orlando, FL, Apr. 18, 19, 1995 (A95-33965 08-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2465), 1995, p. 142-153.
PY- 1995
PD- 199500
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9508
AB- The Aeroflightdynamics Directorate of the U.S. Army's Aviation Research, Development and Engineering Center initiated a study to determine the effects of limiting a rotorcraft pilot's field-of-view (FOV) on performance and workload. Pilot FOV was restricted to simulate

current and next generation helmet mounted display FOVs used in night vision systems. A helmet visor was constructed for this test to restrict the horizontal peripheral limits of the square-shaped FOV to values of 100, 80, 60, 40, and 20 deg. The vertical limits and overlap were held constant at 40 deg (except for the 20-deg FOV). Six pilots executed a series of prescribed low altitude maneuvers with an instrumented NAH-1S (Cobra) rotorcraft. It was observed that reducing FOV increased the difficulty of controlling the aircraft and altered head movement. Reducing FOV also diminished the pilots' situational awareness. (Author)
DE- <MAJOR> *ROTARY WING AIRCRAFT; *FIELD OF VIEW; *PILOT PERFORMANCE
DE- HELMET MOUNTED DISPLAYS; NIGHT VISION; IMAGE INTENSIFIERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02192639
AN- <AEROSPACE> A95-33975
TI- Helmet mounted display symbology research in the United Kingdom
AU- Gillow, Charles (Aircraft & Armament Evaluation Establishment, Boscombe Down, United Kingdom); Southam, Tim (Defence Research Agency, Man Machine Interface Dept., Farnborough, United Kingdom)
SO- In: Helmet- and head-mounted displays and symbology design requirements II; Proceedings of the Conference, Orlando, FL, Apr. 18, 19, 1995 (A95-33965 08-54), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2465), 1995, p. 102-110.
PY- 1995
PD- 199500
RF- 6
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9508
AB- The DRA's research effort in Visually Coupled Systems (VCS) is intended to assist the operational pilot fly aggressively at night and day, by giving him an informative view of the near-Earth environment. A number of simulator trials have been conducted to explore some of the issues identified in Helmet-Mounted Display symbol set development. The development of successful symbol sets will be iterative. A careful study of the operational requirement should produce a series of tests which will demonstrate compliance. International cooperation on VCS research has been formalized through a Memorandum of Understanding with the U.S. that defines a 48-month program; considerable effort has been put into achieving an efficient flow of information between partners. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *SYMBOLS; *ROTARY WING AIRCRAFT
DE- HUMAN FACTORS ENGINEERING; NIGHT VISION; NAP-OF-THE-EARTH NAVIGATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02192629
AN- <AEROSPACE> A95-33965
TI- Helmet- and head-mounted displays and symbology design requirements II; Proceedings of the Conference, Orlando, FL, Apr. 18, 19, 1995
AU- Lewandowski, Ronald J. (Honeywell, Inc., Minneapolis, MN); Stephens, Wendell; Haworth, Loran A. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA), EDS.
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2465), 1995, 307 p. (For individual items see A95-33966 to A95-33993).
PY- 1995
PD- 199500
RN- SPIE-2465; ISBN 0-8194-1818-8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9508
AB- The present conference discusses topics in the fields of helmet-mounted display (HMD) hardware development, flight testing, and evaluation, HMD human factors studies, and HMD symbology development and evaluation. Attention is given to laser HMDs, image fusion for night flying, civil certification of see-through displays, HMD symbol stabilization concepts, ejection safety for advanced fighter helmets, head-and-aircraft-fixed IR imagery for the Maverick missile, and HMD night vision and FLIR imagery. (AIAA)
DE- <MAJOR> *CONFERENCES; *DISPLAY DEVICES; *HELMET MOUNTED DISPLAYS; *SYMBOLS; *SYSTEMS ENGINEERING
DE- SOLID STATE DEVICES; NIGHT VISION; FLIR DETECTORS; FLIGHT TESTS; HUMAN FACTORS ENGINEERING; INFRARED IMAGERY; ROTARY WING AIRCRAFT; FIGHTER AIRCRAFT

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02188521
AN- <AEROSPACE> N95-18505
TI- V-22 simulator evaluation for shipboard operations
AU- REDDY, WILLIAM D.
CS- Naval Air Warfare Center, Patuxent River, MD. Aircraft Div.
CS- <CODE> NP157728
PY- 1994
PD- 199400
PG- 17P.
NT- Limited Reproducibility: More than 20% of this document may be affected by microfiche quality
RN- AD-A284156
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity (Defense Technical Information Center (DTIC))
JA- STAR9505
AB- In June 1990, a preliminary evaluation of the Naval Air Warfare Center Aircraft Division (NAWCAD) Patuxent River's Manned Flight Simulator (MFS) motion base was performed to assess its value for pilot training and task familiarization for Dynamic Interface (DI) testing. Since that time, MFS engineers have made significant improvements in the areas of ship airwake and turbulence modelling, ship visual elements, and motion cueing. In early 1993, the DI department was tasked to perform an evaluation with a duel purpose. The first was to evaluate and document the fidelity of the V-22 flight simulator for the shipboard operations flight tests. The second was to identify the critical elements required to adequately perform various shipboard compatibility analyses and prepare project pilots for shipboard DI testing. The test consisted of 220 shipboard landings, 8 short take off's, and comprised a total of 16 flight hours. (DTIC)
SF- DTIC
DE- <MAJOR> *DYNAMIC TESTS; *FLIGHT SIMULATORS; *FLIGHT TESTS; *PILOT PERFORMANCE; *PILOT TRAINING; *TILT ROTOR AIRCRAFT; *V-22 AIRCRAFT; *VERTICAL TAKEOFF AIRCRAFT
DE- MACH NUMBER; TURBULENCE; WARFARE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02185381
AN- <AEROSPACE> A95-29887
TI- Rotorcraft Pilot's Associate update - The Army's largest science and technology program
AU- Colucci, Frank
SO- Vertiflite (ISSN 0042-4455), vol. 41, no. 2, Apr. 1995, p. 16-20.
PY- 1995
PD- 199504
RF- 5
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9507
AB- Recent developments in the Army's Pilot's Associate (RPA) program, which puts artificial intelligence into helicopter cockpits to automate the flow of information and piloting tasks and improve aircrew survivability and efficiency, are discussed. Army experience with D/NAPS (Day/Night Adverse Weather Pilotage System) is reviewed and the contributions of data fusion and virtual application prototyping to RPA are considered. The responsibilities of various private companies in the development of RPA are described along with the results of flight tests of RPA. (AIAA)
DE- <MAJOR> *PILOT'S ASSOCIATE; *MILITARY HELICOPTERS; *ARTIFICIAL INTELLIGENCE
DE- AIRCRAFT SURVIVABILITY; AH-64 HELICOPTER; WORKLOADS (PSYCHOPHYSIOLOGY); DECISION MAKING; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02185237
AN- <AEROSPACE> A95-29743
TI- Development and testing of a main rotor blade designed for reduced vibratory hub loads
AU- Goodman, Robert K. (Sikorski Aircraft, Stratford, CT)
SO- In: Vertical Lift Aircraft Design Conference, San Francisco, CA, Jan. 18-20, 1995, Proceedings (A95-29731 07-05), Moffett Field, CA, NASA Ames Reproduction Technology Branch, 1995, p. 4.5-1 to 4.5-21.
PY- 1995
PD- 199500

RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9507
AB- The development of a growth main rotor blade for the H-60 product line included scale model wind tunnel tests and aeroelastic analysis aimed at identifying design features to minimize hub vibratory loads. Results from the model tests and analysis led to the fabrication of two full scale prototype rotors designs, one incorporating design features specifically directed at vibratory hub load reduction. Flight tests of the full scale rotors included instrumentation to measure hub loads. Results from the flight test bear out the reduced vibratory loads of the low vibration rotor design predicted by model test and analysis. (Author)
DE- <MAJOR> *ROTARY WINGS; *VIBRATORY LOADS; *VIBRATION DAMPING; *FLIGHT TESTS
DE- TEST STANDS; H-60 HELICOPTER
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02183461
AN- <AEROSPACE> A95-27967
TI- Venom's vital parts
TI- <EXTENSION> British reconfiguration of AH-1W helicopter
AU- Gray, Peter
SO- Flight International (ISSN 0015-3710), vol. 147, no. 4453, Jan. 4, 1995, p. 32, 33.
PY- 1995
PD- 199501
SN- 0015-3710
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9506
AB- An account is given of the flight simulator features designed to test the cockpit instrumentation and sensor displays for the 'Venom' variant of the AH-1W SuperCobra attack helicopter. Notable components of this cockpit system are head-mounted displays (HMDs) with integrated sighting and night-vision goggles. The helicopter nose-mounted sighting system allows the pilot to vary his field-of-view in three steps, from narrow to wide. The HMD displays attitude, airspeed, groundspeed, height, heading, etc.; warnings of onboard malfunctions and external threats are made known through the cockpit's multifunction displays. (AIAA)
DE- <MAJOR> *BELL AIRCRAFT; *MILITARY HELICOPTERS; *FLIGHT SIMULATORS; *AIRCRAFT CONFIGURATIONS
DE- HELMET MOUNTED DISPLAYS; NIGHT VISION; WEAPON SYSTEMS; AIRCRAFT INSTRUMENTS; FLIR DETECTORS; COCKPITS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02181485
AN- <AEROSPACE> A95-25991
TI- The protection of rotor speed following power failure
AU- Haddon, D. R. (Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: European Rotorcraft Forum, 20th, Amsterdam, Netherlands, Oct. 4-7, 1994, Proceedings. Vol. 3 (A95-25916 06-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1994, p. 43-2 to 43-21.
PY- 1994
PD- 199400
RF- 4
LA- English
GL- United Kingdom
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9506
AB- Commercial considerations and aircraft performance criteria have tended to influence modern design trends towards low inertia rotor systems which compound the power failure problem by increasing the rotor speed decay rate. This has resulted in a reduction in the time available to the pilot to recover from such a failure. Any increase in available intervention time, achieved through a fundamental change in rotor inertia, could only be realized at the expense of restricting the performance and operational use of the vehicle. This would be commercially unacceptable to operators. An alternative approach is to improve the actual intervention time which could be achieved through better cues and warnings provided in the cockpit. A number of possible solutions have been postulated, including: enhanced visual systems, various auditory warnings, and automatic intervention systems, all of which would provide an enhanced rotor speed protection capability. These strategies have undergone an assessment in a recent study whose

results are presented in this paper. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *ELECTRICAL FAULTS; *AIRCRAFT POWER SUPPLIES; *HELICOPTERS; *AIRCRAFT STABILITY; *PILOT PERFORMANCE
DE- WARNING SYSTEMS; FLIGHT SIMULATORS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02181453
AN- <AEROSPACE> A95-25959
TI- Feasibility study of a fire fighting helicopter for high buildings
AU- Saito, Shigeru; Okuno, Yoshinori; Harada, Masashi; Funabiki, Kohei (National Aerospace Lab., Tokyo, Japan); Akamatsu, Shigeki (Tokyo, Univ., Japan)
SO- In: European Rotorcraft Forum, 20th, Amsterdam, Netherlands, Oct. 4-7, 1994, Proceedings. Vol. 2 (A95-25916 06-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1994, p. 49-1 to 49-18.
PY- 1994
PD- 199400
RF- 7
LA- English
GL- Japan
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9506
AB- A helicopter is now being considered as a candidate to extinguish fires in high buildings. This paper investigates the feasibility of the fire fighting helicopter, which has the capability of carrying one ton water inside the cabin, hovering in the turbulent wind nearby a building, and hitting the water on the target window by using a water ejection system. The following three methods were used for this study: (1) linearized analysis considering the effects of the turbulence, automatic control system, and the weight change and reaction force during the water ejection, (2) flight simulation tests considering the collaboration of the pilot and the ejection boom operator, and (3) flight tests including hovering flights nearby a real high building. As the results of these investigations, it was shown that the assumed fire fighting helicopter based on an existing large size helicopter has an enough capability to make hovering at a distance of 20 m from the building wall up to a wind speed of 7 m/s and can hit nearly 80 percent of the ejected water on the target window. (Author)
DE- <MAJOR> *FEASIBILITY; *HELICOPTER DESIGN; *FIRE FIGHTING; *SYSTEMS ENGINEERING
DE- FLIGHT SIMULATION; FLIGHT TESTS; COMPUTERIZED SIMULATION; WIND PROFILES
; HUMAN FACTORS ENGINEERING; EQUATIONS OF MOTION; CONTROL SYSTEMS
DESIGN; TURBULENCE MODELS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02181175
AN- <AEROSPACE> A95-25681
TI- Integration of off-the-shelf weapons; Proceedings of the Conference, Boscombe Down, United Kingdom, Feb. 23, 1995
SO- London, Royal Aeronautical Society, 1995, 57 p. (For individual items see A95-25682 to A95-25689).
PY- 1995
PD- 199500
RN- ISBN 1-85768-041-3
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA9506
AB- The present volume on integration of off-the-shelf weapons discusses the role of the U.K. Ordnance Board, integration of an attack helicopter weapon system, integration of Paveway III - an off-the-shelf case study, and integration of AMRAAM on Sea Harrier. Attention is given to TIALD with guided weapons, a convertible laser designation pod and the AS 30 laser missile, adaptation of the Sting Ray torpedo to various aircraft, and human factors considerations of integrating off-the-shelf weapon systems. (AIAA)
DE- <MAJOR> *CONFERENCES; *AIRCRAFT DESIGN; *WEAPON SYSTEMS
DE- MISSILE DESIGN; LASER GUIDANCE; HOMING DEVICES; AIRCRAFT CONFIGURATIONS
; MILITARY HELICOPTERS; TORPEDOES; MAN MACHINE SYSTEMS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02180422
AN- <AEROSPACE> N95-15815
TI- Test Operation Procedure (TOP): Vibration testing of helicopter equipment
TI- <SUPPLEMENT> Final Report
CS- Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
CS- <CODE> A2870159

PY- 1994
PD- 199408
PG- 42P.
RN- AD-A284433; TOP-7-3-531
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9503
AB- This TOP provides guidelines and procedures for helicopter vibration calibration and measurements. Guides are provided for vibration frequencies and magnitudes to be expected. Procedures are developed for transducer selection and placement, instrumentation system design, and data collection. Emphasis is placed on use of piezoelectric accelerometers for vibration measurement and tape recorders for data storage. Step-by-step procedures are provided for accelerometer sensitivity measurement and calibration, instrumentation system adjustments and calibrations, and data collection and handling. (DTIC)
SF- DTIC
DE- <MAJOR> *ACCELEROMETERS; *FLIGHT TESTS; *HELICOPTERS; *IN-FLIGHT MONITORING; *PIEZOELECTRIC TRANSDUCERS; *VIBRATION MEASUREMENT; *VIBRATION TESTS
DE- DATA ACQUISITION; DATA STORAGE; PROCEDURES; SINE WAVES; TAPE RECORDERS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02180374
AN- <AEROSPACE> N95-15767
TI- Collection of real-time, multichannel EEG data from helicopter pilots in flight: A feasibility study
TI- <SUPPLEMENT> Final Report
AU- CALDWELL, JOHN A.; LEWIS, JAMES A.; DARLING, STEPHEN R.; DILLARD, ROBERT M.; JOHNSON, PARLEY P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1994
PD- 199405
PG- 64P.
NT- Limited Reproducibility: More than 20% of this document may be affected by microfiche quality
CN- DA PROJ. 3M1-62787-A-879
RN- AD-A284396; USAARL-94-26
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity (Defense Technical Information Center (DTIC))
JA- STAR9503
AB- An initial assessment of whether valid electroencephalographic (EEG) data could be collected on helicopter pilots in flight was conducted using 20 volunteers. Each subject provided a brief eyes-open and eyes-closed EEG in the laboratory and then in a helicopter. During helicopter flights, data were monitored and recorded on the ground in real-time via a radio telemetry system. Initial hardware problems resulted in the exclusion of several records, but these problems were resolved toward the end of the study. Analysis of the remaining acceptable EEG records indicated that the typical increase in alpha activity (7.5-13.0 Hz) due to eye closure was clearly observable at every analyzed electrode site regardless of whether the testing occurred in the laboratory or in the helicopter. Further examinations of delta, theta, and beta bands showed that the EEG data were not overly contaminated by artifacts, although it was much more difficult to find 'clean' segments on records collected in the helicopter than in the laboratory. It was concluded that it is possible to record and telemeter useable EEG from the in-flight helicopter environment. Follow-on studies will examine the feasibility of analyzing EEG data collected while the pilot is performing flight-related tasks. (DTIC)
SF- DTIC
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *ELECTROENCEPHALOGRAPHY; *HELICOPTERS; *IN-FLIGHT MONITORING; *PILOT PERFORMANCE; *RADIO TELEMETRY
DE- FEASIBILITY; FLIGHT TESTS; REAL TIME OPERATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02179316
AN- <AEROSPACE> N95-14102
TI- Identification of dynamic systems. Volume 3: Applications to aircraft. Part 2: Nonlinear analysis and manoeuvre design
TI- <ORIGINAL> L'identification des systemes dynamiques: Applications aux aeronefs. Titre 2: L'analyse non-lineaire et la conception de la manoeuvre

AU- MULDER, J. A. (Technische Univ., Delft, Netherlands.); SRIDHAR, J. K. (Technische Univ., Delft, Netherlands.); BREEMAN, J. H. (National Aerospace Lab., Amsterdam, Netherlands.)
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Mechanics Panel.
CS- <CODE> AD455458
PY- 1994
PD- 199405
PG- 213P.
NT- Flight Test Techniques Series
RN- AGARD-AG-300-VOL-3-PT-2; ISBN-92-835-0748-7
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A10/MF A03
JA- STAR9503
AB- This AGARDograph is a sequel to the previous AGARDographs published in the AGARD Flight Test Techniques Series, Volume 2 on 'Identification of Dynamic Systems' and Volume 3 on 'Identification of Dynamic Systems - Applications to Aircraft - Part 1: The Output Error Approach' both written by R.E. Maine and K.W. Iliff. The intention of the present document is to cover some of those areas which were either absent or only briefly mentioned in those volumes. These areas are Flight Path Reconstruction, Nonlinear Model Identification, Optimal Input Design and Flight Test Instrumentation. The present approach to identification is rather different from that presented in the earlier AGARDographs in the sense that the identification problem is decomposed into a state estimation and a parameter identification part. This approach is referred to as the Two-Step Method (TSM), although one will find other names like Estimation Before Modelling (EBM) in the literature. It will be shown in the present AGARDograph that this approach has significant practical advantages over methods which no attempt is made to decompose the joint parameter-state estimation problem. The two-step method is generally applicable to flight vehicles such as fixed wing aircraft and rotorcraft which are equipped with state of the art inertial reference systems. The theoretical developments in the present AGARDograph will be illustrated with examples of a flight test program with the De Havilland DHC-2 Beaver aircraft, the experimental aircraft of the Delft University of Technology which has been used for almost two decades to test new ideas in the science of aircraft parameter identification. (Author)
DE- <MAJOR> *AIRCRAFT DESIGN; *DYNAMICAL SYSTEMS; *FLIGHT PATHS; *FLIGHT TEST INSTRUMENTS; *FLIGHT TESTS; *NONLINEAR SYSTEMS; *PARAMETER IDENTIFICATION
DE- AIRCRAFT CONFIGURATIONS; AIRCRAFT CONTROL; AIRCRAFT INSTRUMENTS; AIRCRAFT STABILITY; DHC 2 AIRCRAFT; STATE ESTIMATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02177832
AN- <AEROSPACE> A95-24826
TI- ICIASF '93 - International Congress on Instrumentation in Aerospace Simulation Facilities, 15th, Saint-Louis, France, Sept. 20-23, 1993, Record
SO- New York, Institute of Electrical and Electronics Engineers, Inc., 1993, 364 p. (For individual items see A95-24827 to A95-24868, A95-24870, A95-24871).
PY- 1993
PD- 199300
RN- ISBN 0-7803-0800-X
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9505
AB- Various papers on instrumentation in aerospace simulation facilities are presented. Individual topics addressed include: cryogenic instrumentation target of 0.01 percent accuracy achieved, Goertler vortices in hypersonic flow detected by IR thermography, measurements on the ISL rotor model, nonintrusive measurements of gaseous concentrations and temperatures, laser measurements of vaporization in a burning spray of methanol, design features of a system for transition characterization, new experiences on transition detection by infrared images, surface hot-film applications in laminar-turbulent flows, heat transfer measurement in a backward-facing step flow, development of a 3D fast response aerodynamic probe. Also discussed are: multiport pressure measurements on continuously moving wind tunnel models, investigation of vibration parameters of aviation turbine coolers, concept for a miniature signal processing unit, 2D laser velocimetry near helicopter blades, new laser Doppler sensors for spatial velocity information, application of LDA and DGV to complex high-speed flows, nonintrusive diagnostics of supersonic missile afterbody flows. (AIAA)
DE- <MAJOR> *CONFERENCES; *MEASURING INSTRUMENTS; *AERODYNAMICS

DE- CRYOGENICS; ACOUSTIC MEASUREMENT; SPECTROSCOPY; TURBULENT FLOW; OPTICAL
MEASURING INSTRUMENTS; WIND TUNNEL TESTS; LASER ANEMOMETERS; PARTICLE
IMAGE VELOCIMETRY; VIBRATION MEASUREMENT; SCHLIEREN PHOTOGRAPHY;
HOLOGRAPHY
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02177614
AN- <AEROSPACE> A95-24608
TI- Looking ahead; Proceedings of the International Symposium on Head Up Display, Enhanced Vision and Virtual Reality, Amsterdam, Netherlands, Oct. 25, 26, 1993
SO- Amsterdam, Netherlands, Netherlands Association of Aeronautical Engineers, 1993, 179 p. (For individual items see A95-24609 to A95-24624).
PY- 1993
PD- 199300
LA- English
GL- Netherlands
CP- Netherlands
DT- CONFERENCE PROCEEDINGS
JA- IAA9505
AB- The present conference discusses the development status and prospects of HUDs and enhanced vision/virtual reality systems for civil aviation. Attention is given to FAA and JAA views of the certification-related aspects of HUDs, human factors aspects of HUDs, and Alaska Airlines and Canadair experiences with HUDs and enhanced vision systems. Also discussed are the application of pictorial display formats to future ATC concepts, enhanced vision systems for Airbus aircraft, and man-machine interfaces for future civil aviation. (AIAA)
DE- <MAJOR> *CONFERENCES; *HEAD-UP DISPLAYS; *VISUAL AIDS; *VIRTUAL REALITY
; *AIRCRAFT INSTRUMENTS
DE- CERTIFICATION; AIRCRAFT GUIDANCE; AIR TRAFFIC CONTROL; HUMAN FACTORS
ENGINEERING; HELICOPTERS; MAN MACHINE SYSTEMS; MAN-COMPUTER INTERFACE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02176958
AN- <AEROSPACE> A95-23952
TI- AIAA/FAA Joint Symposium on General Aviation Systems, Mississippi State Univ., Starkville, MS, May 24, 25, 1994, Proceedings
SO- Atlantic City, NJ, Federal Aviation Administration, 1994, 624 p. (For individual items see A95-23953 to A95-23993).
PY- 1994
PD- 199400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9505
AB- Various papers on general aviation (GA) systems are presented. Individual topics addressed include: data link applications for GA, ducted fan propulsion for a GA replica fighter aircraft, overview of advanced flight controls for GA, pilot workload assessment and validity, robust planning technique of a GA smart cockpit system, automotive gasoline usage in aircraft engines, unleaded aviation gasoline, alternative fuels for GA, certification of a carbureted aircraft engine on ethanol fuel, aircraft aging effects on transonic cruise performance, GA individual aircraft load monitoring program, life cycle design of future GA aircraft, pilot an controller perspectives on TCAS II. Also discussed are: integrating helicopters in the National Airspace System, two-element laminar flow airfoil optimized for cruise, winglet performance for high aspect ratio wing planforms, evaluation of tackifier agents for resin transfer molding, crashworthiness considerations in aircraft seat cushion design, flight safety assurance for the Honda MH-02, box-and beam carrythroughs of the RP-series composite sailplanes, procedure for airspeed calibration using GPS, utilization rate of GA aircraft. (AIAA)
DE- <MAJOR> *CONFERENCES; *AIRCRAFT DESIGN; *GENERAL AVIATION AIRCRAFT;
*CIVIL AVIATION
DE- HUMAN FACTORS ENGINEERING; AIRCRAFT FUELS; AGING (MATERIALS); SERVICE
LIFE; AIRSPACE; AIR TRAFFIC CONTROL; AERODYNAMICS; AIRCRAFT CONSTRUCTION MATERIALS; FLIGHT TESTS; ECONOMIC FACTORS; COCKPITS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02176896
AN- <AEROSPACE> A95-23890
TI- Design and development of an advanced integrated helmet system for use with a helmet mounted display

AU- Cadogan, David P.; Jackson, Lisa H. (ILC Dover, Inc., Frederica, DE)
SO- In: SAFE Association, Annual Symposium, 32nd, Reno, NV, Oct. 10-12, 1994, Proceedings (A95-23851 05-54), Cottage Grove, OR, SAFE Association, 1994, p. 275-286.
PY- 1994
PD- 199400
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- Through the use of advanced technologies, such as computer aided design, laser cutting, rapid prototyping (stereolithography), and advanced materials technology, an integrated helmet system was developed for use with a 40 deg binocular integrated day/night helmet mounted display system. This helmet system consists of three major interchangeable assemblies: 1) a basic helmet assembly, 2) a module assembly (for mounting of the optics to the helmet), and 3) a visor assembly. The system was developed in various configurations for use on the PAH2 rotary wing aircraft and an advanced tactical aircraft with the capability to be adapted to multiple applications. This paper discusses the technologies utilized in the system design as well as the design aspects of the systems subassemblies. In addition, the design approach utilized to meet the system requirements and the verification testing conducted are presented. (Author)
DE- <MAJOR> *HELMETS; *HELMET MOUNTED DISPLAYS; *PRODUCT DEVELOPMENT; *HUMAN FACTORS ENGINEERING; *SYSTEMS ENGINEERING
DE- DESIGN ANALYSIS; TECHNOLOGY UTILIZATION; VISORS; SUBASSEMBLIES; LININGS ; PERFORMANCE TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02176881
AN- <AEROSPACE> A95-23875
TI- Model of an ergonomically designed helicopter seat
AU- Kroh, G.; Pongratz, H. (German Air Force, Inst. of Aviation Medicine, Manching, Germany); Dupuis, H. (Mainz, Univ., Germany); Meiller, H. (Grammer AG, Amberg, Germany)
SO- In: SAFE Association, Annual Symposium, 32nd, Reno, NV, Oct. 10-12, 1994, Proceedings (A95-23851 05-54), Cottage Grove, OR, SAFE Association, 1994, p. 157-163.
PY- 1994
PD- 199400
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- A completely new helicopter seat design is proposed with side arm controls for cyclic stick and collective pitch, integrated in the armrests. The model seat complies with ergonomic requirements and contains individually adjustable lumbar supports and armrests as well as solutions for microclimate control. This enables the pilot to operate the helicopter in all flight regimes in a reclined and relaxed, and, above all, symmetrical posture. (Author)
DE- <MAJOR> *SEATS; *HELICOPTER DESIGN; *AIRCRAFT PARTS; *HUMAN FACTORS ENGINEERING
DE- MAN MACHINE SYSTEMS; AIRCRAFT PILOTS; LUMBAR REGION; POSTURE; COCKPITS; WORKSTATIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02176857
AN- <AEROSPACE> A95-23851
TI- SAFE Association, Annual Symposium, 32nd, Reno, NV, Oct. 10-12, 1994, Proceedings
SO- Cottage Grove, OR, SAFE Association, 1994, 405 p. (For individual items see A95-23852 to A95-23901).
PY- 1994
PD- 199400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9505
AB- The papers presented in this volume provide an overview of recent developments in the field of support, survival, and safety technology. Topics discussed include a prototype computer-controlled life support system for independent regulation of G-suit and PBG pressures; full mission environment simulation; advanced technology for rotary-wing aircraft crashworthiness; altitude decompression sickness risk

prediction; and model of an ergonomically designed helicopter seat. Papers are also presented on anthropogenic considerations for military masks; improved escape for nonejection seat aircraft; adaptive seat propulsion; and spatial disorientation episodes during Desert Storm among F-15C pilots. (AIAA)
DE- <MAJOR> *CONFERENCES; *AEROSPACE SAFETY; *MILITARY TECHNOLOGY; *MAN MACHINE SYSTEMS; *LIFE SUPPORT SYSTEMS; *HUMAN FACTORS ENGINEERING; *AERONAUTICS
DE- ESCAPE SYSTEMS; OXYGEN SUPPLY EQUIPMENT; ALTITUDE SIMULATION; HEAD-UP DISPLAYS; CRASHWORTHINESS; DECOMPRESSION SICKNESS; BIODYNAMICS; HELMETS ; EJECTION SEATS; CANOPIES; INJURIES; ACCELERATION PROTECTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02176323
AN- <AEROSPACE> A95-23317
TI- Airborne laser depth sounding - System aspects and performance
AU- Steivall, Ove; Koppari, Kurt; Karlsson, Ulf (Swedish Research Defense Establishment, Linkoping, Sweden)
SO- In: Ocean optics XII; Proceedings of the Meeting, Bergen, Norway, June 13-15, 1994 (A95-23305 05-48), Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 2258), 1994, p. 392-412.
PY- 1994
PD- 199400
LA- English
GL- Sweden
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- In Sweden work on airborne depth sounding lidar has been taking place for more than ten years. Activities include the development of a helicopter-borne lidar called FLASH as well as instrumentation (HOSS) for in situ measurement of the water optical parameters. Recently we have been engaged in analysis of lidar data to determine system performance and possible ways to optimize it in relation to lidar parameters and anticipated bottom depth and topography. Examples from this analysis are presented. Comparisons between laser and acoustic soundings are presented. The FLASH system has been further developed into two operational systems called Hawk Eye. The first of these two systems has now been delivered for helicopter installation and acceptance flights. (Author)
DE- <MAJOR> *OPTICAL RADAR; *AIRBORNE RADAR; *WATER DEPTH; *DEPTH MEASUREMENT
DE- COASTS; LASER APPLICATIONS; DYE LASERS; BATHYMETERS; SEA STATES
SH- 7536 Lasers & Masers (1975-)

AN- <DIALOG> 02175541
AN- <AEROSPACE> A95-22535
TI- Research on measurement and control of helicopter rotor response using blade-mounted accelerometers 1992-93
AU- McKillip, Robert M., Jr. (Continuum Dynamics, Princeton, NJ); Ham, Norman D. (MIT, Cambridge, MA); Balough, Dwight L. (NASA, Ames Research Center, Moffett Field, CA)
SO- In: European Rotorcraft Forum, 19th, Como, Italy, Sept. 14-16, 1993, Proceedings. Vol. 2 (A95-22426 05-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1993, p. O3-1 to O3-4.
PY- 1993
PD- 199300
RF- 7
LA- English
GL- United States
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- Comparisons are presented among Black Hawk helicopter rotor blade first-mode bending displacements as estimated by blade-mounted accelerometers and strain gages, which illustrate the ability of accelerometer-based instrumentation to determine elastic bending response. The sensors must be filtered to allow for the frequency-dependent modal content of their signals. (AIAA)
DE- <MAJOR> *ROTARY WINGS; *HELICOPTER DESIGN; *ACCELEROMETERS; *FLIGHT TESTS; *ROTOR BLADES (TURBOMACHINERY)
DE- STRAIN GAGES; ELASTIC BENDING; MODAL RESPONSE; FEEDBACK CONTROL; ACTIVE CONTROL; STRUCTURAL VIBRATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02175486

AN- <AEROSPACE> A95-22480
TI- Helicopter noise certification experience and compliance cost reductions
AU- Cox, Charles (Bell Helicopter Textron, Inc., Fort Worth, TX)
SO- In: European Rotorcraft Forum, 19th, Como, Italy, Sept. 14-16, 1993, Proceedings. Vol. 1 (A95-22426 05-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1993, p. E1-1 to E1-13.
PY- 1993
PD- 199300
LA- English
GL- United States
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- This paper reviews the development of civil helicopter noise certification standards, summarizes recent compliance experiences and related program costs, and identifies improvements in the noise certification process which can reduce its complexity and cost. Certificated noise levels and compliance margins for 25 helicopter models are presented. It is shown that, on average, compliance margins are less for the larger helicopters than for the smaller ones. The costs to noise-certificate nine of these helicopters are then summarized, and shown to be high. Three primary cost drivers are identified: the extensive aircraft and site instrumentation used, the flight time necessary to meet all noise test requirements, and the amount of data processing. Ways are described to lessen the complexity of helicopter noise standards and to reduce the costs of compliance. (Author)
DE- <MAJOR> *CERTIFICATION; *AIRCRAFT NOISE; *HELICOPTERS; *CIVIL AVIATION
DE- TAKEOFF; AIRCRAFT INSTRUMENTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02175484
AN- <AEROSPACE> A95-22478
TI- Aerial cargo handling technology for advanced cargo rotorcraft
AU- Pettitt, L. K. (U.S. Army, Aviation Applied Technology Directorate, Fort Eustis, VA)
SO- In: European Rotorcraft Forum, 19th, Como, Italy, Sept. 14-16, 1993, Proceedings. Vol. 1 (A95-22426 05-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1993, p. D13-1 to D13-12.
PY- 1993
PD- 199300
RF- 2
LA- English
GL- United States
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- The role of Army cargo rotorcraft is expanding, requiring craft to (1) deliver high-priority cargo in support of scout, attack and assault helicopters, and (2) play a peacetime role in disaster and humanitarian relief efforts. The result is an increased need and expanded emphasis on expedient and efficient internal/external cargo operations. Future cargo rotorcraft system design must transport cargo in innovative ways. Attention is here given to integrating rotorcraft, aircrew and instrumentation into system design for safer and more efficient sling load operations, be they routine or in low visibility conditions. Also discussed are the changes necessary in rotorcraft cargo compartment design to facilitate acquisition and discharge of cargo loads, and the in-flight transition of internal loads to external loads (and vice versa). (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *CARGO AIRCRAFT; *AIR CARGO
DE- LANDING GEAR; HOVERING
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02175478
AN- <AEROSPACE> A95-22472
TI- Ergonomic analysis of helicopter cockpit geometry
AU- Makarkin, Andrej I.; Pelevin, Nikolaj D. (Mil Moscow Helicopter Plant, Russia)
SO- In: European Rotorcraft Forum, 19th, Como, Italy, Sept. 14-16, 1993, Proceedings. Vol. 1 (A95-22426 05-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1993, p. D6-1 to D6-12.
PY- 1993
PD- 199300
RF- 9
LA- English
GL- Russia
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- An account is given of a computerized ergonomic data base derived from

statistical data obtained by a survey of 2000 pilots, using the coordinate-measurement method. Attention is given to measurements of 560 pilots covering 67 anthropometric properties; a computer code was used that calculates histograms, as well as such distribution characteristics as averages, standard deviations, asymmetries, and excess coefficients. (AIAA)
DE- <MAJOR> *COCKPITS; *HUMAN FACTORS ENGINEERING; *HELICOPTERS
DE- AIRCRAFT PILOTS; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02175436
AN- <AEROSPACE> A95-22430
TI- The application of human engineering to advanced helicopter design
AU- Biggin, K. (Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: European Rotorcraft Forum, 19th, Como, Italy, Sept. 14-16, 1993, Proceedings. Vol. 1 (A95-22426 05-01), Amsterdam, Netherlands, National Aerospace Laboratory, 1993, p. A4-1 to A4-17.
PY- 1993
PD- 199300
RF- 3
LA- English
GL- United Kingdom
CP- Netherlands
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- A survey is presented of a major British helicopter manufacturer's current practices in the matter of human factors-related cockpit design, as exemplified in the case of the EH101 helicopter. Attention is given to the benefits of rapid prototyping, representative uses of developmental cockpit and mission simulators, and the value of crew workspace and operator performance modeling tools. Simulation results are subjected to decision and error analysis. (AIAA)
DE- <MAJOR> *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- SYSTEMS INTEGRATION; COMPUTERIZED SIMULATION; MAN MACHINE SYSTEMS;
HUMAN PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02175211
AN- <AEROSPACE> A95-22205
TI- An investigation of piloting strategies for engine failures during takeoff from offshore platforms
AU- Thomson, D. G.; Taylor, C. D. (Glasgow, Univ., United Kingdom); Talbot, N.; Ablett, R. (Civil Aviation Authority, Gatwick, United Kingdom); Bradley, R. (Glasgow Caledonian Univ., United Kingdom)
SO- Aeronautical Journal (ISSN 0001-9240), vol. 99, no. 981, Jan. 1995, p. 15-25.
PY- 1995
PD- 199501
RF- 11
SN- 0001-9240
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9505
AB- An analysis technique capable of simulating the effect of engine failure during takeoff from offshore platforms is presented. Use is made of inverse simulation whereby the control actions required for a subject helicopter to follow a particular trajectory can be established. A mathematical representation of the towering takeoff procedure, and details of the modified inverse simulation technique needed to cope with the modeling of an engine failure are described. Detailed piloting accounts of the strategy used to fly the towering takeoff (with and without engine failures) are also given and are used to give qualitative validation of the analytical approach. Simulation results for a single engine failure of a transport helicopter during critical phases of a towering takeoff are presented. Some directions for future work and potential applications of the technique are discussed. (Author)
DE- <MAJOR> *ENGINE FAILURE; *TAKEOFF; *OFFSHORE PLATFORMS; *HELICOPTER
CONTROL; *PILOT PERFORMANCE; *AIRCRAFT MANEUVERS
DE- HOVERING; COMPUTERIZED SIMULATION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02172845
AN- <AEROSPACE> A95-19839
TI- Techniques for comprehensive measurement of model helicopter rotor aerodynamics
AU- Lorber, Peter F.; Stauter, R. C.; Haas, Robert J.; Anderson, Torger J. (United Technologies Research Center, East Hartford, CT); Torok, Michael S.; Kohlhepp, Fred W. (Sikorsky Aircraft, Stratford, CT)

SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 2 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 797-814.
PY- 1994
PD- 199400
RF- 26
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- A wide selection of sophisticated experimental measurement techniques was recently applied to examine the aerodynamics of advanced design, Mach scaled helicopter main rotor models in a wind tunnel. Comprehensive measurements on a single rotor were made using three-dimensional smoke visualization to determine tip vortex geometries, laser velocimetry, particle image velocimetry to determine flow velocities, and pressure and hot film instrumented blades to measure airloads and boundary layer states. In addition, the effects of rotor geometry and flight condition on rotor stall were studied using minituft visualization and blade strain gauges. Finally, the interaction between the main rotor wake and the horizontal tail was quantified using unsteady pressure instrumentation, a traversing pressure probe, and shadowgraphy. This paper describes the experimental techniques used and provides sample results. (Author)
DE- <MAJOR> *ROTOR AERODYNAMICS; *ROTARY WINGS; *FLOW MEASUREMENT; *WIND TUNNEL MODELS; *HELICOPTER DESIGN
DE- FLOW VISUALIZATION; PARTICLE IMAGE VELOCIMETRY; LASER DOPPLER VELOCIMETERS; HOT-FILM ANEMOMETERS; HELICOPTER WAKES; ROTOR BODY INTERACTIONS; SMOKE; HELICOPTER TAIL ROTORS
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 02172828
AN- <AEROSPACE> A95-19822
TI- G force testing in the AH-64A Apache
AU- Peterson, Allen L. (U.S. Army, Aviation Technical Test Center, Fort Rucker, AL)
SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 1 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 597-600.
PY- 1994
PD- 199400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- The aims of this study were to define the range of G forces likely to confront the Army aviator during helicopter air combat maneuvering (ACM), define the cardiovascular effects of these forces, and enable USAARL to advise the Army how best to combat these forces. The test was conducted in a fully instrumented AH-64A helicopter with data being recorded on magnetic tape and transmitted via telemetry. Five test subjects were instrumented for physiological parameters and flown through essentially identical G profiles. The preliminary test results indicated that the G forces encountered in the helicopter did adversely affect the aviator's cardiovascular systems and that the L-1 antiG straining maneuver (AGSM) effectively combatted these effects. The likely G envelope of the AH-64A was identified and several lessons learned for future testing were noted. (Author)
DE- <MAJOR> *ACCELERATION STRESSES (PHYSIOLOGY); *AH-64 HELICOPTER; *CARDIOVASCULAR SYSTEM
DE- AIRCRAFT MANEUVERS; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02172826
AN- <AEROSPACE> A95-19820
TI- Flight testing the UH-60A airloads aircraft
AU- Kufeld, Robert M.; Balough, Dwight L.; Cross, Jeffrey L.; Studebaker, Karen F.; Jennison, Christopher D. (NASA, Ames Research Center, Moffett Field, CA); Bousman, William G. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 1 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 557-578.
PY- 1994
PD- 199400
RF- 40
LA- English
GL- United States
CP- United States

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- An overview is given of the NASA/Army UII-60A Airloads Program and its accomplishments. The rotor and aircraft instrumentation are described along with the onboard data acquisition system. Data processing steps taken to move from flight tapes to the electronic database are addressed along with some database features. Examples of data validation checks are given along with sample results. (AIAA)
DE- <MAJOR> *FLIGHT TESTS; *UH-60A HELICOPTER; *AERODYNAMIC LOADS; *DATA ACQUISITION
DE- TRANSDUCERS; ROTOR BLADES (TURBOMACHINERY); BLADE-VORTEX INTERACTION; AIRCRAFT MANEUVERS; DYNAMIC RESPONSE; FLIGHT CONDITIONS; WIND TUNNEL TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02172793
AN- <AEROSPACE> A95-19787
TI- Cognitive factors in helicopter low-level navigation - An overview of the research
AU- Wickens, Christopher D. (Illinois, Univ., Savoy); Battiste, Vernol (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 1 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 139-146.
PY- 1994
PD- 199400
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- A set of seven experiments are described that examine cognitive factors involved in low level navigation, and how these factors are influenced by electronic map display design. In the first four experiments, issues of map rotation are addressed. In addition to their technical costs in graphics requirements, rotating maps also provide the pilot with an inconsistent representation of the terrain, which may hinder the performance of certain map location tasks. However rotating maps also provide a congruence between the map depictions and the forward field of view and control action while on southerly headings. This congruence is missing from fixed (north up maps). Our results suggest that the benefits of map rotation are indeed task-dependent, and that both visual momentum principles and workload sharing by a second crew member may offset the navigational costs of fixed maps. We examine the feasibility of 3D (perspective) maps and methods of flight rehearsal. (Author)
DE- <MAJOR> *AIR NAVIGATION; *HELICOPTERS; *COGNITION; *HUMAN FACTORS ENGINEERING; *ELECTRONIC EQUIPMENT
DE- MAPS; DISPLAY DEVICES; COMPUTER GRAPHICS; PILOT TRAINING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02172792
AN- <AEROSPACE> A95-19786
TI- Ergonomic design of helicopter controls geometry using the criterion of pilot comfortable working posture
AU- Makarkin, A. I.; Pelevin, N. D. (MIL Moscow Helicopter Plant, Russia)
SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 1 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 129-138.
PY- 1994
PD- 199400
RF- 9
LA- English
GL- Russia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- Joint angles with minimally strained muscles acting in opposite directions are called 'equitonometric' in biophysics, but have for ergonomic-design purposes been designated 'comfortable angles'. An account is given of the systematic employment of confortable-angles criteria in the ergonomic design of a helicopter cockpit's control systems. Attention is given to the computational algorithms and graphic representation menthods employed, as well as to the results of design analyses conducted on the basis of these methods. (AIAA)
DE- <MAJOR> *HELICOPTER DESIGN; *CONTROL SYSTEMS DESIGN; *AIRCRAFT PILOTS; *COCKPITS; *HUMAN FACTORS ENGINEERING
DE- ALGORITHMS; DESIGN ANALYSIS; ELLIPSOIDS; FLIGHT CREWS

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02172784
AN- <AEROSPACE> A95-19778
TI- The use of virtual prototyping in Longbow and RPA
TI- <EXTENSION> Rotorcraft Pilots Associate
AU- Allen, Daniel M. (McDonnell Douglas Helicopter Systems, Mesa, AZ)
SO- In: AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vol. 1 (A95-19776 04-01), Alexandria, VA, American Helicopter Society, 1994, p. 13-16.
PY- 1994
PD- 199400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9504
AB- The Longbow Apache and Rotorcraft Pilots Associate programs make extensive use of rapid, virtual cockpit prototyping. These programs, now underway at McDonnell Douglas Helicopter Systems, use virtual prototypes of the crew station to refine the cockpit information management strategies used on these 'glass cockpits' of the future. (Author)
DE- <MAJOR> *ROTORCRAFT AIRCRAFT; *COCKPITS; *AIRCRAFT PILOTS; *HUMAN FACTORS ENGINEERING; *AIRCRAFT DESIGN
DE- MCDONNELL DOUGLAS AIRCRAFT; FLIGHT CREWS; INFORMATION MANAGEMENT; DESIGN ANALYSIS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02172782
AN- <AEROSPACE> A95-19776
TI- AHS, Annual Forum, 50th, Washington, DC, May 11-13, 1994, Proceedings. Vols. 1 & 2
SO- Alexandria, VA, American Helicopter Society, 1994. (For individual items see A95-19777, A95-19778, A95-19780 to A95-19862, A95-19864 to A95-19883).
PY- 1994
PD- 199400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9504
AB- The present conference discusses topics in the fields of virtual prototyping and distributed interactive simulation for helicopters, rotorcraft acoustics, aspects of helicopter cockpit human factors design, helicopter manufacturing quality and product assurance methods, and helicopter configuration design. Also discussed are topics concerning rotary wing dynamics, helicopter propulsion systems and drivetrains, helicopter crash safety factors, helicopter test and evaluation techniques, product support, and the development status of Japanese helicopter technologies. (AIAA)
DE- <MAJOR> *HELICOPTER DESIGN; *AEROACOUSTICS; *HUMAN FACTORS ENGINEERING; *PRODUCT DEVELOPMENT; *AIRCRAFT DESIGN; *PROPULSION SYSTEM PERFORMANCE; *AIRCRAFT SAFETY; *CONFERENCES
DE- MANUFACTURING; FLIGHT SIMULATION; PERFORMANCE PREDICTION; ROTORCRAFT AIRCRAFT; TURBOMACHINE BLADES; ROTOR AERODYNAMICS; TILT ROTOR AIRCRAFT; INTERACTIONAL AERODYNAMICS; BLADE-VORTEX INTERACTION; FLIGHT CREWS; MILITARY HELICOPTERS; V-22 AIRCRAFT; DESIGN ANALYSIS; CRASHWORTHINESS; AERODYNAMIC CHARACTERISTICS; VIBRATION DAMPING; AEROELASTICITY; FLIGHT TESTS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02170913
AN- <AEROSPACE> A94-28778
TI- A simulator study about effects of visibility upon helicopter pilot performance
AU- Funabiki, Kohei; Tanaka, Keiji; Kawahara, Hiroyasu; Wakairo, Kaoru; Watanabe, Akira (National Aerospace Lab., Chofu, Japan)
SO- In: Aircraft Symposium, 30th, Tsukuba, Japan, Sept. 30-Oct. 2, 1992, Proceedings (A94-28718 09-01), Tokyo, Japan Society for Aeronautical and Space Sciences, 1992, p. 430-433.
PY- 1992
PD- 199200
RF- 7

LA- English
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9409
AB- A flight simulation was conducted to investigate the effect of visibility on helicopter pilot performance by analyzing flight and control variables as well as eye point movements. Visibility change had a significant effect on lateral cyclic control. Pilots maintained attitude not by using outside visual cues but by using the attitude indicators on the instrument panel under low visibility conditions. (AIAA)
DE- <MAJOR> *PILOT PERFORMANCE; *VISIBILITY; *FLIGHT SIMULATORS; *HELICOPTER CONTROL
DE- BO-105 HELICOPTER; MATHEMATICAL MODELS; FLIGHT TESTS; DATA ACQUISITION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02170912
AN- <AEROSPACE> A94-28777
TI- Functions of NAL fixed base simulator for helicopter research
AU- Watanabe, Akira; Wakairo, Kaoru; Kawahara, Hiroyasu; Tanaka, Keiji; Funabiki, Kohei (National Aerospace Lab., Chofu, Japan)
SO- In: Aircraft Symposium, 30th, Tsukuba, Japan, Sept. 30-Oct. 2, 1992, Proceedings (A94-28718 09-01), Tokyo, Japan Society for Aeronautical and Space Sciences, 1992, p. 426-429.
PY- 1992
PD- 199200
RF- 5
LA- English
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9409
AB- A new and simple flight simulator has been constructed to investigate the effects of visual cues and visibility effects on helicopter pilot performance. The main components of the simulator are a real helicopter cabin, two large screens, and a fixed base cockpit. The simulator functions were evaluated by seven helicopter pilots, and the results are reported. (AIAA)
DE- <MAJOR> *FLIGHT SIMULATORS; *COCKPIT SIMULATORS; *HELICOPTERS; *PILOT PERFORMANCE; *VISUAL SIGNALS
DE- SYSTEMS ANALYSIS; AIRCRAFT COMPARTMENTS; CONTROL EQUIPMENT; SOUND GENERATORS; SYSTEM EFFECTIVENESS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02168796
AN- <AEROSPACE> N94-37742
TI- Night vision goggles in Emergency Medical Service (EMS) helicopters
TI- <SUPPLEMENT> Final Report
AU- SAMPSON, WILLIAM T.; SIMPSON, GARY B.; GREEN, DAVID L.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> S9210736
PY- 1994
PD- 199407
PG- 90P.
CN- DTFA01-87-C-00014
RN- SCT-93RR-22; DOT/FAA/RD-94/21
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR9412
AB- This document addresses the potential use of night vision goggles (NVG's) by the emergency medical service (EMS) industry. Key issues analyzed are the night environment, physiology of the eye, characteristics of night vision devices, maintenance of the NVG, and night operations. Pilots from the government and EMS industry participated in a flight program at the FAA Technical Center to assess the capabilities and utility of NVG's in EMS scenarios. The results of the tests are incorporated in the recommendations of this document. Information produced by other government agencies, with extensive experience with NVG's, was reviewed for use in this application and incorporated into the text. This investigation concludes that NVG's are a viable tool during en route and terminal operations during certain EMS scenarios. The NVG, when properly used, can increase safety, enhance situational awareness, and reduce pilot workload and stress normally associated with night operations. (Author)

DE- <MAJOR> *FLIGHT OPERATIONS; *FLIGHT SAFETY; *GOGGLES; *HELICOPTERS;
*MEDICAL SERVICES; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION; *VISUAL CONTROL
DE- EYE (ANATOMY); HUMAN FACTORS ENGINEERING; STRESS (PHYSIOLOGY); WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <AEROSPACE> N94-37604
TI- Composite helicopter accident profiles: Deficient crew/aircraft performance
AU- GREEN, DAVID L.
CS- Starmark Corp., Arlington, VA.
CS- <CODE> S0527066
PY- 1994
PD- 199407
PG- 115P.
NT- Prepared for Systems Control Technology, Inc., Arlington, VA
CN- DTFA01-87-C-00014
RN- AD-A283551; SCT-90RR-46; DOT/FAA/RD-94/22
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A06/MF A02
JA- STAR9412
AB- The purpose of this report is twofold. First, the unique characteristics of a wide variety of helicopter operations which ended in a collision with terrain features or man-made obstructions were analyzed. Special emphasis was given to operations during difficult visual conditions. Second, this report provides the reader with systematic insights into the affiliated technical and operational aspects of helicopter flight operations which contributed to this category of accident. The report explores the way helicopters are flown in the low airspace and employs composite accident summaries as points of departure to both illustrate and substantiate the analysis which in turn identifies opportunities for improved flight safety and productivity in the National Airspace System (NAS). The included analysis deals with a series of rotorcraft accidents involving terrain and obstruction strikes. The common characteristics of these accidents support the need for specific changes. Each composite accident is illustrated and treated to an analysis which often allows the reader to focus on one characteristic in isolation. The summaries of these composite accidents and supporting analysis are included in the report to provide a common information base for the FAA analysts and industry engineers to support the need for additional equipment, new procedures, new products, additional training, and regulatory change. This technical report contains pertinent data and testing/guidance material needed to support those elements of the agency charged with performance of regulatory actions and the development of advisory materials and standards. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *COLLISION AVOIDANCE; *CRASHES; *FLIGHT
OPERATIONS; *FLIGHT SAFETY; *HELICOPTERS; *PILOT PERFORMANCE; *VISIBILITY
DE- NATIONAL AIRSPACE SYSTEM; NIGHT FLIGHTS (AIRCRAFT); TAKEOFF; TRANSMISSION LINES
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02166192
AN- <AEROSPACE> A95-18502
TI- Factors related to pilot survival in helicopter commuter and air taxi crashes
AU- Krebs, Matthew B. (USAF, School of Aerospace Medicine, Brooks AFB, TX); Li, Guohua; Baker, Susan P. (Johns Hopkins Univ., Baltimore, MD)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 66, no. 2, Feb. 1995, p. 99-103.
PY- 1995
PD- 199502
RF- 14
SN- 0095-6562
CN- PHS-R49-CCR-302486-06; DTFA01-90-C-00046
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9503
AB- We examined factors related to pilot survival in 167 consecutive helicopter commuter and air taxi crashes that occurred during 1983-88. Case fatality rates and adjusted odds ratios from multivariate logistic regression models were determined using data from the National Transportation Safety Board (NTSB). During this period, 29 pilots-in-command died in 167 helicopter commuter and air taxi crashes, a case fatality rate of 17.4 pct. Factors significantly associated with

increased risk of pilot fatality were aircraft fire (odds ratio (OR) 20.0, 95 pct confidence interval (CI) 4.6-86.8), not using shoulder harnesses (OR 9.2, 95 pct CI 2.2-37.3), and aircraft with two engines (OR 4.8, 95 pct CI 1.3-17.4). In addition, we present data regarding success and failure of emergency flotation devices. The results suggest that the likelihood of pilot survival in helicopter crashes could be greatly improved by preventing crash associated fires and promoting the usage of shoulder restraints. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *AIRCRAFT ACCIDENTS; *HELICOPTER CONTROL;
*AIR TRANSPORTATION; *EJECTION INJURIES
DE- HUMAN FACTORS ENGINEERING; TAXIING; STANDARD DEVIATION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02162963
AN- <AEROSPACE> N94-33875
TI- Operational agility
TI- <ORIGINAL> La maniabilite operationnelle
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Mechanics Panel.
CS- <CODE> AD455458
PY- 1994
PD- 199404
PG- 222P.
RN- AGARD-AR-314; ISBN-92-835-0743-6
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A10/MF A03
JA- STAR9410
AB- From previous AGARD activities, it was recognized that flying qualities and traditional aircraft performance parameters did not characterize the capability or effectiveness of combat aircraft, although they do offer a guide. Other expert groups had reached a similar conclusion. The subject that arose from these realizations was 'agility'. Recognizing that this was an incomplete or immature concept and that a wide variety of sometimes disparate views existed, the Flight Mechanics Panel formed a further Working Group, WG 19, consisting of specialists from AGARD member countries, to study the subject under the title of 'Operational Agility'. Working sessions were held at places of special interest to the group, between 1991 and 1993. The specific aims of the Working Group were to provide definitions, which are universally acceptable, of the terminologies involved in agility; to collate the results of lessons learned from experiments on agility; to define metrics or figures of merit for use in design and evaluation; to explore and document the theoretical foundations; to explore the operational pay-off of balanced capabilities between the airframe, systems and weapons; to highlight any specialized aspects applicable to rotorcraft; to indicate possible means of evaluation in flight; and to recommend areas for further research and development activities, including possible collaborative projects. The Group has completed its study of operational agility with this report. In undertaking the study, a greater understanding has been reached of those subjects which influence operational agility and how these subjects, via the use of operational agility concepts, may be related to the combat effectiveness of the weapon systems. In reaching this understanding, the Group has proposed definitions of the agility terminology which should prove universally acceptable; it has arrived at the methodology for assessment of the various component systems which contribute to the operational agility or combat effectiveness of a Weapon System; and has listed a number of major conclusions and recommendations. (Author)
DE- <MAJOR> *AIRCRAFT MANEUVERS; *AIRCRAFT PERFORMANCE; *FIGHTER AIRCRAFT;
*FLIGHT CHARACTERISTICS; *FLIGHT CONTROL; *FLIGHT MECHANICS; *SYSTEM
EFFECTIVENESS; *WEAPON SYSTEMS
DE- ACTIVE CONTROL; AIRFRAMES; COMBAT; FLIGHT OPERATIONS; HELICOPTERS;
PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02154708
AN- <AEROSPACE> A95-13206
TI- Accident investigation - Training to avoid rushing the judgment
AU- Komich, J. N. (Flight Safety Inst., Sacramento, CA)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 1035-1038.
PY- 1993
PD- 199300
LA- English
GL- United States
CP- United States

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- A survey is conducted of relevant aviation accidents to identify circumstances in which a lapse from objectivity has led to premature judgment of critical issues. Paradigmatic instances of such lapses are derived from Mark Lane's 'A Rush to Judgment', concerning the Kennedy assassination, and the film 'Twelve Angry Men'. (AIAA)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *INVESTIGATION; *EDUCATION; *HUMAN FACTORS ENGINEERING
DE- HELICOPTERS; FLIGHT SAFETY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02154703
AN- <AEROSPACE> A95-13201
TI- Emergency Medical Service (EMS) - A unique flight environment
AU- Shivley, R. J. (U.S. Army; NASA, Ames Research Center, Moffett Field, CA)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 1016-1019.
PY- 1993
PD- 199300
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- The Safety Assessment for Flight Evacuation (SAFE) system has been developed in order to improve the operational safety of EMS helicopters. SAFE is a computer-based system that allows the interaction of many operational factors to be considered through the complex relationships of the if/then conditional statements making up its data base. SAFE also conducts automated data collection for the pilot. (AIAA)
DE- <MAJOR> *EMERGENCIES; *MEDICAL SERVICES; *PILOT PERFORMANCE; *AIRCRAFT ACCIDENTS
DE- RISK; DISPLAY DEVICES; HELICOPTERS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02154701
AN- <AEROSPACE> A95-13199
TI- EMS helicopter incidents reported to the NASA Aviation Safety Reporting System
AU- Connell, Linda J.; Reynard, William D. (NASA, Ames Research Center, Moffett Field, CA)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 1001-1008.
PY- 1993
PD- 199300
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- NASA's ASRS possesses the world's largest data base on aviation incidents and is accordingly an important basis for an alternative perspective on flight safety concerning events that did not result in accidents. The ASRS data base is here interrogated for incidents associated with Emergency Medical Service helicopters; attention is given to 81 reports of incidents that occurred in 1986-1991, in order to ascertain the weather, airspace, flight phase, etc., conditions associated with these incidents, and determine the contribution of human factors to the incident. (AIAA)
DE- <MAJOR> *HELICOPTERS; *EMERGENCIES; *NASA PROGRAMS
DE- FLIGHT SAFETY; HUMAN FACTORS ENGINEERING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02154670
AN- <AEROSPACE> A95-13168
TI- Navigational demands of low-level helicopter flight
AU- Delzell, Susanne (San Jose State Univ., CA); Battiste, Vernol (NASA, Ames Research Center, Moffett Field, CA)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 838-842.
PY- 1993
PD- 199300

RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- The present study was designed to assess the verbal references to map, terrain, direction, and position, that navigators and pilots communicate during a simulated low-level flight. Two-person crews were asked to communicate normally while negotiating six short flight missions that varied widely in regard to map-terrain characteristics. Half of the crews performed the exercises with fixed north-up maps, and the other half used movable maps that were adjusted to maintain a track-up correspondence to the flight route. An analysis was performed to compare differences in crew communication patterns between map orientations, characteristics, and navigation tasks. The results showed differences in the frequency of communication across categories for map characteristics but not for map orientations or tasks. A difference in the proportion of communications between pilot and navigator occurred when crews were lost. Pilots communicated more than navigators when crews were lost, and the reverse was true when crews were not lost. (Author)
DE- <MAJOR> *NAP-OF-THE-EARTH NAVIGATION; *MILITARY HELICOPTERS; *FLIGHT SIMULATION
DE- PILOT PERFORMANCE; COMMUNICATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02154656
AN- <AEROSPACE> A95-13154
TI- A PC-based system to enhance development of scenarios - ASCEND (Analysis of SCENario Demands) system
AU- Oser, Randall L.; Mazzara, Maria (U.S. Navy, Naval Training Systems Center, Orlando, FL)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 766-769.
PY- 1993
PD- 199300
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- The ASCEND system's development history and performance goals are described. Attention is given to an investigation of the degree to which the system may be able to furnish an effective platform for scenario evaluation, and the preliminary reaction to the system from experts on the subject matter treated by it. An account is given of a planned validation effort for the system, with a view to its various potential applications. (AIAA)
DE- <MAJOR> *PERSONAL COMPUTERS; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *SCENE ANALYSIS
DE- COCKPITS; HELICOPTERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02154627
AN- <AEROSPACE> A95-13125
TI- Strategies for Army helicopter pilots during rapid transitions to nocturnal work schedules
AU- Comperatore, Carlos A.; Pearson, Jacquelyn Y.; Chiaramonte, James A.; Stone, Lewis W. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL) ; Boley, Kenneth O.; Hess, Gerald L. (U.S. Army, Eastern Army National Guard Aviation Training Site, Fort Indiantown Gap, PA)
SO- In: International Symposium on Aviation Psychology, 7th, Columbus, OH, Apr. 26-29, 1993, Proceedings. Vol. 2 (A95-13001 02-53), Columbus, OH, Ohio State Univ., 1993, p. 634-638.
PY- 1993
PD- 199300
RF- 4
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9502
AB- The present study of helicopter pilot students' transitions to nocturnal work schedules has uncovered two patterns of bedtimes and rise times during the night-vision goggle training period. The first pattern, associated with instructors, involved a consistent delay in bed times after night flights without a consistent delay in rise time on the following morning. The second pattern, associated with students,

involved a delay of rise times after night flights. (AIAA)
DE- <MAJOR> *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *PILOT PERFORMANCE
DE- REST; ACTIVITY (BIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02152993
AN- <AEROSPACE> A95-11491
TI- Achieving level 1 flying qualities at the helicopter/ship dynamic interface - First experience using the DRA Advanced Flight Simulator
AU- Tate, S. J.; Padfield, G. D. (Defence Research Agency, Bedford, United Kingdom)
SO- In: Rotorcraft simulation; Proceedings of the Conference, London, United Kingdom, May 18, 19, 1994 (A95-11482 01-05), London, Royal Aeronautical Society, 1994, p. 9.1-9.19.
PY- 1994
PD- 199400
RF- 10
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9501
AB- The combination of visual/motion cueing and vehicle/environment modeling problems makes the helicopter/ship dynamic interface one of most challenging in the simulation of aerospace vehicles. Over the last few years a collaborative effort has been directed towards the definition of fidelity levels required for various dynamic interface applications. We report on a UK activity within this collaboration that uses simulation to define the desirable flying qualities for future maritime helicopters. This first-of-a-kind trial on the U.K. Defense Research Agency's Advanced Flight Simulator, to establish a baseline set of data for rate response, or conventional helicopter response types. Key areas examined were roll, pitch and heave response characteristics of a large helicopter recovering to a small ship in various sea states. We describe the simulation set up, the trials, and the main results, with special attention to simulation fidelity issues. (Author)
DE- <MAJOR> *MILITARY HELICOPTERS; *AIRCRAFT CARRIERS; *FLIGHT SIMULATION; *MAN-COMPUTER INTERFACE
DE- ARCHITECTURE (COMPUTERS); MOTION SIMULATION; PILOT PERFORMANCE; MILITARY OPERATIONS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02152992
AN- <AEROSPACE> A95-11490
TI- The development of helicopter pilot models to control engineering simulations
AU- Hamm, Jonathan (Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: Rotorcraft simulation; Proceedings of the Conference, London, United Kingdom, May 18, 19, 1994 (A95-11482 01-05), London, Royal Aeronautical Society, 1994, p. 8.1-8.10.
PY- 1994
PD- 199400
RF- 5
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9501
AB- The HELMSMAN pilot model that has been devised for a Coupled Rotor-Fuselage Model (CRFM) mimics the mental and physical processes of a helicopter pilot. Logic switches are used to change piloting goals either as a maneuver develops or in response to such unexpected circumstances as engine failure. The CRFM has been correlated for steady flight; the maneuvering-flight version will soon be completed. The pilot model has been used to control Lynx and EH101 helicopter simulations. (AIAA)
DE- <MAJOR> *ROTARY WING AIRCRAFT; *SYSTEMS SIMULATION; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- COMPUTERIZED SIMULATION; FLIGHT PATHS; DYNAMIC CHARACTERISTICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02151491
AN- <AEROSPACE> A94-37064
TI- A flight simulation study of visual cues for helicopter piloting
AU- Funabiki, Kohei; Kawahara, Hiroyasu; Tanaka, Keiji; Wakairo, Kaoru; Watanabe, Akira (National Aerospace Lab., Tokyo, Japan)
SO- In: Aircraft Symposium, 31st, Gifu, Japan, Nov. 10-12, 1993, Proceedings (A94-36967 12-01), Tokyo, Japan Society for Aeronautical and Space Sciences, 1993, p. 644-647. In Japanese.
PY- 1993

PD- 199300
RF- 2
LA- Japanese
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9412
AB- A flight simulation to investigate the role of visual cues for helicopter piloting was carried out. One part of the flight simulation was conducted to quantify the relationship between visibility and helicopter pilot performance, by varying the visibility of visual scene and stability of the aircraft, respectively. Results of the simulation revealed that, in order to maintain performance as good as the visibility, the pilots required 800 m of visibility at 300 m of altitude in this simulation setup. In another part of the simulation, in order to investigate effects of the ground texture upon control performance and pilot eye movements, ground objects, such as trees and roads, were varied as parameters for visual cues. (Author)
DE- <MAJOR> *FLIGHT SIMULATION; *HELICOPTERS; *AIRCRAFT PILOTS; *VISUAL FLIGHT
DE- PILOT PERFORMANCE; VISIBILITY; AIRCRAFT STABILITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02147392
AN- <AEROSPACE> A94-32965
TI- Visual effectiveness of different areas on the simulated instrument board of military helicopters
AU- Ding, Yaping; Liu, Baoshan; Cao, Buping (Chinese Air Force, Inst. of Aviation Medicine, Beijing, China)
SO- Chinese Journal of Aviation Medicine (ISSN 1001-6589), vol. 5, no. 2, June 1994, p. 108-111. In Chinese.
PY- 1994
PD- 199406
RF- 2
SN- 1001-6589
LA- Chinese
GL- China
CP- China
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9411
AB- In an experiment to determine the effectiveness of different areas on the simulated instrument board of military helicopters, the sizes of the boards and visual distances (the distance between the pilot's eye and the central point of the board) were measured. To study the visual effectiveness of the different areas, simulated needle dials without digits were used as visual targets. Ninety-six helicopter pilots were asked to differentiate between 'signal' or 'noise' depending on the direction of the needle, and the reaction time (RT) was recorded. The visual effectiveness of different areas according to the RT were compared using a Duncan test, and the simulated instrument board was divided into three parts: best visual area, next-best visual area, and basic visual area. (AIAA)
DE- <MAJOR> *VISUAL STIMULI; *MILITARY HELICOPTERS; *AIRCRAFT INSTRUMENTS
DE- COCKPITS; AIRCRAFT PILOTS; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02144845
AN- <AEROSPACE> A94-30418
TI- Helicopter in-flight simulation development and use in test pilot training
AU- Miller, R. V.; Khinoo, L. A. (U.S. Navy, Naval Air Warfare Center, Patuxent River, MD)
SO- In: AIAA, Flight Simulation Technologies Conference, Scottsdale, AZ, Aug. 1-3, 1994, Collection of Technical Papers (A94-30386 13-01), Washington, DC, American Institute of Aeronautics and Astronautics, 1994, p. 264-277.
PY- 1994
PD- 199400
RF- 7
RN- AIAA Paper 94-3433
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9410
AB- The development of a Variable Stability and Control (VCS) system installed in an SH-60B helicopter as a specialized training aid is described. The discussion covers in-flight simulation via a VSC system, VSC operating modes, test aircraft description, instrumentation, and VSC implementation. Attention is also given to the VSC system reliability, VSC flight exercises, test results, and future developments. (AIAA)

DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTERS; *FLIGHT SIMULATION; *PILOT TRAINING
DE- AIRFRAMES; FLIGHT TESTS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02144678
AN- <AEROSPACE> A94-30251
TI- Meeting the challenge of innovative design and enhanced productivity
AU- Peake, David J.; Walkley, Kenneth B. (Dynamic Engineering, Inc., Newport News, VA)
SO- AIAA, Aerospace Ground Testing Conference, 18th, Colorado Springs, CO, June 20-23, 1994, 16 p..
PY- 1994
PD- 199406
RN- AIAA Paper 94-2555
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9410
AB- Innovative approaches to challenges of design and manufacture of aerospace wind tunnel model systems are discussed. Emphasis is placed on flutter model systems technology, structure and materials, remote systems, instrumentation, improvements in fixed wing model design and fabrication techniques, and a full-scale spinning missile model with active canard control. Road test standards and hardware and innovative helicopter rotor systems are also discussed. (AIAA)
DE- <MAJOR> *AIRCRAFT PRODUCTION; *WIND TUNNEL MODELS; *AERODYNAMIC CHARACTERISTICS; *AIRCRAFT DESIGN
DE- RESEARCH AND DEVELOPMENT; PRODUCTION COSTS; FIXED WINGS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02144420
AN- <AEROSPACE> A94-29993
TI- Use of a laboratory tilt rotor aircraft to develop practical knowledge of flying qualities issues
AU- Doman, David B. (USAF, Wright Lab., Wright-Patterson AFB, OH); Andrisani, D., II (Purdue Univ., West Lafayette, IN)
SO- In: AIAA Guidance, Navigation and Control Conference, Scottsdale, AZ, Aug. 1-3, 1994, Technical Papers. Pt. 1 (A94-29961 10-63), Washington, DC, American Institute of Aeronautics and Astronautics, 1994, p. 290-298.
PY- 1994
PD- 199400
RF- 6
RN- AIAA Paper 94-3696
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9410
AB- A laboratory tilt rotor aircraft was designed and built for the purpose of experimentally investigating the relationships between human pilot behavior, display, and aircraft response types. The pedagogic value of this device for students of control and man-machine systems is elucidated. Pilot and pilot-vehicle describing functions are obtained from time histories of dynamic tracking tasks where the pilot attempts to track a random appearing input. Correlations between Cooper-Harper ratings and quantitative descriptions of pilot behavior are made. A product rule is developed which describes the handling qualities degradation which occurred when switching form single to multiaxis tracking tasks. Experimental results compare favorably to the classical theory of man-machine system dynamics, which is based on the crossover model. It is inferred that desirable controlled elements in man-machine systems have the characteristics of a simple tracker. (Author)
DE- <MAJOR> *TILT ROTOR AIRCRAFT; *PILOT PERFORMANCE; *FLIGHT CHARACTERISTICS
DE- FEEDBACK CONTROL; FREQUENCY RESPONSE; YAW
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02144270
AN- <AEROSPACE> A94-28036
TI- Display systems; Proceedings of the Meeting, Munich, Germany, June 23, 24, 1993
AU- Bartlett, Christopher T. (GEC-Marconi Avionics, Ltd., Rochester, United Kingdom); Cowan, Matthew D. (Kermis Group, Ltd., Canada), EDS.
SO- Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1993, 257 p..
PY- 1993
PD- 199300
RN- SPIE-1988; ISBN 0-8194-1237-6
LA- English

GL- United Kingdom
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9408
AB- These proceedings discuss high-resolution and large-screen displays (including three-dimensional systems and imaging devices) and helmet, head-up, and head-down displays, with particular consideration given to human factors and systems issues, display technologies, and helmet-mounted displays. Papers are presented on an analysis of 3-D TV systems, a light valve for high-performance video projection, the cockpit display requirements and specifications, the effect of vibration on the readability of an electronic flight instrument display, a high resolution ferroelectric liquid crystal display, and a second-generation holographic head-up display. Attention is also given to operational requirements and technical approach to helmet-mounted displays for rotary-wing aircraft, a 24-hour helmet-mounted display, a visor-projected display using a spherical combiner, field hysteresis of the cholesteric-nematic phase transition in LCDs, and advanced LCD enhancement technology for improved display performance. (Author)
DE- <MAJOR> *CONFERENCES; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS
DE- IMAGING TECHNIQUES; HIGH RESOLUTION; HELMETS; HEAD-UP DISPLAYS; HEAD DOWN TILT; TELEVISION SYSTEMS; COCKPITS; LIQUID CRYSTALS; VISORS; VIBRATION EFFECTS; IMAGE RESOLUTION; TECHNOLOGICAL FORECASTING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02133651
AN- <AEROSPACE> A94-24765
TI- The on-board monitoring system of the MTR390 engine
AU- Richter, Klaus (Motoren- und Turbinen-Union Muenchen GmbH, Munich, Germany)
SO- In: Symposium on Aircraft Integrated Monitoring Systems, 17th, Bonn, Germany, Sept. 21-23, 1993, Proceedings (A94-24751 06-06), Cologne, Germany, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt (DLR-Mitteilungen, No. 94-01), 1994, p. 259-279.
PY- 1994
PD- 199400
RF- 7
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9406
AB- The capability of the MTR390 Engine Control and Monitoring Unit to provide a range of functions for performing diagnoses of engine condition (engine performance check, limit excedance monitoring, and service life monitoring) is examined. The engine performance check is shown to require a longer period and a greater number of flights for analysis. For limit exceedance monitoring, the occurrence of a high-priority maintenance request is to be messaged to the flight crew, since it affects the mission: only a single or even no engine restart is permitted. An approved and very accurate life monitoring which meets customers' requirements for long-term engine use has been applied to the MTR390. It is shown that damage increments vary individually for each monitored area as a function of mission type. (AIAA)
DE- <MAJOR> *HELICOPTER ENGINES; *ENGINE MONITORING INSTRUMENTS; *ENGINE PARTS; *TEMPERATURE MEASURING INSTRUMENTS; *VELOCITY MEASUREMENT
DE- AIRCRAFT PERFORMANCE; HELICOPTERS; TORQUE; SERVICE LIFE; DISPLAY DEVICES; TURBOSHAFTS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02132646
AN- <AEROSPACE> A94-23760
TI- Flying with dichoptic displays - The interplay between display characteristics and attention control
AU- Gopher, Daniel; Kimchi, Ruth; Seagull, F. J.; Catz, Irit; Trainin, Ori (Technion - Israel Inst. of Technology, Haifa)
SO- In: Human Factors Society, Annual Meeting, 36th, Atlanta, GA, Oct. 12-16, 1992, Proceedings. Vol. 2 (A94-23706 06-54), Santa Monica, CA, Human Factors Society, 1992, p. 1469-1473.
PY- 1992
PD- 199200
RF- 7
LA- English
GL- Israel
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9406
AB- Two experiments were conducted to investigate the concurrent performance of a tracking task and letter classification under dichoptic display conditions. Subjects were required to fly a simulated helicopter path while classifying letter pairs presented

intermittently. Instructions in Experiment A specifically emphasized a 2D interpretation of the visual field. Under these instructions, the presentation of a common visual axis to the two eyes provided by the flight-tunnel did not aid subjects, and their performance deteriorated in dichoptic conditions. In Experiment B, the instructions to subjects were changed to advocate a 3D interpretation of the display. Under these instructions, dichoptic performance-levels were substantially improved when the tunnel was present. These results imply that the presence of a common visual axis is not automatically beneficial. To improve performance, attention should be directed to utilize information supporting a 3D frame of mind. (Author)
DE- <MAJOR> *HELMET MOUNTED DISPLAYS; *NIGHT VISION; *VISUAL TASKS; *PILOT PERFORMANCE
DE- DISPLAY DEVICES; ATTENTION; VISUAL PERCEPTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02132429
AN- <AEROSPACE> A94-23543
TI- Computer architectures for a real-time passive ranging algorithm
TI- <EXTENSION> for rotorcraft aircraft
AU- Sridhar, Banavar; Suorsa, Raymond E. (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AIAA/IEEE Digital Avionics Systems Conference, 12th, Fort Worth, TX, Oct. 25-28, 1993, Proceedings (A94-23499 06-01), New York, Institute of Electrical and Electronics Engineers, Inc., 1993, p. 292-297.
PY- 1993
PD- 199300
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9406
AB- A passive-ranging algorithm extracts obstacle information from imagery at rates that vary from 5 to 30 frames/sec, depending on the speed of the helicopter bearing the electrooptical sensor that the algorithm processes; currently, real-time data and computational requirements for such an algorithm are beyond the capability of off-the-shelf signal processors. Attention is here given to the computational requirements of such an algorithm, and to the evaluation results obtained for four different parallel-processing architectures capable of real-time operation. (AIAA)
DE- <MAJOR> *ARCHITECTURE (COMPUTERS); *REAL TIME OPERATION; *HELICOPTER CONTROL; *AIRBORNE/SPACEBORNE COMPUTERS
DE- PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY); DISTRIBUTED PROCESSING ; PARALLEL PROCESSING (COMPUTERS)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02128954
AN- <AEROSPACE> A94-20068
TI- Downwash design criteria for VTOL aircraft
AU- Stanzione, Kaydon A.; Oliver, Lendell L. (Praxis Technologies Corp., Woodbury, NJ)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 2 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 1381-1396.
PY- 1993
PD- 199300
RF- 39
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- An account is given of VTOL aircraft-pertinent downwash considerations, encompassing flight-test and analytical data as well as quantifications of aircraft design and operational effects of downwash. Analytical prediction techniques are presented, in conjunction with an extensive bibliography. Future VTOL designers must take into account intended use, ground equipment, human factors, terrain composition, and operational techniques. These considerations make up the Rapid Analytical Downwash Determination graphical methodology for determining downwash characteristics. (AIAA)
DE- <MAJOR> *VERTICAL TAKEOFF AIRCRAFT; *TANDEM ROTOR HELICOPTERS; *HELICOPTER DESIGN; *STRUCTURAL DESIGN CRITERIA; *AIRCRAFT CONFIGURATIONS
DE- DOWNWASH; FLIGHT TESTS; AIRCRAFT EQUIPMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02128891
AN- <AEROSPACE> A94-20005
TI- Civil tiltrotor - Flight simulation development of instrument procedures
AU- Klein, Peter D. (Bell Helicopter Textron, Inc., Fort Worth, TX); Wilkinson, Paul R.; Zmroczek, Leon A. (Boeing Defense & Space Group, Philadelphia, PA)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 465-479.
PY- 1993
PD- 199300
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- Real-time, piloted simulation researches have been conducted which demonstrate the ability of tiltrotor aircraft to execute steep instrument approaches to vertical landings. Approaches with glide slopes as steep as 25 deg have been successfully demonstrated. Guidance cues provided for the pilots included raw flightpath deviation data and flight director steering commands. The low speeds associated with the steepest approaches introduce unique problems that favor the use of flight director guidance or modified pilot control strategies. Steep approaches are expected to be a normal requirement for center-city vertiport operations, but existing instrument procedures and ATC procedures do not support the steep approach capabilities of vertical flight aircraft. The FAA has recognized this and directed the development of the Vertical Flight IFR Terminal Area Procedures (VERTAPS) program plan. VERTAPS will develop instrument procedures and ATC procedures to take advantage of the unique capabilities of vertical flight aircraft while safely and efficiently integrating them into the national airspace system. (Author (revised))
DE- <MAJOR> *TILT ROTOR AIRCRAFT; *CIVIL AVIATION; *FLIGHT SIMULATION; *FLIGHT CONTROL; *VERTICAL FLIGHT
DE- MATHEMATICAL MODELS; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02128888
AN- <AEROSPACE> A94-20002
TI- Evaluation of simulation motion fidelity criteria in the vertical and directional axes
AU- Schroeder, Jeffery A. (NASA, Ames Research Center, Moffett Field, CA)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 419-437.
PY- 1993
PD- 199300
RF- 23
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- An evaluation of existing motion fidelity criteria was conducted on the NASA Ames Vertical Motion Simulator. Experienced test pilots flew single-axis repositioning tasks in both the vertical and the directional axes. Using a first-order approximation of a hovering helicopter, tasks were flown with variations only in the filters that attenuate the commands to the simulator motion system. Between configurations, pilots recalibrated their motion response perception by flying the task with full motion. Pilots subjectively rated the motion fidelity of subsequent configurations relative to this full motion case, which was considered the standard for comparison. The results suggested that the existing vertical-axis criterion was accurate for combinations of gain and natural frequency changes. However, if only the gain or the natural frequency was changed, the rated motion fidelity was better than the criterion predicted. In the vertical axis, the objective and subjective results indicated that a larger gain reduction was tolerated than the existing criterion allowed. The limited data collected in the yaw axis revealed that pilots had difficulty in distinguishing among the variations in the pure yaw motion cues. (Author)
DE- <MAJOR> *MOTION SIMULATORS; *COCKPITS; *PILOT PERFORMANCE; *YAW
DE- MATHEMATICAL MODELS; SYSTEMS ANALYSIS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02128887
AN- <AEROSPACE> A94-20001
TI- An aeroelastic model structure investigation for a manned real-time rotorcraft simulation
AU- Lewis, William D. (U.S. Army, Fort Eustis, VA)

SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 391-418.
PY- 1993
PD- 199300
RF- 20
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- A model structure is presented for a UH-60 helicopter's flexible rotary wing manned flight simulation which consistently matches structural and aerodynamic theory. The investigation methodology encompasses a piloted assessment, as well as frequency domain and time-domain criteria evaluations. The Comprehensive Identification from Frequency Response program was used to ascertain frequency response by driving the simulator controls, recording the resulting response, and comparing it to flight test data. (AIAA)
DE- <MAJOR> *AEROELASTICITY; *REAL TIME OPERATION; *ROTORCRAFT AIRCRAFT; *COMPUTERIZED SIMULATION; *PILOT PERFORMANCE; *HOVERING
DE- ROTOR BLADES; DYNAMIC CHARACTERISTICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02128883
AN- <AEROSPACE> A94-19997
TI- Human engineering maintenance analyses for the RAH-66 Comanche
AU- Wunsh, Elliot L.; Grenell, James F. (Boeing Co., Helicopters Div., Philadelphia, PA)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 319-336.
PY- 1993
PD- 199300
RF- 2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- The human engineering analysis process used to shape and evaluate the design of maintenance-personnel interfaces for the RAH-66 Comanche helicopter encompasses three early verification analysis techniques: (1) maintenance and support task analyses for workload evaluations, (2) personnel training analyses, and (3) computer graphics-aided 3D interactive applications analyses. These tools furnish a comprehensive assessment of proposed equipment designs against human capabilities and limitations, thereby driving aircraft configuration. (AIAA)
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *AIRCRAFT MAINTENANCE; *AIRCRAFT RELIABILITY; *WORKLOADS (PSYCHOPHYSIOLOGY); *ANTHROPOMETRY
DE- EDUCATION; BOEING AIRCRAFT; SIKORSKY AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02128864
AN- <AEROSPACE> A94-19978
TI- Flight measurements of blade-vortex interaction noise including comparisons with full-scale wind tunnel data
AU- Yamauchi, Gloria K.; Signor, David B.; Watts, Michael E.; Hernandez, Francisco J. (NASA, Ames Research Center, Moffett Field, CA); LeMasurier, Philip (Sikorsky Aircraft, Trumbull, CT)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 25-53.
PY- 1993
PD- 199300
RF- 15
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- Acoustic measurements of a Sikorsky S-76C helicopter in flight are presented, and comparisons are made with acoustic measurements of a full-scale S-76 rotor tested in the 80-by-120 foot wind tunnel at NASA-Ames. The comparisons provide a preliminary determination of the validity of using the wind tunnel as an acoustic testing facility for full-scale rotor research and are the first direct comparison between in-flight and full-scale wind tunnel noise measurements. Attention was given to the blade vortex interaction noise generated by the S-76

rotor. Flight measurements were acquired using the NASA-Ames YO-3A research aircraft fitted with acoustic instrumentation. Effects of tip-path-plane angle and advance ratio on the in-flight acoustics are presented for a limited number of conditions. Increasing tip-path-plane angle causes the blade-vortex interaction (BVI) peaks to reach a maximum earlier in time; these observations are similar to those observed in two-bladed rotor flight test data and small-scale wind tunnel data. Flight and wind tunnel data are compared for three conditions. (Author (revised))
DE- <MAJOR> *BLADE-VORTEX INTERACTION; *NOISE MEASUREMENT; *WIND TUNNEL TESTS; *ACOUSTIC MEASUREMENT; *SIKORSKY AIRCRAFT; *HELICOPTERS
DE- DATA ACQUISITION; DATA REDUCTION; LOW PASS FILTERS
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 02128863
AN- <AEROSPACE> A94-19977
TI- Noise certification of Bell Model 412, 230, and 206L-4 helicopters
AU- Cox, Charles R.; Shank, Suzanna; Riley, Richard G., Jr.; Brieger, John T.; Settle, T. B. (Bell Helicopter Textron, Inc., Fort Worth, TX)
SO- In: AHS, Annual Forum, 49th, Saint Louis, MO, May 19-21, 1993, Proceedings. Vol. 1 (A94-19976 04-01), Alexandria, VA, American Helicopter Society, 1993, p. 1-24b.
PY- 1993
PD- 199300
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- This paper describes three noise certification test programs and presents results of data analyses leading to noise compliance of five configurations of the Bell Model 412, 230, and 206L-4 series helicopters. Noise certification standards for helicopters are reviewed. The requirements that determine the extent of the flight testing and the sophistication of the data acquisition and processing systems are reviewed. Insights are given of the numerous activities involved in test planning, the pretest buildup of aircraft and ground based instrumentation, the preparation of the test site, the acquisition of the test data, the posttest data analyses, and the determination of compliance. (Author)
DE- <MAJOR> *AIRCRAFT NOISE; *CERTIFICATION; *BELL AIRCRAFT; *HELICOPTERS; *CIVIL AVIATION
DE- TELEMETRY; FLIGHT TESTS; AIRCRAFT INSTRUMENTS; NOISE MEASUREMENT; LEAST SQUARES METHOD
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 02128773
AN- <AEROSPACE> A94-19887
TI- Compromises in the visual field with the M43 aviation mask
AU- Wingert, Timothy A.; McAlister, W. H.; Bachman, W. G. (Missouri Univ., Saint Louis)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 65, no. 2, Feb. 1994, p. 157-160.
PY- 1994
PD- 199402
RF- 11
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- This study evaluated peripheral vision through the M43 protective mask currently worn by aviators in the AH-64 Apache helicopter. A Humphrey Visual Field Analyzer was used to measure the sensitivity of a subject's visual field with and without the mask. The results were analyzed using Dicon's Fieldview software. The monocular visual field was reduced for each eye when wearing the mask, especially superiorly and nasally. The overall size of the visual field was not reduced when both eyes were open; however, the quality of the visual field was reduced. The area of binocular vision (central binocular vision fusion field subserving stereopsis) was restricted to the central 30 deg. (Author)
DE- <MAJOR> *MASKS; *HUMAN FACTORS ENGINEERING; *PERIPHERAL VISION; *VISUAL FIELDS; *HUMAN PERFORMANCE
DE- VISUAL PERCEPTION; RESPIRATORS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02128051
AN- <AEROSPACE> A94-19165
TI- Evaluation of a pilot interface with an automated nap-of-the-earth rotorcraft system
AU- Coppenbarger, R. A.; Hardy, G. H.; Dearing, M. G. (NASA, Ames Research Center, Moffett Field, CA); Lam, T. (Sterling Software, Inc., Palo Alto, CA)
SO- In: IEEE/AIAA Digital Avionics Systems Conference, 11th, Seattle, WA, Oct. 5-8, 1992, Proceedings (A94-19151 07-06), New York, Institute of Electrical and Electronics Engineers, Inc., 1992, p. 74-84.
PY- 1992
PD- 199200
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9404
AB- Pilot interface with an automated nap-of-the-earth (NOE) rotorcraft guidance and control system was investigated in a workstation-based piloted simulation. This concept, referred to as Pilot-Directed Guidance (PDG), involves interpreting pilot inputs as high-level commands to an automatic guidance system. With this interface, a pilot can concentrate upon primary course guidance and fire-control tasks by delegating obstacle detection and avoidance tasks to automated sub-systems. This paper first describes the Ames Automated NOE Guidance and Control System (ANGCS) and the associated PDG interface, followed by results from a fixed-base simulation aimed at tuning the PDG interface for optimal pilot acceptability. Concept verification and system improvements were carried out simultaneously through the use of a highly versatile graphical simulation environment. Head-up display symbology, unique to NOE flight with PDG interface, was developed through numerous simulation trials under varying obstacle conditions and flight speeds. An initial investigation aimed at prioritizing automatic lateral and vertical avoidance maneuvers was also carried out. (Author (revised))
DE- <MAJOR> *MAN MACHINE SYSTEMS; *NAP-OF-THE-EARTH NAVIGATION; *ROTORCRAFT
AIRCRAFT; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *AUTOMATIC CONTROL
DE- COMPUTERIZED SIMULATION; OBSTACLE AVOIDANCE; AIRCRAFT MANEUVERS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02128037
AN- <AEROSPACE> A94-19151
TI- IEEE/AIAA Digital Avionics Systems Conference, 11th, Seattle, WA, Oct. 5-8, 1992, Proceedings
SO- New York, Institute of Electrical and Electronics Engineers, Inc., 1992, 626 p. (For individual items see A94-19152 to A94-19249).
PY- 1992
PD- 199200
RN- ISBN 0-7803-0821-2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9404
AB- The papers presented in this volume provide an overview of recent developments in the field of digital avionics, with particular reference to civil, military, and space applications. General topics discussed include vehicle management systems; communication, navigation, and identification; synthetic vision; systems engineering methods and tools; rotorcraft avionics; and airport safety systems. Other topics covered include fault tolerant avionics, artificial intelligence and expert systems, modular avionics technology, sensors and signal processing, crew station technology, software engineering, optical technologies and systems, and crew station human factors. (AIAA)
DE- <MAJOR> *AVIONICS; *DIGITAL TECHNIQUES; *CONFERENCES
DE- MANAGEMENT SYSTEMS; TERRAIN FOLLOWING AIRCRAFT; COLLISION AVOIDANCE;
GROUND-AIR-GROUND COMMUNICATION; RELIABILITY ENGINEERING; MULTISENSOR
APPLICATIONS; PULSE COMMUNICATION; ROTORCRAFT AIRCRAFT; FAULT TOLERANCE
; RUNWAY CONDITIONS; PARALLEL PROCESSING (COMPUTERS); COMPUTER VISION;
COMMERCIAL AIRCRAFT; AIRCRAFT CONTROL; HELMET MOUNTED DISPLAYS;
INFORMATION MANAGEMENT; HUMAN FACTORS ENGINEERING; SOFTWARE ENGINEERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02127533

AN- <AEROSPACE> A94-18647
TI- Society of Flight Test Engineers, Annual Symposium, 21st, Garden Grove, CA, Aug. 6-10, 1990, Proceedings
SO- Lancaster, CA, Society of Flight Test Engineers, 1990, 303 p. (No individual items are abstracted in this volume).
PY- 1990
PD- 199000
RN- ISBN 1050-9690
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9403
AB- Various papers on flight tests are presented. Individual topics addressed include: digital Doppler rate-of-descent indicator, flight testing a digital terrain-following system, state-of-the-art airborne video recording, flying qualities testing on the modern technology airship, the High-Technology Test Bed, variable capacitance accelerometer for flight test measurements, helicopter in-flight frequency response testing techniques, limit cycle oscillation and flight flutter testing, Fokker 50 flameouts in icing conditions, SAS flight analysis and aircraft monitoring system. Also discussed are: research flight test of a scaled unmanned air vehicle, real-time data acquisition for expert systems in UNIX workstations at Space Shuttle Mission Control, AV-8B VSTOL performance analysis, low-profile microsensor for aerodynamic pressure measurement, in-flight targeting techniques for ground-based hover testing, dealing with pilot response time in failure case testing, development of pitot static flightline testing. (AIAA)
DE- <MAJOR> *CONFERENCES; *FLIGHT TESTS
DE- DIGITAL TECHNIQUES; DOPPLER EFFECT; DESCENT; GLOBAL POSITIONING SYSTEM;
WEAPON SYSTEMS; AIR TO AIR REFUELING; LOW ALTITUDE; ACCELEROMETERS;
SWEPT WINGS; AIRCRAFT ICING; REMOTELY PILOTED VEHICLES; INERTIAL NAVIGATION; EXPERT SYSTEMS; SPACE SHUTTLES; MISSION PLANNING; AEROELASTICITY; PILOT PERFORMANCE; AIRCRAFT HAZARDS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02126561
AN- <AEROSPACE> A94-17675
TI- Factors influencing success or failure in the AH-64 course
TI- <EXTENSION> for pilots
AU- Cornum, Rhonda L. S.; Caldwell, J. L.; Ludwick, Robert (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 64, no. 12, Dec. 1993, p. 1120-1124.
PY- 1993
PD- 199312
RF- 6
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9403
AB- A greater percentage of qualified student pilots fail the AH-64 (Apache) transition than any other advanced aircraft transition in the Army. We studied 140 consecutive students presenting for training in an effort to identify factors which might predict success or failure in the AH-64 course. Questionnaires were used to elicit demographic, anxiety level, and motion sickness history information prior to beginning Apache flight training. Motion sickness symptoms (MSS) during the enclosed cockpit, or 'bag', phase of training were quantified using pre- and postbag flight symptom questionnaires. Only one piece of information obtained prior to flight training was related to performance in the AH-64 course; i.e., students who requested the transition performed measurably better than students who did not. While 7 percent of pilots described significant MSS on the first day of enclosed cockpit flight, this decreased to 2 percent by day five. Severity of symptoms during bag phase was not related to any measure of subsequent performance. (Author (revised))
DE- <MAJOR> *AH-64 HELICOPTER; *PILOT TRAINING; *PILOT PERFORMANCE
DE- MOTION SICKNESS; FLIGHT SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02123794
AN- <AEROSPACE> A94-14908
TI- Development of an adjustable crewseat cushion to enhance comfort
AU- Vaningen-Dunn, Caroline; Richards, Marvin K. (Simula, Inc., Phoenix, AZ)
SO- In: SAFE Association, Annual Symposium, 30th, Las Vegas, NV, Nov. 2-4, 1992, Proceedings (A94-14876 02-54), Yoncalla, OR, SAFE Association, 1993, p. 303-311.
PY- 1993

PD- 199300
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9402
AB- Body aches are a common affliction of helicopter flightcrew members. A high incidence of reported discomfort takes the form of lower back pain and numbness in the buttocks and legs. Research programs have been conducted to modify the existing Apache helicopter crewseat by developing adjustable cushions. This paper describes the approach taken to design an adjustable crewseat cushion assembly, and the results that were achieved. Design parameters determined from the crewseat and cockpit configuration, cyclic stick range of motion, and human anthropometry are presented. The adjustable crewseat cushion assembly is described and the cushion vibration testing, static testing, and dynamic analysis are summarized. Ten cushion shipsets were fabricated and installed into Apache aircraft for flight evaluation. A summary of the pilots' responses who have already evaluated the cushions is presented. (Author)
DE- <MAJOR> *SEATS; *FLIGHT CREWS; *COMFORT; *HUMAN FACTORS ENGINEERING; *HELICOPTER DESIGN
DE- CUSHIONS; MAN MACHINE SYSTEMS; FLIGHT TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02121562
AN- <AEROSPACE> A94-12676
TI- Flight-vehicle materials, structures, and dynamics - Assessment and future directions. Vol. 5 - Structural dynamics and aeroelasticity
AU- Noor, Ahmed K. (Virginia Univ.; NASA, Langley Research Center, Hampton) ; Venneri, Samuel L. (NASA, Washington), EDS.
SO- New York, American Society of Mechanical Engineers, 1993, 521 p. (For individual items see A94-12677 to A94-12698).
PY- 1993
PD- 199300
RN- ISBN 0-7918-0663-4
LA- English
GL- United States
CP- United States
DT- COLLECTED WORK
JA- IAA9401
AB- Various papers on flight vehicle materials, structures, and dynamics are presented. Individual topics addressed include: general modeling methods, component modeling techniques, time-domain computational techniques, dynamics of articulated structures, structural dynamics in rotating systems, structural dynamics in rotorcraft, damping in structures, structural acoustics, structural design for control, structural modeling for control, control strategies for structures, system identification, overall assessment of needs and benefits in structural dynamics and controlled structures. Also discussed are: experimental aeroelasticity in wind tunnels, aeroservoelasticity, nonlinear aeroelasticity, aeroelasticity problems in turbomachines, rotary-wing aeroelasticity with application to VTOL vehicles, computational aeroelasticity, structural dynamic testing and instrumentation. (AIAA)
DE- <MAJOR> *AEROELASTICITY; *DYNAMIC STRUCTURAL ANALYSIS; *AIRCRAFT STRUCTURES
DE- MATHEMATICAL MODELS; ELASTODYNAMICS; ROTATING BODIES; ROTORCRAFT AIRCRAFT; VIBRATION DAMPING; STRUCTURAL DESIGN; CONTROL EQUIPMENT; AEROACOUSTICS; SYSTEM IDENTIFICATION; WIND TUNNEL TESTS; AEROSERVOELASTICITY; AEROELASTIC RESEARCH WINGS; DYNAMIC TESTS; VIBRATION TESTS
SH- 7539 Structural Mechanics (1975-)

AN- <DIALOG> 02121119
AN- <AEROSPACE> A94-12233
TI- Evaluation of advanced control laws using a sidestick on the experimental fly-by-wire Dauphin helicopter
AU- Damotte, S.; Mezan, S. (Eurocopter France, Marignane)
SO- AAAF, European Rotorcraft Forum, 18th, Avignon, France, Sept. 15-18, 1992, Paper, 10 p..
PY- 1992
PD- 199200
RF- 2
LA- English
GL- France
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- The objectives and results of the experimental evaluation of the

fly-by-wire (FBW) Dauphin 6001 helicopter are summarized. In particular, attention is given to the evaluation of the impact of sidestick on control and piloting in terms of workload and performance. It is noted that direct law piloting is degraded by the use of the sidestick, as compared with the classical stick. It is shown, however, that this degradation of the control accuracy can be compensated by advanced control laws. The law by angular rate objective is evaluated. However, the deficiency in control margin restitution and the transition problems on landing prevent this law from being applied in an operational context without any improvement. It is then shown that the conventional law provides easy control with the sidestick throughout the flight envelope. (AIAA)
DE- <MAJOR> *CONTROL THEORY; *HELICOPTER CONTROL; *FLY BY WIRE CONTROL; *MAN MACHINE SYSTEMS
DE- HUMAN FACTORS ENGINEERING; ARCHITECTURE (COMPUTERS); CONTROLLABILITY
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02121118
AN- <AEROSPACE> A94-12232
TI- The TIGER cockpit and its simulator
AU- Hellmuth, H.; Kampa, K.; Karl, W. (Eurocopter Deutschland GmbH, Munich, Germany)
SO- AAAF, European Rotorcraft Forum, 18th, Avignon, France, Sept. 15-18, 1992, Paper, 11 p..
PY- 1992
PD- 199200
RF- 3
LA- English
GL- Germany
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- The cockpit of the Franco/German Anti Tank Helicopter TIGER (HAC, PAH2, HAP) is described, with attention given to its geometric baseline and the man-machine interface. In particular, the discussion covers the general layout of the cockpit, seats, panels and consoles, glare shields and visors, doors and windows, frame structure, flight controls, and the principal cockpit systems and their functions. The discussion then focuses on the technical concept and capabilities of the development simulator for the TIGER. Consideration is given to the hardware and software concepts, the on-line simulation model, landing gear model, noise, and validation of the simulation model. (AIAA)
DE- <MAJOR> *MILITARY HELICOPTERS; *COCKPIT SIMULATORS; *MAN MACHINE SYSTEMS; *HUMAN FACTORS ENGINEERING; *HELICOPTER DESIGN
DE- COMPUTERIZED SIMULATION; FLIGHT SIMULATION; AIRCRAFT INSTRUMENTS; HELICOPTER PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02120983
AN- <AEROSPACE> A94-12097
TI- EUROFAR simulation trials on EPOPEE simulator
AU- Rollet, Philippe (Eurocopter France, Marignane); Thibaudat, Christine (Aerospatiale, Div. Avions, Les Mureaux, France)
SO- AAAF, European Rotorcraft Forum, 18th, Avignon, France, Sept. 15-18, 1992, Paper, 13 p..
PY- 1992
PD- 199209
RF- 9
LA- English
GL- France
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- The EPOPEE cockpit flight controls simulator has been modified to evaluate the handling qualities of the EUROFAR tilt-rotor VTOL aircraft project's flight control laws. Over 60 hours of simulated flight have been logged in pursuit of a characterization of EUROFAR handling qualities. These characteristics will be assessed during the next simulation phase for this aircraft, with due enhancement of the EUROFAR aircraft model. (AIAA)
DE- <MAJOR> *FLIGHT SIMULATION; *AIRCRAFT PERFORMANCE; *CONTROLLABILITY; *TILT ROTOR AIRCRAFT; *AIRCRAFT CONTROL
DE- MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; HUMAN FACTORS ENGINEERING

SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02120982
AN- <AEROSPACE> A94-12096

TI- Flight tests of the digitally controlled Turbomeca Arrius 1B engines on EC BO 108
AU- von Gersdorff, Michael (Eurocopter Deutschland GmbH, Munich, Germany); Lordon, Chantal (Turbomeca, Bordes, France)
SO- AAAF, European Rotorcraft Forum, 18th, Avignon, France, Sept. 15-18, 1992, Paper, 12 p..
PY- 1992
PD- 199209
LA- English
GL- Germany
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- In October 1988 the first BO 108 prototype equipped with two Allison 250 C20R engines made its maiden flight. The second prototype (V2), equipped with two TURBOMECA ARRIUS 1B engines and Digital Engine Control Unit (DECU) has provided successful flight test results since June 1991. A brief description of the engine and engine control will be given together with information about the different DECU functions and mode of operation. The ground and flight test program together with the aircraft test equipment and instrumentation are presented. Results focus on the most important tests related to the use of a digital engine control system and the main advantages of those systems over conventional (hydro-mechanic/pneumatic) engine control systems. Finally the definition and initial flight testing of a variable rotorspeed adapted to the flight conditions are presented. (Author)
DE- <MAJOR> *HELICOPTER ENGINES; *FLIGHT TESTS; *DIGITAL SYSTEMS; *ENGINE CONTROL
DE- PROTOTYPES; GROUND TESTS; PROPULSION SYSTEM PERFORMANCE; ENGINE FAILURE

SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 02120954
AN- <AEROSPACE> A94-12068
TI- Reconstruction of spanwise air load distribution on rotorblades from structural flight test data
AU- Oery, H.; Lindert, H. W. (Aachen, Rheinisch-Westfaelische Technische Hochschule, Germany)
SO- AAAF, European Rotorcraft Forum, 18th, Avignon, France, Sept. 15-18, 1992, Paper, 13 p..
PY- 1992
PD- 199209
RF- 8
LA- English
GL- Germany
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- During flight tests performed with Kamov-26 and Hughes 500E helicopters in Hungary, rotor blade structural response was measured with strain gauges applied to the blade. The measured response data were evaluated using a force reconstruction method. This method computes the acting air load forces on the rotating blade from measured blade response data. For each helicopter a blade was prepared for testing and the structural parameters measured. Strain gauges were applied at specific spanwise locations. The flapping angle and azimuth position of the blade were recorded during flight testing. The signals from the blade instrumentation were transmitted by a telemetric system from the rotating rotor to a stationary receiving unit on the ground. Flight tests consisted of several hovering and forward flights at different flight speeds with both helicopters. Reconstruction results of the spanwise air load forces are presented for both helicopter types. Reconstruction results for the Hughes helicopter at low flight speeds show blade-vortex-interactions at the appropriate locations. This is also the case for some hovering flight test data evaluations. (Author)
DE- <MAJOR> *AERODYNAMIC LOADS; *LOAD DISTRIBUTION (FORCES); *ROTOR AERODYNAMICS; *BLADE-VORTEX INTERACTION; *HELICOPTERS
DE- FLIGHT TESTS; STRAIN MEASUREMENT; DEFORMATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02120250
AN- <AEROSPACE> A94-11364
TI- The use of EH101 Development Cockpit Simulator for pilot assessment
AU- Hague, Colin; Romans, J.; Shaw, A. H. (Westland Helicopters, Ltd., Yeovil, United Kingdom)
SO- In: The use of simulation in aircraft accident prevention and investigation; Proceedings of the Conference, London, United Kingdom, Nov. 11, 12, 1992 (A94-11355 01-01), London, Royal Aeronautical Society, 1992, p. 9.1-9.12.
PY- 1992
PD- 199200
LA- English

GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- This paper will highlight some of the major uses of the EH101 Development Simulator with particular regard to the Pilot Assessment of cockpit layout, information retrieval/presentation and redundancy. Particular attention will be given to those systems which influence the operability of the aircraft and therefore affect safety. A brief outline of the facility and the reasons for its procurement will be discussed. Three development programs have been chosen from the many assessments undertaken within the simulator. They are: Cockpit Ergonomics, the Electronic Instrument System, and the Automatic Flight Control System. The selection of these programs was on the basis of their effect on the operability of the aircraft and their impact on safety. The paper provides an insight into the development process and the value of the pilot in the assessments. It is estimated that over 500 flying hours have been saved through the use of the simulator. Coupled with this is the use for pilot familiarization prior to the first flight. To underline the consideration given to safe operation, a brief overview of the major features of the EH101 helicopter is provided. (Author)
DE- <MAJOR> *COCKPIT SIMULATORS; *HUMAN FACTORS ENGINEERING; *HELICOPTER CONTROL; *CONTROL SYSTEMS DESIGN
DE- AIRCRAFT INSTRUMENTS; AUTOMATIC FLIGHT CONTROL; HUMAN PERFORMANCE; CRASHWORTHINESS; VIBRATION DAMPING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02119400
AN- <AEROSPACE> A94-10514
TI- Helicopter rotor blade injury - A persistent safety hazard in the U.S. Army
AU- Crowley, John S.; Geyer, Shannon L. (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 64, no. 9, Sept. 1993, p. 854-858.
PY- 1993
PD- 199309
RF- 6
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9401
AB- Rotor blade injuries are an inherent hazard of helicopter operations. To determine the recent incidence of rotor blade injuries in the U.S. Army, a review of accident records (1972-1991) was conducted. Crash-related injuries were not included. During the study period, there were 24 blade strike injuries (12 involving the main rotor), 11 (46 percent) of which were fatal. Comparison with previous reports indicates a lower rotor blade injury rate in the last decade than in any previous period. The head was injured most frequently (65 percent), followed by the chest (17 percent) and abdomen (7 percent). Protective helmets helped to reduce injury in several instances. Flight crew comprised 49 percent of the victims, passengers 29 percent, ground crew 14 percent, and bystanders 8 percent. Helicopter crews must maintain situational awareness when around turning blades professional training alone does not guarantee protection from rotor blade injury. (Author (revised))
DE- <MAJOR> *HELICOPTERS; *ROTOR BLADES; *INJURIES; *AIRCRAFT ACCIDENTS
DE- AIRCRAFT SAFETY; HELICOPTER TAIL ROTORS; SAFETY MANAGEMENT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02115951
AN- <AEROSPACE> N93-29484
TI- Predicting radiation induced performance decrements of AH-1 helicopter crews. Volume 2: Evaluation of modeling and simulation techniques for predicting radiation induced performance decrements
TI- <SUPPLEMENT> Technical Report, 25 Sep. 1986 - 30 Nov. 1991
AU- PEREZ, WILLIAM A.; INMAN, VAUGHAN W.; PETERS, JOSEPH I.; SANCHEZ, ROBERT R.; YOUNG, ROBERT W.
CS- Science Applications International Corp., McLean, VA.
CS- <CODE> SD708880
PY- 1993
PD- 199303
PG- 118P.
CN- DNA001-86-C-0308
RN- AD-A262872; DNA-TR-92-54-V2-VOL-2
LA- English
GL- United States

CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A06/MF A02
JA- STAR9311
AB- The effects of intermediate doses of ionizing radiation on Army helicopter crew performance are investigated. The analysis of performance on the Walter Reed Performance Assessment Battery (WRPAB), and the development of an initial model for the WRPAB using Multidimensional Scaling (MDS) techniques is documented. The WRPAB was used in a study where 20 AH-1 pilots (1) predicted the effects of various symptom complexes on their performance, (2) went through a 36-hour protocol to induce symptoms similar to symptoms that follow exposure to intermediate doses of radiation, (3) performed a simulated AH-1 mission before and after symptom induction, and (4) were administered the WRPAB approximately every 2 hours throughout the 36-hour protocol. MicroSAINT models for AH-1 tank engagements were developed that used PAB performance to predict AH-1 performance degradation. The results indicate that the WRPAB (or some other test battery) has utility for the prediction of operator performance as affected by stressors such as ionizing radiation. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT SIMULATION; *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *RADIATION DOSAGE
DE- IONIZING RADIATION; RADIATION EFFECTS; RADIATION SICKNESS; SIGNS AND SYMPTOMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02106266
AN- <AEROSPACE> N93-19785
TI- Equipment, more or less ready to be used in helicopters
AU- HELLMUTH, H.; BOEHM, H.-D. V.
CS- Eurocopter Deutschland G.m.b.H., Munich (Germany).
CS- <CODE> E5674258
PY- 1992
PD- 199210
NT- In AGARD, Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface 6 p (SEE N93-19757 06-54)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9306
AB- Examples of equipment taken from project studies and the specific boundary conditions for helicopters are discussed. Avionic equipment, sensors, displays, and controls are covered. Equipment and technologies ready to be used today and in the near future as well as equipment hardly usable are analyzed. Equipment specific characteristics and helicopter/cockpit integration specifics are covered. (Author)
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *COCKPITS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *VISIBLE SPECTRUM
DE- GLOBAL POSITIONING SYSTEM; HELMET MOUNTED DISPLAYS; IMAGE PROCESSING; NAP-OF-THE-EARTH NAVIGATION; VISUAL AIDS; VOICE COMMUNICATION; WARNING SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02106264
AN- <AEROSPACE> N93-19783
TI- Liquid crystal displays replacing the CRT and CLE of future cockpits
TI- <ORIGINAL> Les ecrans a cristaux liquides remplacant du CRT et CLE des futurs cockpits
AU- DELAUZUN, FREDERIC
CS- Sextant Avionique, Saint Medard en Jalles (France).
CS- <CODE> SH812997
PY- 1992
PD- 199210
NT- In AGARD, Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface 9 p (SEE N93-19757 06-54)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9306
AB- Due to well-known advantages such as low weight, reduced volume, low consumption, visibility (under high brightness) reliability, to mention the most important, the flat panels have already started to replace the CRT in the world of military aircraft. Among flat panels, the liquid

crystal active matrix display is the most advanced. Full colors and grey shades displays are mass produced for commercial applications and new military cockpits, both for airplanes and helicopters based on that technology (Rafale is used as an example to illustrate the advantages of LCD compared to CRT). Furthermore, liquid crystal panel is a technical key which will help future cockpit concepts to wake-up to life. The head level display and the large interactive display are among them. Projection techniques and liquid crystal cells are merged to take benefits of liquid crystal, removing the drawbacks (that notion is illustrated by a brief description of a head level display demonstrator). (Author)
DE- <MAJOR> *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING; *LIQUID CRYSTALS;
*MAN MACHINE SYSTEMS; *PANELS
DE- CATHODE RAY TUBES; COCKPITS; COMMERCIAL AIRCRAFT; HELICOPTERS; MILITARY
AIRCRAFT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02106261
AN- <AEROSPACE> N93-19780
TI- CVA, cockpit design and development tool
AU- WEBER, CHRISTOPH
CS- Elektronik-System G.m.b.H., Munich (Germany).
CS- <CODE> ES160428
PY- 1992
PD- 199210
NT- In AGARD, Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface 5 p (SEE N93-19757 06-54)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A03
JA- STAR9306
AB- The conceptual design and development of a modern helicopter cockpit requires the consideration of ergonomic, operational, and technical aspects. New and additional technologies lead to a steady increase of data and workload, so that an essential task is to obtain an optimum layout of the 'Man-Machine-Interface' (MMI). For the performance of this task, MoD has charged ESG to generate a national Cockpit Design Tool CVA and to operate it in parallel with the TIGER development. Due to the national character of the CVA those tasks are primarily handled which concern the specific German portion of the TIGER program, e.g. the control and display system of the digital map generator, the helmet-mounted sight/display system, and the HF data link. These complex systems, however, cannot be investigated separately due to the multiple reciprocal actions with the remaining display and control systems, but have to be considered with the overall cockpit. Thus the CVA is the reproduction of a functioning 1:1 cockpit of the PAH2 version of the TIGER and is operated in close cooperation with the future user (pilot). It is a closed-loop simulator which enables the checking of important areas of the MMI not only in theory, but mainly under practical conditions long before a prototype of the new helicopter exists. (Author)
DE- <MAJOR> *COCKPIT SIMULATORS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING;
*MAN MACHINE SYSTEMS
DE- COMMAND AND CONTROL; DISPLAY DEVICES; HELICOPTER DESIGN; SYSTEMS
INTEGRATION; WEAPON SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02106253
AN- <AEROSPACE> N93-19772
TI- The use of voice processing for some aspects of the pilot-vehicle-interface in an aircraft
AU- HOLLEVOET, FERNAND; WELLEKENS, CHRISTIAN J.
CS- Lernout and Hauspie Speech Products N.V., Ypres (Belgium).
CS- <CODE> LL906720
PY- 1992
PD- 199210
NT- In AGARD, Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface 7 p (SEE N93-19757 06-54)
LA- English
GL- Belgium
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9306
AB- The challenges that lie in the development and design of a pilot vehicle interface (PVI), both in the basic voice processing technologies as in the robustness requirements of the system, due to the peculiar circumstances in which it has to be used, are described.

Furthermore, we will focus on the state of the art, and on the results of the current R&D efforts within Lernout and Hauspie Speech Products on both the recognizer itself as well as its robustness, and also the hardware implementation. At the end, we will dip into the future and look at the continuing R&D efforts both to enhance the available algorithms and to undertake new basic efforts in the area of application. (Author)
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS;
*ROBUSTNESS (MATHEMATICS); *SPEECH RECOGNITION; *VOICE COMMUNICATION
DE- AIRCRAFT NOISE; BACKGROUND NOISE; HARDWARE; VOICE DATA PROCESSING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02106241
AN- <AEROSPACE> N93-19760
TI- Advanced cockpit-mission and image management
AU- STRUCK, JUERGEN, ed.
CS- Telefunken System Technik G.m.b.H., Wedel (Germany). Aircraft Equipment.
CS- <CODE> TL846448
PY- 1992
PD- 199210
NT- In AGARD, Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface 15 p (SEE N93-19757 06-54)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9306
AB- Modern cockpit designs require new modular architectures for mission and image-management with regards to hardware and software aspects. The main task is the collection of aircraft specific data using the appropriate data management, the transformation of such data to graphical images with the appropriate logical image management, the generation of physical graphical images on several image devices by physical image management and the conversion and combination/mixing of physical graphical data with the data, created by external video sensors using video management. Finally the video-data has to be presented on several devices, like head down-, head up-, and helmet mounted displays. The main goal for us as basic system supplier is to give the application programmer an abstract high-level interface for all these functions. This is to be done and is specially supported by the program language Ada, which is the required language for military and civil aircraft applications. The system described herein was developed for the German experimental helicopter program AVT and two special applications for the X31A experimental aircraft. (Author)
DE- <MAJOR> *CHANNELS (DATA TRANSMISSION); *COCKPITS; *COMPUTER SYSTEMS
DESIGN; *DATA MANAGEMENT; *HUMAN FACTORS ENGINEERING; *IMAGE PROCESSING
; *MAN MACHINE SYSTEMS; *PROJECT MANAGEMENT
DE- ADA (PROGRAMMING LANGUAGE); CIVIL AVIATION; DATA ACQUISITION; HEAD-UP
DISPLAYS; HELMET MOUNTED DISPLAYS; MILITARY AVIATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02106159
AN- <AEROSPACE> N93-19678
TI- Underlying causes of human error in US Army rotary wind accidents
AU- FITZPATRICK, DANIEL T.
CS- Army Safety Center, Fort Rucker, AL.
CS- <CODE> A2213849
PY- 1992
PD- 199209
NT- In AGARD, Aircraft Accidents: Trends in Aerospace Medical Investigation Techniques 6 p (SEE N93-19653 06-03)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A04
JA- STAR9306
AB- Human error has been a causal factor in 80 percent of U.S. Army aviation accidents. The focus of an accident investigation is to identify the task errors and related system inadequacies that contributed to the accident occurrence. Within the U.S. Army, crew error aviation accidents have been attributed to one of five reasons: individual failure (41 percent), leader failure (27 percent), standards failure (15 percent), training failure (12 percent), or other failure (5 percent). This study describes the most frequently occurring aircrew task errors and associated problem areas causing U.S. Army rotary wing

accidents from FY-84 through FY-91. A total of 554 accidents occurred, resulting from 906 aircrew errors. The three most frequently occurring task errors involved improper decision, improper attention, and inadequate communication. Together, they accounted for one half of the total number of identified errors. The most frequently reported problem areas were inadequate crew coordination and improper scanning, which accounted for almost 40 percent of the errors. There were minor differences noted for problem areas based on aircraft type, time of occurrence, and responsible aircrew member. The U.S. Army Aviation Center has introduced corrective measures that address these problem areas. If successful, these corrective measures should reduce crew error, resulting in fewer accidents and a savings in personnel and equipment. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *AIRCRAFT ACCIDENTS; *HUMAN
FACTORS ENGINEERING; *HUMAN PERFORMANCE; *PILOT TRAINING
DE- DECISION MAKING; ERRORS; FAILURE; FLIGHT CREWS; ROTARY WINGS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02106134
AN- <AEROSPACE> N93-19653
TI- Aircraft Accidents: Trends in Aerospace Medical Investigation Techniques
TI- <ORIGINAL> Les Accidents d'Aeronefs: Les Tendances en Techniques d'Investigation Medicale
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Aerospace Medical Panel.
CS- <CODE> AD455458
PY- 1992
PD- 199209
PG- 452P.
NT- Symposium held in Cesme, Turkey, 27 Apr. - 1 May 1992
RN- AGARD-CP-532; ISBN-92-835-0687-1
LA- MULTIPLE
LA- <NOTE> In ENGLISH and FRENCH
GL- France
CP- International Organization
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A20/MF A04
JA- STAR9306
AB- These proceedings include the Technical Evaluation Report and 58 papers of the Symposium sponsored by the AGARD Aerospace Medical Panel held at the Altin Yunus Hotel, Cesme, Turkey, April 27 - May1 , 1992. Since the commencement of aviation, accidents have occurred for a variety of reasons in both fixed- and rotary-wing aircraft. As the complexity of aviation systems increased, so did the task of investigating aircraft accidents. At the same time, advanced techniques in aviation and weapon systems have exacerbated greatly the physiological and cognitive demands on aircrews. The result is that aircraft accidents due to material causes have diminished progressively while the percentage of human factor-caused accidents has not. For individual titles, see N93-19654 through N93-19710.
DE- <MAJOR> *ACCIDENT INVESTIGATION; *ACCIDENT PREVENTION; *AEROSPACE
MEDICINE; *AIRCRAFT ACCIDENTS; *HUMAN FACTORS ENGINEERING; *RELIABILITY
ANALYSIS; *TRENDS
DE- CONFERENCES; PHYSIOLOGY; ROTARY WING AIRCRAFT; WEAPON SYSTEMS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02104303
AN- <AEROSPACE> N93-17817
TI- Effects of terfenadine and diphenhydramine on brain activity and performance in a UH-60 flight simulator
TI- <SUPPLEMENT> Final Report
AU- STEPHENS, ROBERT L.; CALDWELL, JOHN A., JR.; COMPERATORE, CARLOS A.;
PEARSON, JACQUELYN Y.; DELRIE, DARCELLE M.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1992
PD- 199209
PG- 67P.
RN- AD-A258012; USAARL-92-33
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9306
AB- The effects of terfenadine, diphenhydramine, and a placebo on flight performance, resting electroencephalographic (EEG) activity, and auditory and visual evoked potential tasks were investigated. Twelve male Army aviators served as subjects in a double-blind, repeated

measures experimental design. The results indicated that neither diphenhydramine nor terfenadine effected flight performance. Regarding resting EEG, diphenhydramine caused a decrease of alpha power at all electrode sites. For all sites with the exception of Cz, diphenhydramine also caused a decrease of power in the beta band. The P300 component-of the auditory evoked potential was unaffected by either of the drugs. The amplitude of the visual P300 was suppressed under diphenhydramine relative to placebo while the latency was unaffected. The results of this study highlight the importance of measuring multiple aspects of performance in assessing the impact of a drug. While flight performance was unaffected by either drug, the indications from measures of brain activity are that terfenadine is much less sedating. Therefore, it is a more attractive alternative for the treatment of allergic symptoms in the aviator population or in any population where compromised performance is potentially dangerous. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *ANTIHISTAMINICS; *AUDITORY TASKS; *BRAIN; *DRUGS; *ELECTROENCEPHALOGRAPHY; *PILOT PERFORMANCE; *VISUAL TASKS
DE- FLIGHT SIMULATION; HELICOPTERS; MALES
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02102838
AN- <AEROSPACE> N93-16345
TI- Helicopter installations: From motor to rotor
TI- <ORIGINAL> Helikopter installaties: Van motor tot rotor
AU- BOER, J. F.
CS- Technische Univ., Delft (Netherlands). Faculty of Aerospace Engineering.
CS- <CODE> TJ479965
PY- 1991
PD- 199112
PG- 192P.
RN- LR-675; ETN-93-92870
LA- Dutch
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A09/MF A02
JA- STAR9305
AB- The primary installations of helicopters are described with a view to helicopter design. Some relevant helicopter principles are explained. The different types of engine installations, their fuel control systems, and instrumentation as well as the fuel installation are described. The general requirements for transmission systems, the different transmission configurations and their components, the lubrication of the gear casings, and the suspension of the main deceleration box are treated. Rotor heads, rotor blades, and couple compensation systems are presented. The different helicopter control systems are described. (ESA)
DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *HELICOPTER CONTROL; *HELICOPTER DESIGN; *HELICOPTER ENGINES; *HELICOPTERS; *ROTARY WINGS
DE- AIRCRAFT INSTRUMENTS; FUEL CONTROL; FUEL SYSTEMS; GEARS; HELICOPTER TAIL ROTORS; SUSPENSION SYSTEMS (VEHICLES); TRANSMISSIONS (MACHINE ELEMENTS)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02102682
AN- <AEROSPACE> N93-16189
TI- Workshop on Aeronautical Decision Making (ADM). Volume 1: Executive summary
TI- <SUPPLEMENT> Final Report
AU- LOFARO, RONALD J.
CS- Advanced Aviation Concepts, Jupiter, FL.
CS- <CODE> AC946177
PY- 1992
PD- 199208
PG- 76P.
NT- Workshop held in Denver, CO, 6-7 May 1992
CN- DTFA01-90-C-00042
RN- AD-A257016; DOT/FAA/RD-91/14-VOL-1
LA- English
GL- United States
CP- United States
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR9305
AB- This report presents Aeronautical Decision Making (ADM) training accomplishments, limitations, and future needs from the perspectives of commercial operators, general aviation, military aviation, and research development. A select group of experts on ADM was convened to share

ideas, identify and explore future directions for advanced training. Cognitive training requirements based upon decision making task demands of both airplane and helicopter pilots and crews are analyzed. A major question which requires definitional research is the following: What is a real aircrew/pilot decision? That is, when does an event generate a true decisional opportunity for a pilot or crew versus a one-path only reaction, where the actual emphasis is not on cognitive decision making, but the application of procedures and basic airmanship. Going one step further, the group analyzed the decision making differences between expert and novice pilots when a real decision was required. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *AIRLINE OPERATIONS; *COMMERCIAL AIRCRAFT; *DECISION MAKING; *FLIGHT CREWS; *GENERAL AVIATION AIRCRAFT; *JUDGMENTS ; *PILOT TRAINING
DE- EDUCATION; FLIGHT SAFETY; HELICOPTERS; HUMAN FACTORS ENGINEERING; RESOURCES MANAGEMENT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02101823
AN- <AEROSPACE> N93-15328
TI- The use of ultrasonics for oleo compression measurements on a S-70B-2 (Seahawk) helicopter
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> AF441057
PY- 1992
PD- 199207
PG- 20P.
RN- AD-A256315; ARL-FLIGHT-MECH-TM-456; DODA-AR-006-670
LA- English
GL- Austria
CP- Austria
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9304
AB- Dynamic measurements were conducted to acquire data for the development of a mathematical model of the undercarriage of a S-70B-2 (Seahawk) helicopter. The principal measuring instrumentation consisted of LVDT's and ultrasonic transducers. This memorandum discusses a Ranging Ultrasonic Transducer which was developed to overcome the inherent and excessive recovery time delay of the ultrasonic transducers when subjected to out-of-range distance operations during the flight trials. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *MATHEMATICAL MODELS; *ULTRASONIC WAVE TRANSDUCERS
DE- DYNAMIC LOADS; RANGEFINDING; STRUTS; TIME LAG; UNDERCARRIAGES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02101519
AN- <AEROSPACE> N93-15024
TI- Embedded ADM reduces helicopter human error accidents
AU- FOX, ROY G.
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> TV739419
PY- 1992
PD- 199208
NT- In Advanced Aviation Concepts, Workshop on Aeronautical Decision Making (ADM). Volume 2: Plenary Session With Presentations and Proposed Action Plan p 182-229 (SEE N93-15013 04-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9304
AB- The basic outlines are: (1) Who is responsible for safety?; (2) measuring risk; (3) means of reducing risk; and (4) crash survival; (5) accident causes (2/3 are Human); (6) judgement training; and heliprops effects on 206 human error accident rates. The conclusion made is that, Judgement Training has more safety improvement potential than the total elimination of all airworthiness failure causes (a primary goal since the start of aviation). (I.I.C.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT RELIABILITY; *FLIGHT SAFETY; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PILOT TRAINING
DE- CRASHES; HUMAN PERFORMANCE; PILOT ERROR; SURVIVAL
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02101511
AN- <AEROSPACE> N93-15016
TI- Trans-cockpit authority gradient in Navy/Marine aircraft mishaps
AU- ALKOV, ROBERT A.; BOROWSKY, MICHAEL S.; WILLIAMSON, DANA W.; YACAVONE,
DAVID W.
CS- Naval Safety Center, Norfolk, VA.
CS- <CODE> NT252649
PY- 1992
PD- 199208
NT- In Advanced Aviation Concepts, Workshop on Aeronautical Decision Making (ADM). Volume 2: Plenary Session With Presentations and Proposed Action Plan p 56-66 (SEE N93-15013 04-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9304
AB- Navy and Marine Corps aircraft mishaps which have an aircrew causal factor assigned were analyzed to determine if the relative military rank of the pilot and copilot or Naval Flight Officer was associated with the rate of occurrence per 100,000 flight hours. All class A and B helicopter flight mishaps for the elevent calendar year period 1980-1990 were examined. Although statistically significant differences were not found, pairing helicopter pilots who were of equal rank yielded the lowest rate (2.81), seemingly refuting Elwyn Edward's notion that a flat 'trans-cockpit authority gradient' may lead to greater problems in the cockpit than his hypothetical 'optimum gradient'. When there was one rank difference in the cockpit the rate was 2.340. When copilots flew with pilots who differed by two or more ranks, the largest pilot error rate (3.45) was revealed. These findings seem to support Edward's hypothesis that a steeper 'trans-cockpit authority gradient' may be detrimental to helicopter flight safety. Data from fighter and attack jet aircraft, where there is only one pilot flying with a radar intercept officer or a bombardier/ navigator, were also studied for the calendar years 1986-91. It was discovered that the lowest aircrew error rate (1.80) occurred when the pilot and the other aircrew member differed by more than one rank. When the aircrew were of the same rank the rate was 3.51. For those crews in which there was a one rank difference the rate was 3.85. Reasons for these findings are discussed. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT PILOTS; *COCKPITS; *FLIGHT CREWS
; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING; *RANKING; *RESOURCES MANAGEMENT
DE- HELICOPTERS; HYPOTHESES; PILOT ERROR
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02100601
AN- <AEROSPACE> N93-14103
TI- Test and evaluation report of the Physio Control Defibrillator/Monitor, Model LifePak(tm) 6s
TI- <SUPPLEMENT> Final Report
AU- BRUCKART, JAMES E.; QUATTLEBAUM, MARTIN; LICINA, JOSEPH R.; OLDING, BILL
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1992
PD- 199207
PG- 78P.
CN- DA PROJ. 3M4-63807-D-836
RN- AD-A255691; AARL-92-27
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR9304
AB- The Physio Control Defibrillator/Monitor, Model LifePak 6s, was tested for electromagnetic interference/compatibility in the UH-60A helicopter under the U.S. Army Program for Testing and Evaluation of Equipment for Aeromedical Operations. The tests were conducted using current military and industrial standards and procedures for electromagnetic interference/compatibility and human factors. The Physio Control Defibrillator/Monitor, Model LifePak 6s was found to be compatible with U.S. Army aeromedical aircraft. (DTIC)
SF- DTIC
DE- <MAJOR> *AEROSPACE MEDICINE; *ELECTROCARDIOGRAPHY; *ELECTROMAGNETIC
COMPATIBILITY; *ELECTROMAGNETIC INTERFERENCE; *MEDICAL EQUIPMENT; *MONITORS
DE- HUMAN FACTORS ENGINEERING; TEMPERATURE EFFECTS; UH-60A HELICOPTER;

VIBRATION TESTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02099046
AN- <AEROSPACE> N93-12545
TI- Operator workload predictions for the revised AH-64A workload prediction model. Volume 2: Appendixes A through H
TI- <SUPPLEMENT> Interim Report, Sep. 1988 - Dec. 1991
AU- HAMILTON, DAVID B.; BIERBAUM, CARL R.
CS- Anacapa Sciences, Inc., Fort Rucker, AL.
CS- <CODE> AU848387
PY- 1992
PD- 199207
PG- 414P.
CN- MDA903-87-C-0523
RN- AD-A254939; ASI690-354-92-VOL-2; ARI-RN-92-62-VOL-2
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A18/MF A04
JA- STAR9303
AB- Under a previous contract, researchers used a composite scenario to conduct a comprehensive task analysis of the AH-64A attack mission. The analysis produced workload estimates and decision rules for developing an AH-64A workload prediction model. For this research, the task analysis/workload (TAWL) methodology was used to construct a workload prediction model. The TAWL Operator Simulation System (TOSS) was used to implement the model on an IBM-compatible microcomputer, and the original function and task analysis was refined to produce a more accurate simulation of crew task activity. In addition, the ordinal workload rating scales used in the original analysis were replaced with equal-interval scales. The predictions generated by the model constructed for this research indicate that under optimum conditions (1) neither the pilot nor the copilot/gunner experiences excessive workload, (2) the pilot has higher overall workload than the copilot/gunner in most mission segments, and (3) AH-64A workload is high relative to other Army aircraft that have been analyzed for workload. This model can be used as a baseline for analyzing future modifications to the aircraft. Volume 1 (ARI Research Note 92-61) of the report summarizes the results of the research, and contains a 5.25-inch floppy diskette with model data files. This report (Volume 2) contains the appendixes, which present the AH-64A mission/task/workload analysis, decision rules, and workload predictions. (DTIC)
SF- DTIC
DE- <MAJOR> *AH-64 HELICOPTER; *AIRCRAFT MODELS; *AIRCRAFT PILOTS; *FLIGHT CREWS; *FUNCTIONAL ANALYSIS; *MAN MACHINE SYSTEMS; *MATHEMATICAL MODELS ; *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *PREDICTION ANALYSIS TECHNIQUES; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMPUTERIZED SIMULATION; ESTIMATES; MICROCOMPUTERS; TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02094675
AN- <AEROSPACE> A93-54723
TI- A new methodology for helicopter internal noise reduction application to the AS332 L2
AU- DUSSAC, M. (Eurocopter France, Marignane)
PU- <PLACE> London
PU- <PUBLISHER> Royal Aeronautical Society
PY- 1992
PD- 199200
RF- 3
NT- In: The quiet helicopter; Proceedings of the Conference, London, United Kingdom, Mar. 17, 1992 (A93-54718 24-71)
LA- English
GL- France
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9324
AB- A strategy for optimization of sound-proofing treatment inside the helicopter cabin is developed. After reviewing the characteristics and the different origins of the acoustic field inside a helicopter and discussing the state of the art regarding the cabin acoustic insulation, the paper presents a three-step approach, based on the intensimetry technique, for combining weight saving and acoustic efficiency. The main problems of the technique are underlined, and solutions are recommended. As an example, the AS332 L2 MKII cabin treatment is examined. (AIAA)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMPARTMENTS; *HELICOPTER DESIGN; *INSULATION; *NOISE

INTENSITY; *NOISE REDUCTION
DE- AEROACOUSTICS; HUMAN FACTORS ENGINEERING; NOISE MEASUREMENT; OPTIMIZATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02094502
AN- <AEROSPACE> A93-54550
TI- Unusual attitudes - Helicopters and instrument flight
AU- BEARDEN, HILLMAN E. (FlightSafety International, Fort Worth, TX)
SO- SAFE Journal
PY- 1993
PD- 199306
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9324
AB- The hazards of pilots remaining under visual flight rules in dangerous weather conditions are discussed. Recommendations are made for reducing significantly the risk of accidents under these conditions. (AIAA)
SF- AIAA
DE- <MAJOR> *ACCIDENT PREVENTION; *AIRCRAFT ACCIDENTS; *FLIGHT SAFETY; *HELICOPTERS; *INSTRUMENT FLIGHT RULES; *VISUAL FLIGHT RULES
DE- AVIATION METEOROLOGY; FLIGHT CONDITIONS; PILOT PERFORMANCE
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02094349
AN- <AEROSPACE> A93-54397
TI- Data acquisition for aeroelastic testing at the NASA Langley Transonic Dynamics Facility
AU- DOGGETT, ROBERT V., JR.; ROSSER, DAVID C., JR.; BRYANT, CHARLES S. (NASA, Langley Research Center, Hampton, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
PU- <PLACE> Research Triangle Park, NC
PU- <PUBLISHER> Instrument Society of America
PY- 1993
PD- 199300
NT- In: International Instrumentation Symposium, 39th, Albuquerque, NM, May 2-6, 1993, Proceedings (A93-54351 24-35)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9324
AB- Aeroelasticity is defined and different types of aeroelastic tests are described. The instrumentation and data acquisition requirements dictated by the time varying characteristics of aeroelastic phenomena are pointed out. Instrumentation needs for various types of tests are discussed. The hardware components and operational features of the real-time, digital-computer-controlled data acquisition system used to support testing at the Langley Transonic Dynamics Facility, which includes a major wind-tunnel, a helicopter-model hover facility, and two model setup and calibration laboratories are described.
SF- AIAA
DE- <MAJOR> *AEROELASTICITY; *AIRCRAFT MODELS; *DATA ACQUISITION; *HOVERING ; *NUMERICAL CONTROL; *WIND TUNNEL TESTS
DE- CALIBRATING; FLUTTER; HELICOPTERS; REAL TIME OPERATION; ROTARY WING AIRCRAFT; SOFTWARE TOOLS; UNSTEADY AERODYNAMICS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02094245
AN- <AEROSPACE> A93-54293
TI- Royal Air Force support helicopters - Night operations
AU- FORSYTHE, R. A. (RAF Odiham, Basingstoke, United Kingdom)
PU- <PLACE> London
PU- <PUBLISHER> Royal Aeronautical Society
PY- 1992
PD- 199200
NT- In: Helicopter operations in severe environments; Proceedings of the Conference, London, United Kingdom, June 4, 1992 (A93-54287 23-01)
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9323
AB- The night capabilities of the Royal Air Force battlefield helicopter are reviewed. The use of night vision goggles complements the

conventional skills of an aircrew and makes it possible to significantly increase the night capabilities. It is concluded that though modern technology has made considerable progress with the introduction of image intensifiers and thermal images, the main problems remain to be associated with human factors and realistic training. (AIAA)
SF- AIAA
DE- <MAJOR> *GOGGLES; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT);
*NIGHT VISION
DE- ARMED FORCES (FOREIGN); TASK COMPLEXITY; UNITED KINGDOM
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02092627
AN- <AEROSPACE> A93-52675
TI- Simulation motion effect on single axis compensatory tracking
AU- SCHROEDER, JEFFERY A. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PU- <PLACE> Washington
PU- <PUBLISHER> American Institute of Aeronautics and Astronautics
PY- 1993
PD- 199300
RF- 20
NT- In: AIAA Flight Simulation Technologies Conference, Monterey, CA, Aug. 9-11, 1993, Technical Papers (A93-52651 23-09)
RN- AIAA PAPER 93-3579
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9323
AB- An experiment that examined how changes in a motion platform drive filter affect pilot-vehicle performance and opinion was conducted on the NASA Ames Vertical Motion Simulator. Pilots controlled a simplified helicopter model in the vertical or the directional axis and tracked a randomly moving target aircraft in the presence of a random disturbance. With both tasks, variations from full motion to fixed-base conditions were made in the high-pass drive filter gain and natural frequency. The results indicate that vertical motion did not affect the open-loop pilot-vehicle target-tracking crossover frequency, but target-tracking phase margins improved with increased filter gain or decreased natural frequency. Vertical disturbance-rejection crossover frequency increased with decreasing filter natural frequency, while disturbance rejection phase margins improved with increasing filter gain. Vertical tracking errors increased significantly when all vertical motion was removed. No significant differences were measured among the directional configurations, which indicates that pure yaw motion cues may not be as important as previously thought in flight simulation.
SF- AIAA
DE- <MAJOR> *COMPENSATORY TRACKING; *FLIGHT SIMULATORS; *MOTION SIMULATION;
*PILOT PERFORMANCE; *VERTICAL MOTION SIMULATORS
DE- ACCELERATION (PHYSICS); AIRCRAFT MODELS; HELICOPTERS; HIGH PASS FILTERS
; PHASE ERROR
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02092603
AN- <AEROSPACE> A93-52651
TI- AIAA Flight Simulation Technologies Conference, Monterey, CA, Aug. 9-11, 1993, Technical Papers
PU- <PLACE> Washington
PU- <PUBLISHER> American Institute of Aeronautics and Astronautics
PY- 1993
PD- 199300
PG- 378P.
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9323
AB- Papers presented in this volume are grouped under the topics of flight simulation history, simulation modeling, simulation facilities, human factors and pilot cueing, modeling the simulation environment, simulation applications, motion systems, simulation networking, software engineering, simulation validation and verification, pilot training, and in-flight simulation. Particular consideration is given to the aircraft threat modeling from performance data, a high-fidelity video delivery system for real-time flight simulation research, a multistage integration model for human egomotion perception, terrain modeling for real-time phototexture-based visual simulation, and use of a simulator in aircraft accident investigation. Attention is also given

to simulating motion effects on single-axis compensatory tracking, representation of vehicle location in networked simulations, a reusable code for helicopter simulation, a flexible graphical simulation monitoring system, the future of flying work modeling for pilot educational tasks, and a rapid prototyping system for in-flight simulation using the Calspan Learjet 25. (AIAA)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT SIMULATION; *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *TRAINING SIMULATORS; *VISUAL AIDS
DE- AEROBRAKING; AIR TRAFFIC CONTROL; AIRCRAFT ACCIDENT INVESTIGATION; AIRCRAFT CONTROL; AVIATION METEOROLOGY; COMPENSATORY TRACKING; COMPUTER AIDED DESIGN; COMPUTER NETWORKS; COMPUTER PROGRAMS; DISPLAY DEVICES; FLIGHT CONTROL; GRAPHICAL USER INTERFACE; PILOT PERFORMANCE; ROTARY WING AIRCRAFT; ROTORCRAFT AIRCRAFT; TRANSPORT AIRCRAFT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02092454
AN- <AEROSPACE> A93-52502
TI- Modeling strategic behavior in human-automation interaction - Why an 'aid' can (and should) go unused
AU- KIRLIK, ALEX (Georgia Inst. of Technology, Atlanta)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- Human Factors (ISSN 0018-7208)
PY- 1993
PD- 199306
RF- 17
SN- 0018-7208
CN- NAG2-656; NAG2-195
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9322
AB- Task-offload aids (e.g., an autopilot, an 'intelligent' assistant) can be selectively engaged by the human operator to dynamically delegate tasks to automation. Introducing such aids eliminates some task demands but creates new ones associated with programming, engaging, and disengaging the aiding device via an interface. The burdens associated with managing automation can sometimes outweigh the potential benefits of automation to improved system performance. Aid design parameters and features of the overall multitask context combine to determine whether or not a task-offload aid will effectively support the operator. A modeling and sensitivity analysis approach is presented that identifies effective strategies for human-automation interaction as a function of three task-context parameters and three aid design parameters. The analysis and modeling approaches provide resources for predicting how a well-adapted operator will use a given task-offload aid, and for specifying aid design features that ensure that automation will provide effective operator support in a multitask environment.
SF- AIAA
DE- <MAJOR> *AUTOMATIC PILOTS; *BIOLOGICAL MODELS (MATHEMATICS); *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AUTOMATION; FLIGHT CONTROL; FLIGHT SIMULATION; HELICOPTER CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <AEROSPACE> A93-52308
TI- Fatal mishap report - First SPH-4B flight helmet recovered from a U.S. Army helicopter mishap
AU- BRUCKART, JAMES E.; MCENTIRE, B. J.; LICINA, JOSEPH R.; BRANTLEY, DOUGLAS K.; SHANAHAN, DENNIS (U.S. Army, Aeromedical Research Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562)
PY- 1993
PD- 199308
RF- 16
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9322
AB- Consideration is given to the first SPH-4B flight helmet recovered from a fatal mishap which was correlated with the injuries to the wearer. The new shell and liner reduced the impact forces to the head. There

were no side impacts to determine the performance of the crushable earcups in the helmet. The new SPH-4B flight helmet is characterized by new and distinctive features that make it possible to improve survival in future helicopter crashes. (AIAA)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *HELICOPTERS; *HELMETS; *INJURIES
DE- BRAIN DAMAGE; HUMAN FACTORS ENGINEERING; IMPACT DAMAGE; SAFETY DEVICES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02089518
AN- <AEROSPACE> A93-49566
TI- Back ache in helicopter pilots
TI- <ORIGINAL> Bol u ledima pilota helikoptera
AU- COLAK, S.; JOVELIC, S.; MANOJLOVIC, J. (Vazduhoplovnomedicinski Inst., Batajnica, Yugoslavia)
SO- Vojnosanitetski Pregled/Military Medical and Pharmaceutical Review (ISSN 0042-8450)
PY- 1992
PD- 199212
SN- 0042-8450
LA- Serbo-Croatian
GL- Yugoslavia
CP- Serbia
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9321
AB- The present study of lower back pain (LBP) and harmful effects of flying sent questionnaires to 71 helicopter pilots of the experimental group, 22 flying helicopter mechanics, and a control group of 28 air-traffic controllers. The prevalence of LBP was highest in helicopter pilots, followed by helicopter mechanics and air-traffic controllers (respectively 53, 50, and 36 percent). Effects of exposure to vibration, body posture and working load have not contributed significantly to the occurrence of LBP. LBP has not led to an important difference in the strength of the back musculature, body mass index and spondylosis, that is, scoliosis. (Author (revised))
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT STRESS; *HELICOPTERS; *OCCUPATIONAL DISEASES
DE- BACK INJURIES; HUMAN FACTORS ENGINEERING; PAIN
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02083735
AN- <AEROSPACE> A93-43783
TI- Application of two chaos methods to Higher Harmonic Control data
TI- <EXTENSION> for suppression of helicopter vibration
AU- SARIGUL-KLIJN, MARTI M. (U.S. Navy, Naval Aviation Depot, Alameda, CA); KOLAR, RAMESH; WOOD, E. R. (U.S. Naval Postgraduate School, Monterey, CA)
SO- American Helicopter Society, Journal (ISSN 0002-8711)
PY- 1993
PD- 199304
RF- 9
SN- 0002-8711
NT- Research supported by U.S. Navy, NPS Foundation, and McDonnell Douglas Helicopter Co
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9317
AB- This paper presents two new data analysis methods which will reduce Higher Harmonic Control (HHC) flight test requirements. HHC is an active system which suppresses helicopter vibrations. These methods, originally used in the study of chaos, are the Poincare section and the Van der Pol plane. Using flight test data from a test aircraft, these methods show the following: (1) the limits of HHC vibration reduction; (2) determination of HHC controller type; and (3) that the HHC controller transfer matrix is predictable and repeatable when defined in the 'Rotor Time Domain'. These benefits do not require an HHC-equipped helicopter, although they do require an instrumentation system installed. Finally, these methods can be implemented in real time in most instrumentation systems using only software changes and may be applicable to other vibration control and flight testing problems. (Author (revised))
SF- AIAA
DE- <MAJOR> *CHAOS; *FLIGHT TESTS; *HARMONIC CONTROL; *HELICOPTER CONTROL; *ROTOR AERODYNAMICS; *VIBRATION DAMPING
DE- AEROELASTICITY; FOURIER TRANSFORMATION; POINCARE SPHERES
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02077830
AN- <AEROSPACE> A93-37878
TI- Digital resolver for helicopter model blade motion analysis
AU- DANIELS, T. S.; BERRY, J. D. (NASA, Langley Research Center, Hampton, VA); PARK, S. (Old Dominion Univ., Norfolk, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
PU- <PLACE> Research Triangle Park, NC
PU- <PUBLISHER> Instrument Society of America
PY- 1992
PD- 199200
RF- 7
NT- In: International Instrumentation Symposium, 38th, Las Vegas, NV, Apr. 26-30, 1992, Proceedings (A93-37851 15-35)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9315
AB- The paper reports the development and initial testing of a digital resolver to replace existing analog signal processing instrumentation. Radiometers, mounted directly on one of the fully articulated blades, are electrically connected through a slip ring to analog signal processing circuitry. The measured signals are periodic with azimuth angle and are resolved into harmonic components, with 0 deg over the tail. The periodic nature of the helicopter blade motion restricts the frequency content of each flapping and yaw signal to the fundamental and harmonics of the rotor rotational frequency. A minicomputer is employed to collect these data and then plot them graphically in real time. With this and other information generated by the instrumentation, a helicopter test pilot can then adjust the helicopter model's controls to achieve the desired aerodynamic test conditions. (AIAA)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *NUMERICAL CONTROL; *ROTARY WINGS; *ROTOR DYNAMICS; *SIGNAL PROCESSING; *WIND TUNNEL TESTS
DE- DIGITAL TECHNIQUES; FAST FOURIER TRANSFORMATIONS; FEEDBACK CONTROL; REAL TIME OPERATION
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02075975
AN- <AEROSPACE> A93-36023
TI- Piloted simulator investigations of a civil tilt-rotor aircraft on steep instrument approaches
AU- DECKER, WILLIAM A. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1992
PD- 199206
PG- 18P.
RF- 14
NT- AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Paper
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- NASA-Ames has used its Vertical Motion Simulator to investigate steep-glideslope instrument approaches for a civil transport tilt-rotor aircraft in two different cases: (1) where pilots used raw glideslope and localized error data for 6-25 deg slopes, terminating in slow roll-on landings, and (2) where a flight director commanded manual conversion from fixed-wing to helicopter modes and a deceleration on the glideslope led to a vertical landing on a small urban helipad. In the former, there occurred control problems directly ascribable to the slow approach speed; in the latter, the four-cue flight director's cockpit augmentation furnished adequate pilot ratings up to 15-deg glideslope. (AIAA)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *COCKPIT SIMULATORS; *INSTRUMENT APPROACH; *TILT ROTOR AIRCRAFT
DE- FLIGHT INSTRUMENTS; GLIDE PATHS; PILOT PERFORMANCE; TRACKING (POSITION)

SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02075970
AN- <AEROSPACE> A93-36018
TI- Some considerations on indication means for helicopter pilot vision systems

AU- IABLONSKII, EVGENII V. (Moscow Helicopter Plant, Russia)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 2 (A93-35901 14-01)
LA- English
GL- Russia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- Possible approaches to the design of indication means for a round-the-clock helicopter vision system are examined. It is demonstrated that the TV display is preferable to a helmet mounted display (HMD). In an optimal system, the instantaneous field of view should be selectable within the range of 13 x 18 to 21 x 28 degrees; the scale of the image presented on the screen should be natural (i.e., equal to 1). A narrower field of view provides an advantage in terms of the time required for maneuvering. Alpha-numeric flight information (e.g., horizon position, flight height, airspeed, and distance to obstacles) is superimposed on the TV display screen. (AIAA)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *HELMET MOUNTED DISPLAYS; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- AIRCRAFT MANEUVERS; ARCHITECTURE (COMPUTERS); TELEVISION CAMERAS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02075968
AN- <AEROSPACE> A93-36016
TI- Integrated Navigation System for tactical helicopters
AU- PHAM, TUAN M.; MOSSMAN, DAVE C.; COFFEE, JOHN R. (McDonnell Douglas Helicopter Co., Mesa, AZ)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 12
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 2 (A93-35901 14-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- This paper describes an Integrated Navigation System for modern tactical helicopters incorporating dual Ring Laser Gyro Inertial Navigation Systems, Doppler velocimeter, GPS receiver, Air Data System, and Target Acquisition and Designation Sight. Discussion of the design includes automatic moding to reduce flight crew workload, and new operational capabilities provided by synergistic integration of subsystems. Some design issues specific to tactical helicopters are also addressed. (Author)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *INERTIAL NAVIGATION; *MILITARY HELICOPTERS; *TARGET ACQUISITION
DE- AIRFRAMES; FLIGHT CREWS; GLOBAL POSITIONING SYSTEM; HOVERING; KALMAN FILTERS; STRUCTURAL VIBRATION
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 02075913
AN- <AEROSPACE> A93-35961
TI- Handling qualities testing using the mission oriented requirements of ADS-33C
AU- HAM, JOHNNIE A.; METZGER, MARK (U.S. Army, Aviation Technical Test Center, Fort Rucker, AL); HOH, ROGER H. (Hoh Aeronautics, Inc., Lomita, CA)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 10
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314

AB- Tests conducted on a variety of aircraft aimed at developing, validating, and refining the flight test techniques to be used in future ADS-33C evaluations are discussed. Research on the handling qualities requirements of the ADS-33C conducted to further develop the mission-oriented maneuvers of the aircraft is reviewed. These stylized maneuvers were designed to evaluate aircraft response characteristics and pilot workload to both single and multiaxis inputs at three levels of aggressiveness. Some of the problems associated with these maneuvers include the lack of 'adequate' performance criteria and the importance of obtaining performance criteria feedback in the maneuvers. Several of the maneuvers are redefined to more easily determine performance compliance using low-cost instrumentation. The maneuvers provide an excellent quick look at a mature aircraft's overall handling qualities, and can serve as a map to further testing to define which of the engineering requirements of the specification need to be reexamined and tested in detail. (AIAA)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *FLIGHT SIMULATION; *FLIGHT TESTS; *ROTARY WING AIRCRAFT; *ROTORCRAFT AIRCRAFT
DE- ACCELERATION (PHYSICS); AIRCRAFT LANDING; AIRCRAFT MANEUVERS; DECELERATION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02075907
AN- <AEROSPACE> A93-35955
TI- MI-26 autorotational landings
AU- KARAPETIAN, GURGEN R. (Moscow Helicopter Plant, Russia)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
LA- English
GL- Russia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- Autorotational power-off landing is one of the most complicated emergencies. Entry into autorotation, steady-state autorotation, and landing execution features depend on a number of helicopter design, weight characteristics, such as solidity ratio, blade Lock number, main rotor inertia, disc loading, etc. Data obtained from the Mi-26 simulation and flight tests with autorotational power-off landings are discussed below. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *AUTOROTATION; *HELICOPTER DESIGN
DE- AERODYNAMIC CHARACTERISTICS; FLIGHT TESTS; PILOT PERFORMANCE; ROTOR DYNAMICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02075872
AN- <AEROSPACE> A93-35920
TI- MIDAS technology transfer
AU- BEGGS, ROBERT M. (Boeing Defense & Space Group, Helicopters Div., Philadelphia, PA)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 5
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- This paper discusses recent research activities associated with the transfer of the Army-NASA Man/Machine Integration Design and Analysis System (MIDAS) technologies to Boeing Helicopters. It describes the nature of the Army-NASA/Boeing Technical Exchange Agreement (TEA) and the benefits of this collaboration. The paper also introduces supplemental software developed at Boeing, entitled the MIDAS/Systems Analysis Tool (M/SAT). M/SAT provides a method for Boeing Human Factors analysts and NASA system developers to exercise and test the Task Loading Model, a critical module of the MIDAS architecture. (Author)
SF- AIAA
DE- <MAJOR> *AEROSPACE TECHNOLOGY TRANSFER; *DESIGN ANALYSIS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *SYSTEMS ENGINEERING

DE- AIRCRAFT DESIGN; AIRCRAFT PILOTS; BOEING AIRCRAFT; COMPUTER AIDED DESIGN; KNOWLEDGE BASED SYSTEMS
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 02075871
AN- <AEROSPACE> A93-35919
TI- Digital Terrain Systems for helicopters
AU- DARLINGTON, BARRY; HENLEY, TONY (GEC Avionics, Ltd., Rochester, United Kingdom)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 6
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
NT- Research supported by Defence Research Agency of United Kingdom
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- This paper discusses how the application of Digital Terrain Systems to helicopters can lead to significant improvements in pilot situation awareness, survivability and mission effectiveness. The GEC Avionics Total Terrain Avionics (TTA) concept is introduced and specific elements are described in detail. The terrain database required to support the various TTA functions is discussed in terms of the data requirements and the storage technology. Most of the TTA functions require a precision navigation input and a description is given of how this is achieved. A tactical routing function calculates the optimum route for the aircraft taking into account the threat situation, terrain screening, fuel and time. A weapon aiming function calculates targeting information using the precision navigation and terrain data. The enhanced situation awareness is achieved through a number of advanced display options which are described. Finally, some recent flight testing of TTA concepts is discussed. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *MILITARY HELICOPTERS; *TERRAIN ANALYSIS
DE- AIR NAVIGATION; AIRCRAFT CONTROL; FLIGHT TESTS; PILOT PERFORMANCE; WEAPON SYSTEMS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02075869
AN- <AEROSPACE> A93-35917
TI- Advanced Helicopter Pilotage visual requirements
AU- SEEMAN, J.; DE MAIO, J.; JUSTICE, S.; WASSON, J. (McDonnell Douglas Helicopter Co., Mesa, AZ); DERENSKI, P.; HUNTER, M.; WALRATH, L. (McDonnell Aircraft Co., Saint Louis, MO)
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 14
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- This paper reports the results of a study performed by McDonnell Douglas for the U.S. Army CECOM Night Vision and Electro-Optics Directorate (NVEOD) as a task under the Advanced Helicopter Pilotage (AHP) Contract. The study was initiated by NVEOD to conceptually define future helicopter night pilotage systems and to assure that these systems are significantly more responsive to the needs of helicopter pilot visual requirements than previously fielded devices. Pilotage was considered on the basis of the ability to conduct military night flight operations based solely on imagery derived from combined image intensification and Forward-Looking InfraRed (FLIR) sensors. The night vision system of the future is envisioned as a high resolution, wide Field-of-View (FOV), monochromatic, cockpit-mounted and/or helmet-slaved display. Features of the envisioned system, which are intended to accommodate human visual needs, are discussed. (Author (revised))
SF- AIAA
DE- <MAJOR> *MILITARY HELICOPTERS; *NIGHT VISION; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- DISPLAY DEVICES; HEAD MOVEMENT; HELMET MOUNTED DISPLAYS; INFRARED DETECTORS; VIBRATION

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02075866
AN- <AEROSPACE> A93-35914
TI- Helmet Mounted Display symbology integration research
AU- HAWORTH, LORAN A.; SEERY, RONALD E. (U.S. Army, Aeroflightdynamics Directorate; NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
RF- 11
NT- In: AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vol. 1 (A93-35901 14-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9314
AB- A five-week flight simulation investigation comparing screen/head stabilized Apache Helmet Mounted Display (HMD) flight symbology to world stabilized flight symbology is presented in this paper. Simulation test results indicate that pilots perform significantly (P is less than .05) better using world stabilized attitude symbology. They were accurate to an average of 1/2 deg at estimating terrain relief and aerial target locations. Pilots were able to take advantage of world referenced symbology due to the unique features of HMD that allow the pilot to visually use the symbology at extreme azimuth and elevation off-axis angles. Pilots preferred world stabilized symbology while performing contour flight tasks. They reported that the use of climb-dive-marker during contour flight greatly reduced pilot work load under conditions tested. A surprising number of cyclic input errors occurred when using both MIL-STD-1295 hover symbology and test symbology, indicating that a better approach for depicting hover symbology is probably warranted. The magnitude of cyclic input and spatial estimation errors increased as the off-axis viewing angle became larger. (Author (revised))
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *HELMET MOUNTED DISPLAYS; *MILITARY HELICOPTERS; *PILOT PERFORMANCE
DE- DESIGN ANALYSIS; FLIGHT CONTROL; FLIGHT TESTS; MATHEMATICAL MODELS; NIGHT VISION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02075853
AN- <AEROSPACE> A93-35901
TI- AHS, Annual Forum, 48th, Washington, June 3-5, 1992, Proceedings. Vols. 1 & 2
PU- <PLACE> Alexandria, VA
PU- <PUBLISHER> American Helicopter Society
PY- 1992
PD- 199200
PG- 1608P.
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9314
AB- Topics addressed include the development of the coupled rotor-fuselage model, maximum operational effectiveness on RAH-66 Comanche, advanced helicopter pilotage visual requirements, Navy success in modification installation management, improved static and dynamic performance of helicopter powerplant, Navier-Stokes correlations to fuselage wind tunnel test data, a Taguchi analysis of helicopter maneuverability and agility, and thermoplastic applications in helicopter components. Also discussed are Mi-26 autorotational landings, improvements in hover display dynamics for a combat helicopter, prediction of rotorcraft transmission noise, an optimal composite curing system, helicopter rotor blade flap vibratory loads, cost/weight savings for the V-22 wing stow, helicopter response to atmospheric turbulence, a hover performance analysis of advanced rotor blades, scaling of energy absorbing composite plates, an avionics troubleshooting system, and an integrated navigation system for tactical helicopters. (AIAA)
SF- AIAA
DE- <MAJOR> *ACOUSTICS; *AERODYNAMIC CHARACTERISTICS; *AIRCRAFT CONSTRUCTION MATERIALS; *AIRCRAFT DESIGN; *CONFERENCES; *CREW WORKSTATIONS; *DYNAMIC STRUCTURAL ANALYSIS; *FLIGHT SIMULATION; *HUMAN FACTORS ENGINEERING; *MILITARY TECHNOLOGY; *PROPULSION SYSTEM PERFORMANCE; *ROTARY WING AIRCRAFT

DE- AEROELASTICITY; COMPOSITE STRUCTURES; ELASTIC BENDING; EXPERT SYSTEMS;
FLIGHT CHARACTERISTICS; HELICOPTER DESIGN; HELMET MOUNTED DISPLAYS;
NIGHT FLIGHTS (AIRCRAFT); RIGID ROTORS; ROTOR BLADES; ROTOR BODY INTERACTIONS; STRUCTURAL VIBRATION; TECHNOLOGY TRANSFER; TERRAIN ANALYSIS; VISUAL FLIGHT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02072781
AN- <AEROSPACE> A93-32829
TI- IR systems for helicopter pilotage
AU- BAUMAN, BRIAN; WOLFE, WILLIAM L. (Arizona Univ., Tucson)
PU- <PLACE> Bellingham, WA
PU- <PUBLISHER> Society of Photo-Optical Instrumentation Engineers
PY- 1992
PD- 199200
RF- 3
NT- In: Infrared technology XVIII; Proceedings of the Meeting, San Diego, CA, July 19-22, 1992 (A93-32826 12-35)
NT- Research sponsored by McDonnell Douglas Helicopter Co., U.S. Army, and Honeywell, Inc
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9312
AB- As part of a team headed by the McDonnell Douglas Helicopter company and including the Honeywell Systems and Research Division, we have investigated several advanced real-time viewing systems. The study was predicated upon human factors drivers that lead to specifications for several different types of systems. These include systems with 0.6 mr resolution and 170 x 50, 100 x 50, and 50 x 50 FOVs. (Author (revised))

SF- AIAA
DE- <MAJOR> *HELICOPTERS; *INFRARED IMAGERY; *NIGHT FLIGHTS (AIRCRAFT);
*PERFORMANCE PREDICTION; *REAL TIME OPERATION; *SYSTEMS ENGINEERING
DE- COMPUTERIZED SIMULATION; FIELD OF VIEW; IMAGE RESOLUTION; INFRARED
DETECTORS; LENS DESIGN; PIXELS; REQUIREMENTS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02072476
AN- <AEROSPACE> A93-32524
TI- Tomographic radar imaging of rotating structures
AU- FLISS, GERALD G. (Michigan Environmental Research Inst., Ann Arbor)
PU- <PLACE> Bellingham, WA
PU- <PUBLISHER> Society of Photo-Optical Instrumentation Engineers
PY- 1992
PD- 199200
RF- 6
NT- In: Synthetic aperture radar; Proceedings of the Meeting, Los Angeles, CA, Jan. 20, 21, 1992 (A93-32508 12-32)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9312
AB- A high PRF rate single frequency instrumentation radar is used to generate two-dimensional images of rotating structures such as helicopter blades and hubs. The technique utilizes a tomographic backprojection reconstruction algorithm where Doppler spectra generate cross-range one-dimensional profiles of the rotating structure. A simplified computer generated scattering model is developed to show proof-of-concept and aid in developing the reconstruction algorithm. (Author)
SF- AIAA
DE- <MAJOR> *IMAGE RECONSTRUCTION; *PULSE REPETITION RATE; *RADAR IMAGERY;
*ROTARY WINGS; *ROTATING BODIES; *TOMOGRAPHY
DE- ALGORITHMS; ANALOG TO DIGITAL CONVERTERS; COMPUTERIZED SIMULATION;
FOURIER TRANSFORMATION; HELICOPTERS; HOVERING; RADAR TRANSMISSION
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02068826
AN- <AEROSPACE> A93-28874
TI- Helicopters - Handbook
TI- <ORIGINAL> Vertolety - Spravochnik
TI- <EXTENSION> Russian book

AU- VOLODKO, A. M.; VERKHOZIN, M. P.; GORSHKOV, V. A.
PU- <PLACE> Moscow
PU- <PUBLISHER> Voennoe Izdatel'stvo
PY- 1992
PD- 199200
PG- 557P.
RN- ISBN 5-203-00804-3
LA- Russian
GL- Russia
CP- Russia
DT- BOOK
JA- IAA9310
AB- Fundamental reference data are presented on the aerodynamics, flight dynamics, design, equipment, and operation and maintenance of single-rotor and coaxial helicopters. In particular, the book covers the aerodynamics and dynamics of the rotor blades, stability and maneuverability of helicopters, takeoff and landing, and flight emergencies. Descriptions of the general design and technical maintenance data are presented for the main helicopter systems and components, including the main and tail rotors, control system, airframe components, powerplant, electrical equipment, instrumentation and oxygen equipment, radio communication equipment, and piloting and navigation systems. (V.L.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *FLIGHT MECHANICS; *HELICOPTER PERFORMANCE
DE- AIR FLOW; AIRCRAFT MAINTENANCE; AIRCRAFT POWER SUPPLIES; ATMOSPHERIC TURBULENCE; AUTOMATIC CONTROL; CONTROL EQUIPMENT; ELECTRIC EQUIPMENT; FUEL TANKS; HANDBOOKS; HELICOPTER CONTROL; MILITARY HELICOPTERS; RADIO EQUIPMENT; ROTARY WINGS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 02067145
AN- <AEROSPACE> A93-27193
TI- Human factors issues in the use of night vision devices
AU- KAISER, MARY K.; FOYLE, DAVID C. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PU- <PLACE> Santa Monica, CA
PU- <PUBLISHER> Human Factors Society
PY- 1991
PD- 199100
RF- 16
NT- In: Human Factors Society, Annual Meeting, 35th, San Francisco, CA, Sept. 2-6, 1991, Proceedings. Vol. 2 (A93-27126 09-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9309
AB- An account is given of the critical human factors that arise in field data on the differences between night vision displays and unaided day vision. Attention is given to the findings of empirical studies of performance on rotorcraft-flight-relevant perceptual tasks in which depth and distance perception are critical factors. Suggestions are made for man-machine-critical component design modifications in current night vision systems. (O.C.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING; *NIGHT VISION; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- GOGGLES; NIGHT FLIGHTS (AIRCRAFT); STEREOSCOPIC VISION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02067082
AN- <AEROSPACE> A93-27130
TI- The effect of roll-stabilized sensor information on pilot performance
AU- MONTAZER, M. A. (New Haven Univ., West Haven, CT); FERRANTI, MICHAEL J. (Sikorsky Aircraft, Stratford, CT)
PU- <PLACE> Santa Monica, CA
PU- <PUBLISHER> Human Factors Society
PY- 1991
PD- 199100
RF- 5
NT- In: Human Factors Society, Annual Meeting, 35th, San Francisco, CA, Sept. 2-6, 1991, Proceedings. Vol. 1 (A93-27126 09-54)
NT- Research supported by Univ. of New Haven
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9309
AB- A study of the night vision sensor systems on helicopters was conducted at the flight simulation facilities at Sikorsky Aircraft. The study was concerned with determining possible pilot performance improvements with the sensor system being roll-stabilized with respect to the airframe as opposed to it being non-roll-stabilized. A six-pilot x two-sensor factorial experiment was designed and data were collected with respect to nine response variables. The results of the statistical analysis performed on the data were mixed in terms of the superiority of one sensor design over the other. The power collective input was significantly greater for the roll-stabilized design. However, the pilots also flew faster and made fewer errors, though the differences were not significant. One reason for such results might be that the pilots were less familiar with the roll-stabilized design, as it is a more recent technology. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT INSTRUMENTS; *INFORMATION SYSTEMS; *LATERAL CONTROL;
*LATERAL STABILITY; *NIGHT VISION; *PILOT PERFORMANCE
DE- FLIGHT SIMULATION; PILOT ERROR; SIKORSKY AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02063527
AN- <AEROSPACE> A93-23575
TI- Calibration of passive remote observing optical and microwave instrumentation; Proceedings of the Meeting, Orlando, FL, Apr. 3-5, 1991
AU- GUENTHER, BRUCE W., ED. (NASA, Goddard Space Flight Center, Greenbelt, MD)
CS- National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
CS- <CODE> NC999967
PU- <PLACE> Bellingham, WA
PU- <PUBLISHER> Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 1493)
PY- 1991
PD- 199100
PG- 314P.
RN- SPIE-1493; ISBN 0-8194-0602-3
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9307
AB- Various papers on the calibration of passive remote observing optical and microwave instrumentation are presented. Individual topics addressed include: on-board calibration device for a wide field-of-view instrument, calibration for the medium-resolution imaging spectrometer, cryogenic radiometers and intensity-stabilized lasers for EOS radiometric calibrations, radiometric stability of the Shuttle-borne solar backscatter ultraviolet spectrometer, ratioing radiometer for use with a solar diffuser, requirements of a solar diffuser and measurements of some candidate materials, reflectance stability analysis of Spectralon diffuse calibration panels, stray light effects on calibrations using a solar diffuser, radiometric calibration of SPOT 23 HRVs, surface and aerosol models for use in radiative transfer codes. Also addressed are: calibrated intercepts for solar radiometers used in remote sensor calibration, radiometric calibration of an airborne multispectral scanner, in-flight calibration of a helicopter-mounted Daedalus multispectral scanner, technique for improving the calibration of large-area sphere sources, remote colorimetry and its applications, spatial sampling errors for a satellite-borne scanning radiometer, calibration of EOS multispectral imaging sensors and solar irradiance variability. (For individual items see A93-23576 to A93-23603) (C.D.)
SF- AIAA
DE- <MAJOR> *CALIBRATING; *CONFERENCES; *MICROWAVE EQUIPMENT; *OPTICAL
MEASURING INSTRUMENTS; *REMOTE SENSING
DE- CRYOGENIC EQUIPMENT; EARTH OBSERVING SYSTEM (EOS); HEAT MEASUREMENT;
INFRARED SPECTROMETERS; MICROWAVE RADIOMETERS; RADIOMETRIC CORRECTION;
SATELLITE IMAGERY; SATELLITE-BORNE INSTRUMENTS; SOLAR FLUX DENSITY;
ULTRAVIOLET SPECTROMETERS
SH- 7519 Spacecraft Instrumentation (1975-)

AN- <DIALOG> 02063102
AN- <AEROSPACE> A93-23150
TI- Psychophysiological factors which impair the professional reliability of a pilot in emergency situations
TI- <ORIGINAL> Psikhofiziologicheskie faktory, snizhaiushchie

professional'nuiu nadezhnost' letchika v avariinykh situatsiiakh
AU- KOZLOV, V. V.; FEDORUK, A. G.; SHCHERBINSKII, V. V.
SO- Voenno-Meditsinskii Zhurnal (ISSN 0026-9050)
PY- 1992
PD- 199211
SN- 0026-9050
LA- Russian
GL- Russia
CP- Russia
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9307
AB- The main psychophysiological causes of the decreased performance of pilots during emergency situations created by instrument or mechanical breakdowns during flight were investigated using results of a study of helicopter pilots whose psychophysiological parameters were measured during normal flight and in emergency situations. It was found that an expectation of a breakdown by an insufficiently trained pilot does not necessarily improve his performance during the breakdown. The rate of adaptation of a pilot to emergency situations created by mechanical breakdowns is determined by the level of the pilot's experience (i.e., his ability to recognize the situation). (I.S.)
SF- AIAA
DE- <MAJOR> *EMERGENCIES; *PHYSIOLOGICAL EFFECTS; *PILOT PERFORMANCE;
*PSYCHOLOGICAL EFFECTS; *PSYCHOPHYSIOLOGY
DE- ADAPTATION; HEART RATE; HELICOPTERS; PILOT TRAINING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02061147
AN- <AEROSPACE> A93-21195
TI- FOG production transfer at Litton
AU- PAVLATH, GEORGE (Litton Aero Products, Guidance and Control Systems Div., Woodland Hills, CA)
PU- <PLACE> Washington
PU- <PUBLISHER> Institute of Navigation
PY- 1992
PD- 199200
NT- In: Institute of Navigation, National Technical Meeting, San Diego, CA, Jan. 27-29, 1992, Proceedings (A93-21176 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9306
AB- A development status evaluation is presented for fiber-optic gyros that are currently being produced with 1.0-0.1 deg/hr accuracy for military helicopter applications. These have been operated throughout the stipulated temperature range, as well as in harsh vibration environments. Attention is given to the illustrative case of the LN-200 system, which employs silicon accelerometers. (O.C.)
SF- AIAA
DE- <MAJOR> *FIBER OPTICS; *INERTIAL PLATFORMS; *OPTICAL GYROSCOPES; *PRODUCT DEVELOPMENT
DE- DRIFT (INSTRUMENTATION); PRODUCTION ENGINEERING
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 02058368
AN- <AEROSPACE> A93-18416
TI- Preclinical cardiovascular and neurological occupation-related pathological symptoms in helicopter pilots
TI- <ORIGINAL> Donozologicheskie serdechno-sosudistye i nevrologicheskie proiavleniia professional'noi patologii u letchkov vertoletnoi aviatsii
AU- AKIMOV, S. N.; ODINAK, M. M.; EMEL'IANOV, A. IU.; BLAGININ, A. A.; GEORGINOV, A. A.
PU- <PLACE> Moscow
PU- <PUBLISHER> AN SSSR, Institut Istorii Estestvoznaniia i Tekhniki
PY- 1991
PD- 199100
RF- 6
NT- In: K.E. Tsiolkovsky and biomedical problems connected with space exploration; Lectures Devoted to K.E. Tsiolkovsky's Ideas, 25th, Kaluga, Russia, Sept. 11-14, 1990, Transactions (A93-18406 05-52)
LA- Russian
GL- Russia
CP- Russia
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9305
AB- The effect of vibration and noise on the cardiovascular and neural systems of helicopter pilots was investigated in 334 students of a helicopter-aviation school and 79 pilots with various lengths of flight time. Results showed that students without flight experience were free of cardiovascular or neural symptoms, whereas pilots with 500 or more hours of flight time exhibited an increased number of symptoms (e.g.,

82.1 percent of pilots with more than 1500 hours of flight complained of asthenia) and significant ECG alterations. Vertebral changes were found in 87 percent of pilots with over 1500 hours of flight time. (I.S.)
SF- AIAA
DE- <MAJOR> *CARDIOVASCULAR SYSTEM; *FLIGHT TIME; *HELICOPTER CONTROL; *HUMAN PATHOLOGY; *NEUROLOGY; *PILOT PERFORMANCE
DE- NOISE GENERATORS; STRUCTURAL VIBRATION; VERTEBRAE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02058358
AN- <AEROSPACE> A93-18406
TI- K.E. Tsiolkovsky and biomedical problems connected with space exploration; Lectures Devoted to K.E. Tsiolkovsky's Ideas, 25th, Kaluga, Russia, Sept. 11-14, 1990, Transactions
TI- <ORIGINAL> K.E. Tsiolkovskii i biomeditsinskie problemy osvoeniia kosmicheskogo prostranstva; Chteniia, Posviashchennye Ideiam K.E. Tsiolkovskogo, 25th, Kaluga, Russia, Sept. 11-14, 1990, Trudy
AU- MALKIN, V. B.; KOSMOLINSKII, F. P.; KUZNETS, E. I., EDS.
PU- <PLACE> Moscow
PU- <PUBLISHER> AN SSSR, Institut Istorii Estestvoznaniia i Tekhniki
PY- 1991
PD- 199100
PG- 90P.
LA- Russian
GL- Russia
CP- Russia
DT- CONFERENCE PROCEEDINGS
JA- IAA9305
AB- The volume contains papers on Tsiolkovsky's ideas on the problem of human survival in extreme environmental conditions on earth and in space, the interaction of terrestrial and space environments with human life, and the role of human factors in securing safety during spaceflights. Attention is also given to the problem of decompression safety of cosmonauts on a mission to Mars, problems of medical support of EVA during a manned mission to Mars, the factor of physical fitness as a criterion of readiness for spaceflights, and the results from a general model of external information perception. Particular consideration is given to the efficiency of a rehabilitation and prophylactic treatment of civil aviation flight crews, preclinical cardiovascular and neurological occupation-related pathological symptoms in helicopter pilots, psychophysiological studies of acute hypoxia, and the effects of possible atmospheric pollution sources on the growth of selected microorganisms. (For individual items see A93-18407 to A93-18419) (I.S.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENVIRONMENTS; *BIOMEDICAL DATA; *CONFERENCES; *EARTH ENVIRONMENT; *MANNED SPACE FLIGHT; *SURVIVAL
DE- AEROSPACE MEDICINE; AIRCRAFT PILOTS; CARDIOVASCULAR SYSTEM; EXTRAVEHICULAR ACTIVITY; FLIGHT CREWS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; HYPOXIA; INFORMATION PROCESSING (BIOLOGY); MANNED MARS MISSIONS; MICROORGANISMS; PHYSICAL FITNESS; PSYCHOPHYSIOLOGY; SPACE COLONIES; SPACE EXPLORATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02057261
AN- <AEROSPACE> A93-17309
TI- Helicopter approaches in low visibility using RGPS and EFIS
TI- <EXTENSION> EFIS - Electronic Flight Instrumentation System
AU- DOWNES, M.; BROWN, C. (Royal Aerospace Establishment, Bedford, United Kingdom)
PU- <PLACE> London
PU- <PUBLISHER> Royal Aeronautical Society
PY- 1991
PD- 199100
RF- 2
NT- In: Fixed and rotary wing all weather operations; Proceedings of the Conference, London, United Kingdom, Apr. 23, 24, 1991 (A93-17301 04-03)
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9304
AB- This paper describes the development of a guidance system using the Global Positioning System (GPS). The system is aimed specifically at providing precision guidance for the recovery of helicopters to small ships at sea. The background to this work, and the method of deriving the guidance and displaying it to the pilot is described. The use of an electronic display system and the development of various approach profiles to reduce pilot workload are also discussed. The results of

recent sea trials are examined. (Author)
SF- AIAA
DE- <MAJOR> *DATA LINKS; *FLIGHT INSTRUMENTS; *GLIDE PATHS; *GLOBAL POSITIONING SYSTEM; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COST EFFECTIVENESS; FLIGHT CONTROL
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02057253
AN- <AEROSPACE> A93-17301
TI- Fixed and rotary wing all weather operations; Proceedings of the Conference, London, United Kingdom, Apr. 23, 24, 1991
PU- <PLACE> London
PU- <PUBLISHER> Royal Aeronautical Society
PY- 1991
PD- 199100
PG- 149P.
RN- ISBN 0-903409-90-9
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA9304
AB- The present conference discusses the Autoland commercial aircraft landing system, all-weather commercial operations, the certification of HUDs for Category 3 operation, the development and implementation of a HUD guidance system for manual CAT III landings, and landing guidance systems for CAT III operations. Also discussed are ATC and ground-movement control in low visibility, helicopter fog-flying trials, helicopter approaches in low visibility using Relative GPS and the Electronic Flight Instrumentation System, helicopter automatic flight control systems for all weather operations, and ground visual aids. (For individual items see A93-17302 to A93-17311) (O.C.)
SF- AIAA
DE- <MAJOR> *AIR TRAFFIC CONTROL; *ALL-WEATHER LANDING SYSTEMS; *AUTOMATIC LANDING CONTROL; *CONFERENCES; *ROTARY WING AIRCRAFT
DE- AIRCRAFT LANDING; AIRCRAFT RELIABILITY; FLIGHT CONTROL; GLOBAL POSITIONING SYSTEM; GROUND BASED CONTROL; HEAD-UP DISPLAYS; INSTRUMENT LANDING SYSTEMS; LOW VISIBILITY; MICROWAVE LANDING SYSTEMS; PILOT TRAINING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02053282
AN- <AEROSPACE> A93-13330
TI- Determination of YAV-8B Reaction Control System bleed flow usage
AU- BORCHERS, PAUL F.; MORALEZ, ERNESTO, III; MERRICK, VERNON K.; STORTZ, MICHAEL W. (NASA, Ames Research Center, Moffett Field, CA); EAMES, DAVID J. H. (Rolls-Royce, Inc., Atlanta, GA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1992
PD- 199208
PG- 25P.
RF- 4
NT- AIAA, Aircraft Design Systems Meeting, Hilton Head Island, SC, Aug. 24-26, 1992
RN- AIAA PAPER 92-4232
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9302
AB- Using a calibrated Rolls-Royce Pegasus engine, total Reaction Control System (RCS) bleed flow rates have been measured on a YAV-8B Harrier during typical short takeoff, transition, hover and vertical landing maneuvers. Using existing aircraft instrumentation and pressure taps located in the RCS ducts, bleed flow rates at each RCS valve were also measured directly during flight and ground tests. These data were compared with the calibrated engine data and with the RCS part of a YAV-8B mathematical model used in piloted simulation at NASA Ames Research Center. Areas of disagreement were small, being confined to the estimation of closed RCS valve leakages and the modeling of the RCS butterfly valve pressure losses. (Author)
SF- AIAA
DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *ENGINE CONTROL; *FLIGHT TESTS; *REACTION CONTROL; *V/STOL AIRCRAFT; *VERTICAL LANDING
DE- CALIBRATING; COMPUTERIZED SIMULATION; FLOW MEASUREMENT; GROUND TESTS; HOVERING
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 02050278
AN- <AEROSPACE> A93-10326
TI- Effects of 2 mg and 4 mg atropine sulfate on the performance of U.S. Army helicopter pilots
AU- CALDWELL, JOHN A., JR.; STEPHENS, ROBERT L.; CARTER, DAVID J.; JONES, HEBER D. (U.S. Army, Aeromedical Lab., Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562)
PY- 1992
PD- 199210
RF- 15
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9301
AB- Atropine autoinjectors are issued to aviators for use in the event of organophosphate poisoning on the battlefield. This investigation assessed the effects of unchallenged 2 mg and 4 mg doses on flight performance, vision, tracking, cognitive performance, and electroencephalograms of 12 Army aviators. Effects were seen most often with the 4 mg dose in terms of aircraft control problems, vision disturbances, impaired tracking, reduced cortical activation, and decreased cognitive skill. These problems indicate helicopter tactical flight is dangerous after an unchallenged 4 mg dose. Other types of flight should also be avoided for at least 12 h after atropine. (Author)
SF- AIAA
DE- <MAJOR> *ANTIDOTES; *ATROPINE; *MILITARY HELICOPTERS; *PILOT PERFORMANCE
DE- BIOCHEMISTRY; PHYSIOLOGICAL EFFECTS; SULFATES
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02048144
AN- <AEROSPACE> N92-32433
TI- Observing team coordination within Army rotary-wing aircraft crews
TI- <SUPPLEMENT> Interim Report, Apr. - Oct. 1990
AU- THORDSEN, MARVIN L.; KLEIN, GARY A.; WOLF, STEVE
CS- Klein Associates, Inc., Yellow Springs, OH.
CS- <CODE> KX331011
PY- 1992
PD- 199205
PG- 41P.
CN- MDA903-87-C-0523; DA PROJ. 2Q1-62785-A-791
RN- AD-A252234; ARI-RN-92-40
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9223
AB- The purpose of this project was to demonstrate the feasibility of using team decision models to help train crew coordination in the tactical helicopter domain. Ten aircrews were studied as they performed a tactical mission in a UH-60 simulator facility at Fort Campbell, Kentucky. The results indicate that the methods can be adapted for observing team decision-making processes during some types of helicopter missions. Five opportunities for aircrew coordination training were identified: rehearsing mission functional profiles, analyzing commander's intent during preplanning sessions, focusing the time horizon, avoiding micromanagement, and getting cues for anticipation/confirmation during the actual mission. Recommendations were presented for training observers and instructors to use these categories. (DTIC)
SF- DTIC
DE- <MAJOR> *COORDINATION; *CREW PROCEDURES (INFLIGHT); *DECISION MAKING; *FLIGHT CREWS; *GROUP DYNAMICS; *HELICOPTERS
DE- FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING; MISSION PLANNING; PILOT TRAINING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02046882
AN- <AEROSPACE> N92-31165
TI- Helicopter nighttime parking test results - UH-1
TI- <SUPPLEMENT> Technical Report, Jan. - Aug. 1989
AU- WEISS, ROSANNE M.
CS- Federal Aviation Administration, Atlantic City, NJ.
CS- <CODE> FI751336
PY- 1992
PD- 199205
PG- 67P.
RN- DOT/FAA/CT-TN92/1; AD-A253798
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9221
AB- Flight tests were previously conducted at the Federal Aviation Administration (FAA) Technical Center to examine issues regarding rotortip separation in ground maneuver areas at heliports. Technical Note DOT/FAA/CT-TN88/30, 'Heliport Surface Maneuvering Test Results', details the results of those tests. However, those tests were conducted under visual flight conditions (VFR) daylight conditions. Given the limitations of scoptic vision, it was determined that nighttime testing was needed to determine whether pilot parking separation performance and perception deteriorates under night, low ambient light conditions. This report documents the results of nighttime parking tests conducted at the Technical Center between Jan. - Aug. 1989. Over 100 parking maneuvers were conducted using a UH-1H helicopter. All were conducted under head, tail, and crosswind conditions, with an unlit and a lit obstacle and without an obstacle in place. Pilot subjective data in reference to these maneuvers were collected via post-maneuver ratings and post-flight questionnaire. Data collection and analysis methodology and objective as well as subjective issues are discussed. Statistical and graphical analysis of pilot performance and perception data and subjective input are provided. Conclusions are drawn about the considerations that must be given to parking space size at heliports permitting nighttime operations. (Author)
DE- <MAJOR> *FLIGHT CONDITIONS; *FLIGHT TESTS; *HELIPORTS; *NIGHT; *PILOT PERFORMANCE; *UH-1 HELICOPTER; *VISUAL FLIGHT
DE- DATA ACQUISITION; DAYTIME; MANEUVERS; STATISTICAL ANALYSIS; WIND DIRECTION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02037707
AN- <AEROSPACE> N92-21956
TI- A new method for simulating atmospheric turbulence for rotorcraft applications
AU- RIAZ, J. (Georgia Inst. of Tech., Atlanta.); PRASAD, J. V. R. (Georgia Inst. of Tech., Atlanta.); SCHRAGE, D. P. (Georgia Inst. of Tech., Atlanta.); GAONKAR, G. H. (Florida Atlantic Univ., Boca Raton.)
CS- Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
CS- <CODE> GW167534
PY- 1991
PD- 199111
NT- In AGARD, Aircraft Ship Operations 6 p (SEE N92-21951 12-05)
CN- NCA2-512
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9212
AB- Simulation of atmospheric turbulence as seen by a rotating blade element involves treatment of cyclostationary processes. Conventional filtering techniques do not lend themselves well to the generation of such turbulence sample functions as are required in rotorcraft flight dynamics simulation codes. A method to generate sample functions containing second order statistics of mean and covariance is presented. Compared to ensemble averaging involving excessive computer time, the novelty is to exploit cycloergodicity and thereby, replace ensemble averaging by averaging over a single path sample function of long duration. The method is validated by comparing its covariance results with the analytical and ensemble averaged results for a widely used 1-D turbulence approximation. (Author)
DE- <MAJOR> *ATMOSPHERIC TURBULENCE; *BLADE-VORTEX INTERACTION; *FLOW DISTRIBUTION; *INTERACTIONAL AERODYNAMICS; *MATHEMATICAL MODELS; *ROTARY WING AIRCRAFT; *TURBULENT FLOW
DE- COMPUTER PROGRAMS; COMPUTERIZED SIMULATION; COVARIANCE; FUNCTIONS (MATHEMATICS); HUMAN FACTORS ENGINEERING; MONTE CARLO METHOD; ROTOR BLADES
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02034778
AN- <AEROSPACE> N92-19020
TI- Design of helicopter night pilotage sensors: Lessons learned from recent flight experiments and field assessments
TI- <SUPPLEMENT> Abstract Only
AU- VOLLMERHAUSEN, RICHARD; BUI, TRANG; NASH, CAROLYN
CS- Center for Night Vision and Electro-Optics, Fort Belvoir, VA.
CS- <CODE> CJ126933

PY- 1991
PD- 199112
NT- In AGARD, Helmet Mounted Displays and Night Vision Goggles 1 p (SEE N92-19008 09-54)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A02
JA- STAR9209
AB- The Army requirement to fly helicopters at low level at night led to the development and fielding of night vision pilotage sensors. These sensors have included image intensifiers (I sup 2) operating in the near infrared as well as 8 to 12 micron thermal imagers. The design of current pilotage sensors was driven by available technology. There were no clear data for optimum pilotage sensor design, to enable the designer to trade off sensor field of view (FOV) and resolution or to predict the performance sensitivity. The Center of Night Vision and Electro-Optics (CCNVEO) is establishing design criteria for night pilotage sensors. Our program included flight experiments to define sensor characteristics which optimize flight tasks as well as assessments of the performance of fielded systems. We conclude that terrain flight can be accomplished with reasonable pilot workload using a head-tracked sensor with 40 degree FOV and 0.6 cycles per milliradian (cy/mrad) resolution. Larger FOV or better resolution will lessen workload and improve confidence; however, the ability to resolve scene detail of 0.6 cy/mrad is essential and should not be traded for increased FOV. Furthermore, a pilotage system which provides both thermal and I sup 2 imagery will significantly enhance system capability to support a variety of flight tasks under a wide range of environments. We also conclude that solid state cameras with detector dwell time equal to the standard video field rate are not suitable for use in helicopter pilotage systems. The long dwell time leads to image blur due to the head and scene motion associated with many pilotage tasks. (Author)
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *ELECTRO-OPTICS; *FIELD OF VIEW; *HELICOPTER CONTROL; *HELMET MOUNTED DISPLAYS; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION
DE- FLIGHT TESTS; IMAGE INTENSIFIERS; MOTION PERCEPTION; NEAR INFRARED RADIATION; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02033774
AN- <AEROSPACE> N92-18014
TI- An evaluation of four F-16 vertical velocity indicator configurations
TI- <SUPPLEMENT> Final Report, Feb. - May 1990
AU- CONE, SCOTT M.; HASSOUN, JOHN A.
CS- Aeronautical Systems Div., Wright-Patterson AFB, OH.
CS- <CODE> AF595779
PY- 1991
PD- 199111
PG- 53P.
RN- AD-A243629; ASD-TR-91-5007
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9209
AB- Four different Vertical Velocity Indicator (VVI) configurations/mechanizations were evaluated in an F-16C simulator: (1) F-16C moving tape VVI; (2) electromechanical semicircular, moving pointer VVI; (3) liquid crystal, semicircular, moving pointer VVI; and (4) same as 3 with a faster response time. Configurations 1, 2, and 3 had the same dampening characteristics as are currently used in the F-16C; configuration 4 was included to assess the impact of VVI dampening on pilot performance. Ten pilots flew a series of rate climbs/descents and an Instrument Landing System approach and landing for each configuration. Pilot performance data showed a larger average pitch rate for the moving tape VVI, suggesting greater workload, and an improved ability to maintain a specified vertical velocity when using configuration 4. Subjective data showed that the moving tape was the least preferred of the four, especially for use in dynamic conditions. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *ATTITUDE CONTROL; *COCKPITS; *F-16 AIRCRAFT; *INSTRUMENT LANDING SYSTEMS; *LANDING AIDS; *VERTICAL FLIGHT
DE- DIALS; ELECTROMECHANICAL DEVICES; LIQUID CRYSTALS; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- <COSATI> 14B Laboratories, Test Facilities, & Test Equipment
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02032965
AN- <AEROSPACE> N92-17165
TI- System identification methods for handling-qualities evaluation
AU- TISCHLER, MARK B.
CS- Army Aviation Systems Command, Moffett Field, CA. Aeroflightdynamics Directorate.
CS- <CODE> AZ153632
PY- 1991
PD- 199110
NT- In AGARD, Rotorcraft System Identification 9 p (SEE N92-17153 08-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9208
AB- System identification methods for rotorcraft handling-qualities studies are discussed in this paper. A key factor that is responsible for the successful application of system identification techniques in the handling-qualities community is the relative simplicity of the models which are desired for pilot-in-the-loop analyses as compared to the full 6 Degree Of Freedom (DOF) models required for most other applications. Generally, these analyses consider only the on-axis, single-input/single-output response of the pilot/vehicle system. The extracted vehicle model may be nonparametric, such as a frequency-response, or a low-order parametric model, such as a transfer function, or a simplified decoupled state-space representation. Both time- and frequency-domain methods have been widely used for these applications and are discussed in this paper. The requirements for flight testing, data analyses, and modeling for handling-qualities applications of system identification are contrasted with the requirements for extracting multi-input/multi-output state-space models for flight mechanics purposes. Typical handling qualities analysis results are illustrated using the WG 18 databases for the BO-105 and AH-64 helicopters. (Author)
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *CONTROLLABILITY; *FLIGHT MECHANICS; *FLIGHT TESTS; *PILOT PERFORMANCE; *ROTARY WING AIRCRAFT; *SYSTEM IDENTIFICATION
DE- AH-64 HELICOPTER; BO-105 HELICOPTER; DEGREES OF FREEDOM; FLIGHT SIMULATION; TRANSFER FUNCTIONS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02032955
AN- <AEROSPACE> N92-17155
TI- Instrumentation and data processing
AU- KALETKA, JUERGEN
CS- Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugmechanik.
CS- <CODE> DO744537
PY- 1991
PD- 199110
NT- In AGARD, Rotorcraft System Identification 18 p (SEE N92-17153 08-05)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR9208
AB- The quality of measured flight test data is critically important to system identification. Inaccurate or kinematically inconsistent data can lead to identification of an incorrect model or inability to obtain convergence of the estimation solution. Therefore, this lecture concentrates on instrumentation and data processing aspects from a system identification point of view. It is mainly based on the work of the Advisory Group for Aerospace Research & Development (AGARD) Working Group WG-18 on Rotorcraft System Identification who concentrated on the identification of 6 degrees of freedom models. In addition, rotor blade instrumentation needed for the determination of extended models with explicit rotor degrees of freedom is addressed. (Author)
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AIRCRAFT MODELS; *DATA PROCESSING; *FLIGHT TESTS; *HELICOPTER CONTROL; *HELICOPTERS; *MATHEMATICAL MODELS; *SYSTEM IDENTIFICATION
DE- DEGREES OF FREEDOM; ERROR ANALYSIS; LEAST SQUARES METHOD; ROTOR AERODYNAMICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02032954
AN- <AEROSPACE> N92-17154

TI- Design of experiments
AU- MURRAY-SMITH, DAVID J. (Glasgow Univ. (Scotland).); PADFIELD, GARETH D. (Royal Aerospace Establishment, Bedford, England)
CS- Glasgow Univ. (Scotland). Dept. of Electronics and Electrical Engineering.
CS- <CODE> G0637282
PY- 1991
PD- 199110
NT- In AGARD, Rotorcraft System Identification 8 p (SEE N92-17153 08-05)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9208
AB- The planning and conduct of flight experiments is a critically important part of the system identification process. Factors such as the choice of test input signal and the duration of the experiment can have a major influence on the quality of the identification results. Other factors such as the quality of flightcrew and groundcrew briefings and the availability of online monitoring facilities also greatly influence the effectiveness of any flight testing program. Inevitably there is a trade-off between performance and flight safety which must be taken fully into account at all stages of identification flight trials and influences the experiment design process and test matrix in a very significant way. Other important practical constraints arise in experiment design, especially when test input signals have to be applied manually by the pilot. An outline of the forms of test input most commonly used for identification is included, and an account of methods of experimental design is provided in which the value of a frequency-domain approach is emphasized. (Author)
DE- <MAJOR> *EXPERIMENT DESIGN; *FLIGHT SAFETY; *FLIGHT TESTS; *HELICOPTER DESIGN; *HELICOPTERS; *SYSTEM IDENTIFICATION
DE- FLIGHT CREWS; GROUND CREWS; PILOT PERFORMANCE; ROTOR AERODYNAMICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02029391
AN- <AEROSPACE> N92-13583
TI- Task analysis and workload prediction model of the MH-60K mission and a comparison with UH-60A workload predictions. Volume 1: Summary Report
TI- <SUPPLEMENT> Interim Report, Dec. 1988 - Apr. 1990
AU- BIERBAUM, CARL R.; HAMILTON, DAVID B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL.
CS- <CODE> AU848387
PY- 1990
PD- 199010
PG- 56P.
CN- MDA903-87-C-0523
RN- AD-A241204; ASI90-328-90-II-VOL-1; ARI-RR-1576-VOL-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9204
AB- A mission scenario was used to conduct a comprehensive task analysis for MH-60K operations. The analysis used a top-down approach to identify the phases, functions, and tasks for the mission. Five phases, 15 segments, 71 functions, and 230 tasks were identified. Researchers identified the crewmember performing each task, and derived estimates of the sensory, cognitive, and psychomotor workload associated with each task. Estimates of the task durations also were derived. The mission/task/workload analysis data were used to develop a computer model of workload for MH-60K crewmembers. The model used a bottom-up approach to build mission functions from tasks and mission segments from functions. Decision rules were written to specify the procedure for combining the tasks into functions and the functions into segments. The model permitted an analysis of total workload experienced by the pilot and copilot in the performance of both sequential and concurrent tasks. The predicted workload for the MH-60K pilot and copilot was compared to the UH-60A baseline workload prediction to determine the impact of the MH-60K advanced technology. The comparison indicated very little difference in the predicted workload for the pilot and indicated a lower predicted workload for the copilot in the MH-60K. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *H-60 HELICOPTER; *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE; *TASKS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMBAT; COMPUTERIZED SIMULATION; MATHEMATICAL MODELS; TASK COMPLEXITY; VISUAL TASKS
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02027444
AN- <AEROSPACE> N92-11629
TI- Perceptual style and air-to-air tracking performance
AU- ATCHLEY, PAUL
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1991
PD- 199107
PG- 8P.
CN- RTOP 505-61-51
RN- NASA-TM-102868; A-91032; NAS 1.15:102868; USAAVSCOM-TR-90-A-004
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A01
JA- STAR9202
AB- The relationship between perceptual style and tracking of a target was examined. Four pilots were given the Embedded Figures Test to assess their degree of field dependence or independence. They then flew a helicopter simulator and attempted to track an airborne target. A significant correlation was found between perceptual style and tracking performance. Field independent subjects were able to track the target for longer periods than field dependent subjects. (Author)
DE- <MAJOR> *FLIGHT SIMULATORS; *HELICOPTERS; *PILOT PERFORMANCE; *TARGETS; *TRACKING (POSITION); *VISUAL PERCEPTION
DE- CORRELATION; EMBEDDING
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02026820
AN- <AEROSPACE> N92-10993
TI- Guidelines for integrating helicopter assets into emergency planning
TI- <SUPPLEMENT> Final Report
AU- HENNINGER, SANDRA; THOMPSON, JACK; ADAMS, CATHERINE (Advanced Aviation Concepts, Jupiter, FL.)
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> S9210736
PY- 1991
PD- 199107
PG- 66P.
CN- DTFA01-87-C-00014
RN- SCT-91RR-18; DOT/FAA/RD-90/11
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9202
AB- The guidelines are presented which contain recommendations on how to best integrate helicopters into existing emergency planning in order to provide maximum protection and life saving services in the community. Further information is provided on developing an inventory of helicopter resources; surveying helicopter operators capabilities; determining communication capabilities and requirements; designating, establishing, and controlling landing zones; and implementing a planned helicopter response. (Author)
DE- <MAJOR> *DISASTERS; *EMERGENCIES; *HELICOPTERS; *REQUIREMENTS; *RESCUE OPERATIONS
DE- COMMUNICATION; INVENTORIES; PILOT PERFORMANCE; SAFETY FACTORS; SURVEYS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02025290
AN- <AEROSPACE> A92-56954
TI- Requirements for future research in flight simulation training - Guidance based on a meta-analytic review
AU- HAYS, ROBERT T.; JACOBS, JOHN W.; PRINCE, CAROLYN; SALAS, EDUARDO (U.S. Navy, Naval Training Systems Center, Orlando, FL)
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 2, no. 2, 1992, p. 143-158. Research supported by Oak Ridge Associated Universities.
PY- 1992
PD- 199200
RF- 37
SN- 1050-8414
LA- English

GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9224
AB- Traditional narrative reviews of aviation training research have produced inconsistent conclusions and little specific guidance for training design. A quantitative review approach, referred to as meta-analysis, was applied to transfer of training experiments that included sufficient information for the statistical analysis. From a total of 247 journal articles and technical reports, only 26 experiments (19 involving jet aircraft and 7 involving helicopters) were included in the final meta-analysis. Drawing on the meta-analytic review, this report outlines an agenda for future research and provides guidelines for reporting research results. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *FLIGHT SIMULATORS; *FLIGHT TRAINING
DE- DESIGN ANALYSIS; HUMAN FACTORS ENGINEERING; TRAINING EVALUATION; TRANSFER OF TRAINING; VISUAL TASKS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02024673
AN- <AEROSPACE> A92-56337
TI- Design method of a helicopter cockpit
AU- GUBAREV, B. A. (Kamov Helicopter Scientific and Technology Co., Russia)

SO- European Rotorcraft Forum, 17th, Berlin, Germany, Sept. 24-26, 1991, Paper. 14 p.
PY- 1991
PD- 199109
RF- 4
LA- English
GL- Russia
CP- International Organization
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9224
AB- Problems involved in developing a helicopter crew cabin layout are described. These problems are solved within the scope of the task of rendering compatible two essentially different components: the technical details of a cabin and human performance. Heterogeneity and multicriteria aspects relevant to the cockpit layout are investigated, with priority given to behavioral engineering in search of technical solutions. The task of designing a crew cabin layout and selecting its parameters at the early stages of helicopter design is addressed. In this connection, the cabin structure is based on fundamental interfunctional relations as a starting point in designing a crew cabin layout as a complete helicopter component which reflects its application roles and operational features. (C.A.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMPARTMENTS; *COCKPITS; *HELICOPTER DESIGN
DE- DISPLAY DEVICES; FLIGHT CREWS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02024396
AN- <AEROSPACE> A92-56060
TI- An experiment on pilot's visual cues in low altitude helicopter flight
AU- KAWAHARA, HIROYASU; WATANABE, AKIRA; TANAKA, KEIJI; WAKAIRO, KAORU;
FUNABIKI, KOHEI (National Aerospace Laboratory, Chofu, Japan)
SO- IN: Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-9, 1991, Proceedings (A92-56001 24-01). Tokyo, Japan Society for Aeronautical and Space Sciences, 1991, p. 266-269. In Japanese.
PY- 1991
PD- 199100
RF- 2
LA- Japanese
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9224
AB- In order to obtain technical data to be utilized for preventing helicopter accidents caused by human pilots, a flight experiment was conducted by National Aerospace Laboratory, as a part of the urgent research on safety of helicopter operations by the Science and Technology Agency. This paper describes the flight research on pilot's visual cues, which has three themes: visual cues during dropping dusting-powder, identification of cables, and visual cues during hovering and forward flights. Human visual scanning behavior was monitored by an eye-mark-recorder. The results revealed human regular scanning behavior and low ability to identify cables. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *LOW ALTITUDE; *PILOT PERFORMANCE; *VISUAL

FLIGHT; *VISUAL SIGNALS
DE- FLIGHT TESTS; HELICOPTER CONTROL
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02024362
AN- <AEROSPACE> A92-56026
TI- An investigation of the automation of emergency landings for helicopters
AU- SAITO, HIROSHI; KOMODA, MASAKI (Tokyo Metropolitan Institute of Technology, Japan)
SO- IN: Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-9, 1991, Proceedings (A92-56001 24-01). Tokyo, Japan Society for Aeronautical and Space Sciences, 1991, p. 104-107. In Japanese.
PY- 1991
PD- 199100
RF- 4
LA- Japanese
GL- Japan
CP- Japan
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9224
AB- A control system for helicopter emergency landing is presented. The neighboring optimal control is computed and the backward sweep method is used. Vertical optimal control and neighboring optimal control are compared. (Y.P.Q.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *AUTOMATIC LANDING CONTROL; *HELICOPTER CONTROL; *OPTIMAL CONTROL; *PILOT PERFORMANCE
DE- COMPUTERIZED SIMULATION; EMERGENCIES; FEEDBACK CONTROL
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 02023318
AN- <AEROSPACE> A92-54982
TI- Werewolf warrior
AU- VELOVICH, ALEXANDER
SO- Flight International (ISSN 0015-3710), vol. 142, no. 4337, Sept. 23, 1992, p. 49, 50, 52-55.
PY- 1992
PD- 199209
SN- 0015-3710
LA- English
GL- Russia
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9223
AB- A review is presented of the Kamov Ka-50 Werewolf combat helicopter originally designed to outperform the AH-64 Apache, and which now may compete with the Apache on the international arms-sales market. Attention is given to the TV3-117VK powerplants rated at 2,200 shp, available weapons systems variations, and the current avionics and cockpit instrumentation displays. It is noted that a letter of intent has been signed with a U.S. company covering the possibilities of installing Western electronic systems and weapons on the Ka-50 airframe, and also of selling the Werewolf worldwide. (R.E.P.)
SF- AIAA
DE- <MAJOR> *ATTACK AIRCRAFT; *AVIONICS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS
DE- AH-64 HELICOPTER; COCKPITS; U.S.S.R.
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02020778
AN- <AEROSPACE> A92-52442
TI- Generic helicopter for multiship simulations
AU- MOODY, LARRY A. (McDonnell Aircraft Co., Saint Louis, MO)
SO- IN: AIAA/AHS Flight Simulation Technologies Conference, Hilton Head Island, SC, Aug. 24-26, 1992, Technical Papers (A92-52426 22-09). Washington, American Institute of Aeronautics and Astronautics, 1992, p. 154-158.
PY- 1992
PD- 199200
RN- AIAA PAPER 92-4151
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9222
AB- A software model was created to fill the need for a generic helicopter to be used for enhanced environment realism in multiship combat simulations. The main objective of the model was to execute with a minimum of computational processing while maintaining acceptable performance and handling characteristics. This objective was met by

using a set of high fidelity control laws with a minimal aerodynamics reaction model. This approach yielded a helicopter model that not only achieved the objectives of low processing demand and acceptable performance and handling characteristics, but also retained all of the control system's pilot relief modes such as altitude and heading hold modes. (Author)
SF- AIAA
DE- <MAJOR> *COMBAT; *ENVIRONMENT SIMULATION; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *WEAPON SYSTEMS
DE- AERODYNAMIC CHARACTERISTICS; CONTROL SYSTEMS DESIGN; CONTROL THEORY
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02020762
AN- <AEROSPACE> A92-52426
TI- AIAA/AHS Flight Simulation Technologies Conference, Hilton Head Island, SC, Aug. 24-26, 1992, Technical Papers
SO- Conference sponsored by AIAA and AHS. Washington, American Institute of Aeronautics and Astronautics, 1992, 340 p. For individual items see A92-52427 to A92-52461.
PY- 1992
PD- 199200
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9222
AB- The present conference on technologies for flight simulation encompasses rotorcraft applications, human response, crew-station design, simulation applications, simulator architecture, simulation networking, motion systems, pilot cuing, operations and management, simulation facilities, and in-flight simulations. Specific issues addressed include technology applications for helicopter crew training, simulator-induced alteration of head movements, takeoff performance monitoring-system display options, a generic helicopter for multiship simulations, algorithmic improvements for simulator motion drive, and aural/vibrational cuing in rotorcraft simulation. Also addressed are special rotation vectors, dead reackoning for aircraft in distributed interactive simulation, a man/vehicle systems research facility, the applicability of distributed simulation techniques to high performance aircraft, and a parallel architecture for flight-simulator visual systems. (C.C.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INDUSTRY; *CONFERENCES; *FLIGHT SIMULATION; *TECHNOLOGY ASSESSMENT
DE- ARCHITECTURE (COMPUTERS); COLLISION AVOIDANCE; DYNAMIC RESPONSE; F-18 AIRCRAFT; FLIGHT CREWS; HEAD MOVEMENT; HELMET MOUNTED DISPLAYS; MILITARY HELICOPTERS; MOTION SICKNESS; MOVING TARGET INDICATORS; PERFORMANCE TESTS; PILOT PERFORMANCE; REAL TIME OPERATION; ROTORCRAFT AIRCRAFT; V-22 AIRCRAFT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 02018617
AN- <AEROSPACE> A92-50281
TI- The effect of trans-cockpit authority gradient on Navy/Marine helicopter mishaps
AU- ALKOV, ROBERT A.; BOROWSKY, MICHAEL S.; WILLIAMSON, DANA W.; YACAVONE, DAVID W. (U.S. Navy, Naval Safety Center, Norfolk, VA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 63, no. 8, Aug. 1992, p. 659-661.
PY- 1992
PD- 199208
RF- 6
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9221
AB- Navy and Marine Corps helicopter mishaps which had a pilot causal factor assigned were examined to determine if the relative military rank of the pilot and copilot was associated with the rate of occurrence per 100,000 flight hours. All class A and B helicopter flight mishaps for the 11 calendar year period 1980-1990 were examined. Although no statistically significant differences were noted, pairing pilots who were of equal rank yielded the lowest rate, seemingly refuting Elwyn Edward's notion that a flat 'trans-cockpit authority gradient' may lead to greater problems in the cockpit than his hypothetical 'optimum gradient'. Moreover, when copilots flew with pilots who differed by two or more ranks, the largest pilot error rate was revealed. This last finding seems to support Edward's hypothesis

that a steep 'trans-cockpit authority gradient' may be detrimental to aviation safety. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *COCKPITS; *EMPLOYEE RELATIONS; *PILOT ERROR; *PILOT PERFORMANCE
DE- AIRCRAFT PILOTS; MILITARY HELICOPTERS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02014161
AN- <AEROSPACE> A92-45825
TI- A new generation of U.S. Army flight helmets
AU- CARTER, RICHARD M. (U.S. Army, School of Aviation Medicine, Fort Rucker, AL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 63, no. 7, July 1992, p. 629-633.
PY- 1992
PD- 199207
RF- 7
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- Head injuries are the most common cause of fatal injury in helicopter crashes. For over 80 years, the U.S. Army has used crash investigation studies to redesign flight helmets. This paper describes the evolution of the newly fielded U.S. Army helmet, the Sound Protection Helmet No. 4B (SPH-4B), and compares its protective features to its predecessors, especially the SPH-4. A major contribution to the helmet design process was made by the Aviation Life Support Equipment Retrieval Program (ALSERP), a functional program at the U.S. Army Aeromedical Research Laboratory. ALSERP has analyzed more than 500 helmets involved in crash events since 1972. Based on these studies of critical safety factors, the Army has developed and deployed the SPH-4B, a new helmet with improved energy absorption, retention, and stability. (Author)
SF- AIAA
DE- <MAJOR> *DESIGN ANALYSIS; *FLIGHT CLOTHING; *HELMETS; *HUMAN FACTORS ENGINEERING
DE- BRAIN DAMAGE; FLIGHT SAFETY; HISTORIES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02013367
AN- <AEROSPACE> A92-45031
TI- The use of simulation in human factors test and evaluation of the LH helicopter
AU- PICCIONE, DINO; HALE, STEVE (Essex Corp., Fort Rucker, AL)
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 863-867.
PY- 1991
PD- 199100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- Because the LH helicopter's pilot-vehicle interface system is far more complex than that of any vehicle thus far in U.S. Army inventory, the only adequate path to cockpit-design simulation is through the use of man-in-the-loop, full-mission simulations. The human factors portion of LH cockpit design evaluation employed the Subjective Workload Assessment Technique, a scaling procedure furnishing a psychological model of mental workload based on an additive, multidimensional representation of three dimensions: time-load, mental effort load, and psychological stress load. (O.C.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *HUMAN FACTORS ENGINEERING; *LIGHT HELICOPTERS; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- COST REDUCTION; DEFENSE PROGRAM; MILITARY TECHNOLOGY; NIGHT VISION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 02013365
AN- <AEROSPACE> A92-45029
TI- Variables affecting simulator sickness - Report of a semi-automatic scoring system
AU- KENNEDY, ROBERT S.; SMITH, MARTIN G. (Essex Corp., Orlando, FL); JONES, SHERRIE A. (U.S. Navy, Naval Training Systems Center, Orlando, FL)
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH,

Apr. 29-May 2, 1991, Proceedings. Vol. 2 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 851-856.
PY- 1991
PD- 199100
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- The Simulator Sickness Questionnaire (SSQ) has been implemented on a portable computer and fielded at a number of simulator sites to provide a relatively inexpensive, maintenance-free way of collecting simulator-sickness data. Attention is presently given to the results of a 20-month data-acquisition program in which SSQ was fielded at each of two TH-57 helicopter flight trainers. The self-scoring SSQ software furnishes pilots with immediate feedback through which to enhance awareness of systems and their associated performance limitations. (O.C.)
SF- AIAA
DE- <MAJOR> *COMPUTERIZED SIMULATION; *FLIGHT TRAINING; *MOTION SICKNESS
DE- AEROSPACE MEDICINE; AVIATION PSYCHOLOGY; HUMAN FACTORS ENGINEERING
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 02013332
AN- <AEROSPACE> A92-44996
TI- Stop, look and learn from accident investigation
AU- COOK, HENRY L. (Jungle Aviation and Radio Service, Waxhaw, NC)
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 636-639.
PY- 1991
PD- 199100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- An account is given to a method for helping pilots and aircraft mechanics learn from the mistakes of others through role-playing. In this training process, the reading of an accident report is followed by the participants' efforts to recreate the sequence of events which led to the mishap. The illustrative case from which lessons concerning the power of imaginative recreations of an accident scenario are drawn involved a helicopter landing. (O.C.)
SF- AIAA
DE- <MAJOR> *ACCIDENT PREVENTION; *AIRCRAFT ACCIDENT INVESTIGATION; *AIRCRAFT SAFETY; *PILOT TRAINING
DE- CRASH INJURIES; HUMAN FACTORS ENGINEERING; SAFETY FACTORS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 02013320
AN- <AEROSPACE> A92-44984
TI- Visual cues to geographical orientation during low-level flight
AU- BATTISTE, VERNOL (NASA, Ames Research Center, Moffett Field, CA); DELZELL, SUZANNE (San Jose State University, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 566-571.
PY- 1991
PD- 199100
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- A field study of an operational Emergency Medical Service (EMS) unit was conducted to investigate the relationships among geographical orientation, pilot decision making, and workload in EMS flights. The map data collected during this study were compared to protocols gathered in the laboratory, where pilots viewed a simulated flight over different types of unfamiliar terrain and verbally identified the features utilized to maintain geographical orientation. The EMS pilot's questionnaire data were compared with data from non-EMS helicopter pilots with comparable flight experience. (R.E.P.)
SF- AIAA

DE- <MAJOR> *BEARING (DIRECTION); *HELICOPTERS; *LOW ALTITUDE; *MEDICAL
SERVICES; *PILOT PERFORMANCE; *VISUAL SIGNALS
DE- COGNITIVE PSYCHOLOGY; DISPLAY DEVICES; EMERGENCIES; HELICOPTER CONTROL;
NAVIGATION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02013289
AN- <AEROSPACE> A92-44953
TI- U.S. Navy aircrew coordination training - A progress report
AU- ALKOV, ROBERT A. (U.S. Navy, Naval Safety Center, Norfolk, VA)
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 368-371.
PY- 1991
PD- 199100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- A review is presented of the Navy's aircrew coordination training (ACT) program to change the attitudes of naval aviators toward safety. 150 incident and accident reports were abstracted to be used for training aircrews as part of a human factors problems course presented in a seminar discussion setting. The synopses are 'sanitized' to delete all references to names, squadrons, locations, and dates so that the seminars may be conducted in a nonconfrontational style to prevent the development of hostile attitudes towards the training. (R.E.P.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT TRAINING; *GROUP DYNAMICS; *TRAINING
EVALUATION
DE- AVIATION PSYCHOLOGY; FLIGHT SAFETY; FLIGHT SIMULATION; MILITARY HELICOPTERS; PILOT ERROR; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02013276
AN- <AEROSPACE> A92-44940
TI- Aircrew coordination for Army helicopters - An exploration of the attitude-behavior-performance relationship
AU- SIMON, ROBERT; PAWLIK, EUGENE A., SR.; BRONKHORST, TINA M. (Dynamics Research Corp., Wilmington, MA)
SO- IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1 (A92-44901 19-53). Columbus, OH, Ohio State University, 1991, p. 290-295.
PY- 1991
PD- 199100
RF- 13
CN- DAHC35-89-D-0030
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9219
AB- The relationships between aircrew coordination attitudes, behavior, and mission performance were examined using data obtained from a flight-simulator testbed. The behavior-performance link, previously established by Povenmire et al. (1989), was confirmed with aircrew coordination-related behavioral ratings accounting for approximately 50 percent of the variance in performance. An attitude measure was factor-analyzed, and the factors obtained were similar to those identified in the Gregorich et al. (1990) study. Various weight combinations of crew-attitude scores were investigated with a coefficient of agreement (absolute difference score) determined as best explaining the variance in the behavior and mission performance measures. Attitude and behavior measures combined to account for approximately 65 percent of the variance in mission performance. (Author)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *FLIGHT CREWS; *GROUP DYNAMICS; *OPERATOR
PERFORMANCE; *PSYCHOLOGICAL FACTORS
DE- AIRCRAFT PILOTS; BEHAVIOR; FLIGHT SIMULATION; MILITARY HELICOPTERS; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02004288
AN- <AEROSPACE> A92-35952
TI- Dealing with pilot response in failure case testing
AU- WILLIAMS, JOHN R. (Aeroplane and Armament Experimental Establishment, Boscombe Down, England)

SO- IN: Society of Flight Test Engineers, Annual Symposium, 21st, Garden Grove, CA, Aug. 6-10, 1990, Proceedings (A92-35926 14-01). Lancaster, CA, Society of Flight Test Engineers, 1990, p. 6.4-1 to 6.4-13.
PY- 1990
PD- 199000
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- Two examples of failure-case testing are reviewed with specific attention given to the contribution of human factors including pilot response to accurate testing. The paper examines the case of engine failure during ground roll in a Lockheed C130 and the case of hydraulic failure in the yaw-control system of a battlefield helicopter. The C130 is tested to determine the ground minimum control speed, and pilot-intervention delay time is evaluated by examining the test data. The failure of tail-rotor hydraulic system in the helicopter is discussed in terms of pilot-intervention time and the factors influencing pilot action. Extensive statistical data from testing and flight situations are presented graphically. An assessment of the failure modes and pilot responses in each case is presented, and the failure mode in the helicopter case is characterized as unacceptable because it could lead to a high loss rate. (C.C.S.)
SF- AIAA
DE- <MAJOR> *ENGINE FAILURE; *HUMAN BEHAVIOR; *HUMAN FACTORS ENGINEERING; *HUMAN REACTIONS; *PILOT PERFORMANCE
DE- AIRCRAFT PERFORMANCE; C-130 AIRCRAFT; MILITARY HELICOPTERS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02004284
AN- <AEROSPACE> A92-35948
TI- AV-8B V/STOL performance analysis
AU- TIPPEY, D. K. (McDonnell Aircraft Co., Saint Louis, MO)
SO- IN: Society of Flight Test Engineers, Annual Symposium, 21st, Garden Grove, CA, Aug. 6-10, 1990, Proceedings (A92-35926 14-01). Lancaster, CA, Society of Flight Test Engineers, 1990, p. 5.5-1 to 5.5-6.
PY- 1990
PD- 199000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- Performance analyses are conducted for the hover and vertical-landing maneuvers of the AV-8B V/STOL aircraft to examine this flight regime. Attention is given to the fundamental equations and variables that describe hover and vertical landing, and the results of the steady-state technique are compared to those that are corrected to account for the influence of acceleration. The required instrumentation and analysis techniques for vertical landing include an inertial navigation system (INS) and consideration for touchdown and bounce. The plot of bounce height vs sink rate is found to provide useful information for the analysis of vertical landings, since sink rate has the greatest influence on bounce height. The correction techniques for the hover and vertical-landings mode of the V/STOL aircraft can be used in conjunction with data from an INS to conduct accurate analyses of V/STOL performance. (C.C.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ENGINES; *AIRCRAFT PERFORMANCE; *HOVERING STABILITY; *INERTIAL NAVIGATION; *V/STOL AIRCRAFT
DE- ATTACK AIRCRAFT; DATA FLOW ANALYSIS; FIGHTER AIRCRAFT; STRUCTURAL WEIGHT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02004109
AN- <AEROSPACE> A92-35773
TI- Instrumented blade experiments using a light autogiro
AU- MCKILLIP, ROBERT M., JR.; CHIH, MICHAEL H. (Princeton University, NJ)
SO- European Rotorcraft Forum, 16th, Glasgow, Scotland, Sept. 18-21, 1990, Paper. 9 p.
PY- 1990
PD- 199009
RF- 6
LA- English
GL- United States
CP- United Kingdom
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- Results from a program to instrument the rotor blades of a light

autogiro are described. The work was initiated to provide additional data on rotor dynamic response as well as investigate practical implementation issues on the use of blade-mounted instrumentation for rotor state feedback. A description of the aircraft and rotor electronics hardware design and installation is given, along with results to date from the initial flight test program for complete system check-out. (Author)
SF- AIAA
DE- <MAJOR> *AUTOGYROS; *AVIONICS; *HARDWARE; *ROTOR BLADES; *ROTOR DYNAMICS
DE- DATA ACQUISITION; DATA STORAGE; DATA TRANSMISSION; FLIGHT TESTS; ROTORCRAFT AIRCRAFT; TEETERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 02004103
AN- <AEROSPACE> A92-35767
TI- Rotor aeromechanics research with the RAE research Lynx - The experimental facility and test programme
AU- TARTTELIN, P. C. (Royal Aerospace Establishment, Bedford, England)
SO- European Rotorcraft Forum, 16th, Glasgow, Scotland, Sept. 18-21, 1990, Paper. 19 p.
PY- 1990
PD- 199009
RF- 20
LA- English
GL- United Kingdom
CP- United Kingdom
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- The instrumentation and flight test program for the RAE Bedford Lynx are described. The aircraft instrumentation includes an instrumented tail rotor, a helicopter air data system to enable low airspeed measurement, and a control input device to provide a means for injecting preprogrammed control inputs in a precise and repeatable manner. The test program is to include trims and dynamic response in steady and maneuvering flight to support aeromechanics model validation for performance, loads, and flying qualities. The data are gathered using an on-board data recording system, and a set of programs permits data handling and analysis. The lessons learned from experience with similar measurements on the RAE research Puma are reviewed as well. (P.D.)
SF- AIAA
DE- <MAJOR> *AIRBORNE EQUIPMENT; *FLIGHT TESTS; *RESEARCH FACILITIES; *ROTOR AERODYNAMICS; *SEPARATED FLOW
DE- ONBOARD DATA PROCESSING; PRESSURE SENSORS; STRAIN GAGES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02003788
AN- <AEROSPACE> A92-35452
TI- Energy attenuation for crashworthy seating systems - Past, present, and possible future development
AU- GLATZ, J. D. (U.S. Navy, Naval Air Development Center, Warminster, PA)
SO- IN: Annual SAFE Symposium, 29th, Las Vegas, NV, Nov. 11-13, 1991, Proceedings (A92-35426 14-54). Yoncalla, OR, SAFE Association, 1992, p. 174-181.
PY- 1992
PD- 199200
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- Consideration is given to past efforts that have led to successful operational use of energy attenuators for seating systems, recent research, and possible concepts for future development. Energy-attenuating seating systems are considered to be the most effective location for providing occupant energy protection in operational aircraft. They have been developed with new aircraft, including CH-46E Sea Knight, UH-60A Black Hawk, SH-60B Seahawk, and AH-64A Apache. The performance of energy-attenuating seating systems is less vulnerable to impact attitude and surface than energy attenuating landing gear or subfloor structure. (O.G.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *CRASHWORTHINESS; *KINETIC ENERGY; *SEATS; *TECHNOLOGICAL FORECASTING
DE- ACCELERATION PROTECTION; AIRCRAFT ACCIDENTS; ENERGY ABSORPTION; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING; SHOCK RESISTANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02003773

AN- <AEROSPACE> A92-35437
TI- Structural testing of commercial rotorcraft seats - An overview
AU- DESJARDINS, S. P.; SHANE, S. J. (Simula, Inc., Phoenix, AZ)
SO- IN: Annual SAFE Symposium, 29th, Las Vegas, NV, Nov. 11-13, 1991, Proceedings (A92-35426 14-54). Yoncalla, OR, SAFE Association, 1992, p. 63-81.
PY- 1992
PD- 199200
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- Structural testing of commercial rotorcraft seats is reviewed. Topics discussed include static and dynamic tests, dynamic overshoot, test requirements, documentation of results, test equipment, and dynamic test facilities. It is noted that, because of the complexity of testing required for certification, very detailed test plans are a necessity. These test plans should include descriptions of the test articles (the aircraft attachments and the restraint system), the facilities (the equipment, instrumentation, and calibration procedures) and the complete procedures for the testing. (O.G.)
SF- AIAA
DE- <MAJOR> *CRASHWORTHINESS; *DUMMIES; *DYNAMIC TESTS; *ROTORCRAFT AIRCRAFT; *SEATS; *STATIC TESTS
DE- COMMERCIAL AIRCRAFT; GENERAL OVERVIEWS; HIGH SPEED PHOTOGRAPHY; SEAT BELTS; STATIC LOADS; STRUCTURAL STABILITY; TEST EQUIPMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 02003371
AN- <AEROSPACE> A92-35035
TI- Microwave radiometer and radar measurements in the SAAMEX campaign
AU- HALLIKAINEN, MARTTI; PANULA-ONTTO, ESA; JAASKELAINEN, VILLE; TOIKKA, MARTTI; PULLIAINEN, JOUNI; TARES, TEEMU; AHOLA, PEKKA; TAURIAINEN, SIMO ; KURVONEN, LAURI (Helsinki University of Technology, Espoo, Finland)
SO- IN: IGARSS '91; Proceedings of the 11th Annual International Geoscience and Remote Sensing Symposium, Espoo, Finland, June 3-6, 1991. Vol. 2 (A92-34851 14-43). New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 899-902.
PY- 1991
PD- 199100
RF- 5
LA- English
GL- Finland
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9214
AB- The Surface and Atmospheric Airborne Microwave Experiment (SAAMEX) was held in Finland on 14-21 March 1990. The institutes providing airborne microwave sensors for the campaign were the British Meterological Office (BMO) and the Helsinki University of Technology (HUT). The three main targets were sea ice, snow, and forest canopies. Ground truth measurements were made by several Finnish research institutes. HUT instrumentation, HUT's measurement program, and preliminary results are described. (I.E.)
SF- AIAA
DE- <MAJOR> *ATMOSPHERIC SOUNDING; *MICROWAVE RADIOMETERS; *MICROWAVE SOUNDING; *SCATTEROMETERS
DE- CANOPIES (VEGETATION); FINLAND; GROUND TRUTH; HELICOPTERS; SATELLITE OBSERVATION; SEA ICE; SNOW
SH- 8743 Earth Resources & Remote Sensing (1987-)

AN- <DIALOG> 02002140
AN- <AEROSPACE> A92-33804
TI- The impact of personality and task characteristics on stress and strain during helicopter flight
AU- HARSS, CLAUDIA; KASTNER, MICHAEL; BEERMAN, LILLY (Muenchen, Universitaet der Bundeswehr, Munich, Federal Republic of Germany)
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 1, no. 4, 1991, p. 301-318.
PY- 1991
PD- 199100
RF- 17
SN- 1050-8414
LA- English
GL- Germany
CP- United States
DT- JOURNAL ARTICLE

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9213
AB- Over a three year period a longitudinal research project was conducted on the stress and strain of helicopter pilots engaged in low-altitude night flight using night vision goggles. In this theoretical model, stress and strain in flight result from concrete actions by specific pilots in specific objectively definable situations. As examples for concrete interactions between situational variables and personality, the observed stress of helicopter crews, which relies on the personality characteristics of riskiness and test anxiety (worry cognitions), and situation-characteristic difficulty are presented. (R.E.P.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *FLIGHT STRESS (BIOLOGY); *HELICOPTER CONTROL; *NIGHT FLIGHTS (AIRCRAFT); *PERSONALITY; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT CREWS; GOGGLES; HUMAN FACTORS ENGINEERING; NIGHT VISION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 02001565
AN- <AEROSPACE> A92-33229
TI- Comanche crew station design
AU- HAMILTON, BRUCE E. (Sikorsky Aircraft, Stratford, CT); METZLER, THOMAS (USAF, Aviation Systems Command, Saint Louis, MO)
SO- AIAA, Aerospace Design Conference, Irvine, CA, Feb. 3-6, 1992. 9 p.
PY- 1992
PD- 199202
RN- AIAA PAPER 92-1049
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9213
AB- The pilot model used in the design of the Comanche attack helicopter's cockpit ensured that the interface for all systems realistically corresponded to pilot tasks, in view of limited cockpit space, mission time pressures, and simultaneous pilot awareness of numerous complex systems requiring 'cognitive engineering'. The cognitive engineering approach gives attention to the interface through which a pilot receives information and conveys intent, within the framework of crew expectations concerning the task structure that must be accommodated by the hardware and software. The interaction between mission analysis, pilot model, and cockpit arrangement ensures support of the physical plant for crew efforts on task operations. (O.C.)
SF- AIAA
DE- <MAJOR> *CREW WORKSTATIONS; *DISPLAY DEVICES; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *SOFTWARE ENGINEERING; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DESIGN ANALYSIS; WEAPON SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01994060
AN- <AEROSPACE> A92-25724
TI- Comprehensive helicopter rotor instrumentation - A retrofit approach using miniature transducers
AU- JACKLIN, STEPHEN A. (NASA, Ames Research Center, Moffett Field, CA); MORT, RAY; MORRISON, DWAYNE (Bell Helicopter Textron, Inc., Fort Worth, TX)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- AIAA, Aerospace Sciences Meeting and Exhibit, 30th, Reno, NV, Jan. 6-9, 1992. 12 p.
PY- 1992
PD- 199201
RF- 4
RN- AIAA PAPER 92-0268
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9209
AB- This paper reports an approach used to retrofit a set of full-scale main rotor blades with 290 miniature pressure transducers, 46 strain gages, and 24 miniature accelerometers. Normally, in order to avoid disturbing the aerodynamics of the rotor flow field, the pressure instrumentation must be integrally built into the body of the rotor blades. However, using a method developed with NASA, miniature pressure transducers are mounted to the blade exterior surface without degrading the quality of the blade aerodynamics. Moreover, it is estimated that this approach reduced costs by more than 50 percent over building a set

of pressure instrumented blades. The aerodynamic measurement objectives are presented as are instrumentation design considerations, type of instrumentation used, assembly process, and the installed instrumentation characteristics. (Author)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *PRESSURE SENSORS; *RETROFITTING;
*ROTARY WINGS
DE- AERODYNAMIC STABILITY; HELICOPTER DESIGN; ROTOR BLADES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01991646
AN- <AEROSPACE> A92-23310
TI- Spatial disorientation in naval aviation mishaps - A review of Class A incidents from 1980 through 1989
AU- BELLENKES, A.; BASON, R.; YACAVONE, D. W. (U.S. Navy, Naval Safety Center, Norfolk, VA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 63, Feb. 1992, p. 128-131.
PY- 1992
PD- 199202
RF- 12
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9208
AB- The contribution of three specific types of spatial disorientation (SD) to aviation accidents is examined from 33 accidents in which SD was a causal factor. The relationships between SD and mission-related factors are studied with attention given to type-I (unrecognized) SD, type-II (recognized) SD, and type-III (overwhelming) SD. The pertinent factors investigated include aircraft type, phase of flight, time of day, pilot experience, and flight topography. Types I and II are found to be causal factors in all mishaps studied; type I SD is shown to primarily affect helicopter pilots whereas type-II SD is suffered by jet pilots during the day. (C.C.S.)
SF- AIAA
DE- <MAJOR> *ACCELERATION STRESSES (PHYSIOLOGY); *AIRCRAFT ACCIDENTS;
*DISORIENTATION; *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *VERTIGO

DE- ACCIDENT PREVENTION; FIGHTER AIRCRAFT; NAVY; PHYSIOLOGICAL EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01984389
AN- <AEROSPACE> A92-16053
TI- Helicopter NVG testing in the United Kingdom
AU- CASON, RANDALL W. (U.S. Army, Washington, DC); SWALES, MICHAEL R. (Aeroplane and Armament Experimental Establishment, Boscombe Down, England)
SO- IN: 1990 report to the aerospace profession; Society of Experimental Test Pilots, Symposium, 34th, Beverly Hills, CA, Sept. 27-29, 1990, Proceedings (A92-16051 04-05). Lancaster, CA, Society of Experimental Test Pilots, 1990, p. 15-29.
PY- 1990
PD- 199000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9204
AB- A development status evaluation is presented of helicopter night vision goggle (NVG) tests conducted to date in Britain, giving attention to NVG cockpit-compatibility issues in various operational environments that are important to the maximization of flight safety. Accounts are given of NVG test experience obtained with simulated battlefields, adverse weather, mountain flying, maritime operations, flight over snow-covered surfaces, and TOW antitank missile firings. Cockpit-lighting environments allowing easy identification of instrument readings and switch positions by the pilot are of critical importance. (O.C.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *GOGGLES; *HELICOPTER DESIGN; *NIGHT VISION; *PERFORMANCE TESTS
DE- ANTITANK MISSILES; FLIGHT CONDITIONS; FLIGHT SAFETY; PILOT PERFORMANCE;
UNITED KINGDOM
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01984386
AN- <AEROSPACE> A92-16050
TI- Flight safety; Proceedings of the Conference, London, England, Nov. 21, 1991
SO- Conference sponsored by Royal Aeronautical Society. London, Royal Aeronautical Society, 1991, 69 p. No individual items are abstracted in this volume.
PY- 1991
PD- 199100
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA9204
AB- The present conference discusses a civil operator's perspectives on helicopter operation safety in the North Sea region, commercial safety-related aspects of corporate helicopter operations, and the relationship of British safety legislation to the continued airworthiness of light civil helicopters. Also discussed are military perspectives on helicopter flight safety, human factors-related issues in helicopter accident analyses, investigative methods applicable to helicopter accidents, and the application of novel technologies for enhancing helicopter safety. (O.C.)
SF- AIAA
DE- <MAJOR> *CIVIL AVIATION; *CONFERENCES; *FLIGHT SAFETY; *LIGHT HELICOPTERS
DE- AIRCRAFT ACCIDENT INVESTIGATION; AIRCRAFT RELIABILITY; HUMAN FACTORS
ENGINEERING; NORTH SEA; SAFETY DEVICES; SAFETY FACTORS; SAFETY MANAGEMENT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01982790
AN- <AEROSPACE> A92-14454
TI- An analytical study of the helicopter flight safety under an engine failure in proximity of ground
AU- LETNIKOV, VIKTOR B.
SO- AHS, Annual Forum, 47th, Phoenix, AZ, May 6-8, 1991, Paper. 19 p.
PY- 1991
PD- 199105
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- Analytical methods are presented for the safety evaluation of the helicopter flight in the case of either total or partial power plant failure. The methods proposed here can be used to solve a wide range of trajectory problems as part of a search for a rational piloting technique. The methods are illustrated by results of parametric studies for the MI-38 helicopter. (V.L.)
SF- AIAA
DE- <MAJOR> *ENGINE FAILURE; *FLIGHT SAFETY; *HELICOPTER DESIGN; *PILOT PERFORMANCE
DE- ACCIDENT PREVENTION; FLIGHT SIMULATION; FLIGHT TESTS; HELICOPTER CONTROL
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01982768
AN- <AEROSPACE> A92-14432
TI- Advanced workload assessment techniques for engineering flight simulation
AU- GRENELL, JAMES F. (Boeing Defense and Space Group, Helicopters Div., Philadelphia, PA); KRAMER, ARTHUR F.; SIREVAAG, ERIK J.; WICKENS, CHRISTOPHER D. (Illinois, University, Urbana)
SO- IN: AHS, Annual Forum, 47th, Phoenix, AZ, May 6-8, 1991, Proceedings. Vol. 2 (A92-14326 03-01). Alexandria, VA, American Helicopter Society, 1991, p. 1443-1454.
PY- 1991
PD- 199100
RF- 49
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- A series of experiments is conducted to examine operator workload in a high-fidelity simulation of an advanced rotorcraft cockpit. The experiments focused on the mental workload imposed by the type and magnitude of specific flight, communication, and navigation-related tasks. As part of this experimental effort, a multidimensional methodology for the assessment of operator workload employing a battery of subjective, performance, secondary task, and physiological measures

was developed and applied. An overview of this methodology is given including data collection and analysis procedures. Lessons learned from this experience are also presented to provide guidance to future simulation-based experimental efforts. A brief discussion of operator workload assessment is provided to enhanced the reader's understanding of the topic. (Author)
SF- AIAA
DE- <MAJOR> *COCKPITS; *FLIGHT SIMULATION; *PILOT PERFORMANCE; *ROTORCRAFT AIRCRAFT; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AUTOMATIC FLIGHT CONTROL; HELMET MOUNTED DISPLAYS; PHYSIOLOGICAL TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01982767
AN- <AEROSPACE> A92-14431
TI- Increasing mission effectiveness with an intelligent pilot-vehicle interface
AU- CASPER, PATRICIA A.; SMITH, SCOTT R. (Sikorsky Aircraft, Stratford, CT) ; SMITH, HOWARD R. (United Technologies Research Center, East Hartford, CT); HUBANKS, BRUCE (Texas Instruments, Inc., Defense Systems and Electronics Group, Dallas)
SO- IN: AHS, Annual Forum, 47th, Phoenix, AZ, May 6-8, 1991, Proceedings. Vol. 2 (A92-14326 03-01). Alexandria, VA, American Helicopter Society, 1991, p. 1437-1442.
PY- 1991
PD- 199100
RF- 14
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- The application of artificial intelligence technology to single-pilot, day/night adverse weather combat helicopter operations is examined. A program, called D/NAPS (Day/Night Adverse weather Pilotage System), also involves the integration of available advanced technology pilotage sensors, and controls and displays to increase mission effectiveness and survivability. The D/NAPS program is focused on five expert system domains: mission planning, tactical planning, situation assessment, system status assessment, and pilot-vehicle interface (PVI). A sixth domain is the mission executive, which resolves conflicts and executes plans. These six domains are collectively referred to as the Cognitive Decision Aiding System. Unique PVI challenges presented by the D/NAPS mission are described. The attributes of an intelligent PVI are also discussed. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *ARTIFICIAL INTELLIGENCE; *AVIONICS; *EXPERT SYSTEMS; *MAN-COMPUTER INTERFACE
DE- COCKPITS; FEEDBACK CONTROL; HUMAN FACTORS ENGINEERING; NAP-OF-THE-EARTH NAVIGATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01982738
AN- <AEROSPACE> A92-14402
TI- Functionally integrated aircraft instrumentation for the next generation commercial helicopter
AU- GEIST, DOUG (McDonnell Douglas Helicopter Co., Mesa, AZ); FRIED, ZOLTAN (Canadian Marconi Co., Kanata, Canada)
SO- IN: AHS, Annual Forum, 47th, Phoenix, AZ, May 6-8, 1991, Proceedings. Vol. 2 (A92-14326 03-01). Alexandria, VA, American Helicopter Society, 1991, p. 1057-1065.
PY- 1991
PD- 199100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- An Integrated Instrumentation Display System (IIDS) was designed to meet the aircraft instrumentation requirements of FAR, Part 27, for certification of commercial light helicopters. Criteria were defined that would allow an assessment of selected functions for integration into one unit. The goal was to provide a compact instrumentation system to monitor and display the performance of various aircraft subsystems. An aircraft subsystem monitoring feature provides a means to acquire knowledge of the health of the aircraft subsystems. Engine performance can be monitored in real-time, which allows aircraft operators to better schedule repair/overhaul activities. Also, maintenance personnel can transfer collection of aircraft operational information to a ground-based computer for determining trending and maintenance actions. Vibration monitoring is provided to the helicopter user with a simple

and convenient means of acquiring the information needed to minimize vibration caused by mass and aerodynamic imbalance in the rotor and NOTAR fan system. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *DISPLAY DEVICES; *HELICOPTERS
DE- CIVIL AVIATION; IN-FLIGHT MONITORING; SYSTEMS INTEGRATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01982688
AN- <AEROSPACE> A92-14352
TI- Tactical Mission Analysis Methodology
AU- WOLVEN, BRIAN (Bell Helicopter Textron, Inc., Fort Worth, TX)
SO- IN: AHS, Annual Forum, 47th, Phoenix, AZ, May 6-8, 1991, Proceedings. Vol. 1 (A92-14326 03-01). Alexandria, VA, American Helicopter Society, 1991, p. 359-367.
PY- 1991
PD- 199100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- The Tactical Mission Analysis Station (TMAS) is a graphics-oriented, interactive computer model designed for use on Silicon Graphics engineering workstations. TMAS was developed to satisfy the needs of analysts in the survivability and human factors communities by allowing quick, interactive creation of missions that take place in a nap-of-the-earth combat environment. TMAS models the fundamental elements of a combat mission, including terrain, performance of rotorcraft and fixed-wing aircraft, and the capabilities of friendly and threat weapon systems. Terrain and feature information is generated from Defense Mapping Agency Digital Terrain Elevation Data and Digital Feature Analysis Data. Weapon, sensor, and air vehicle performance parameters are stored in data files, allowing the model itself to remain unclassified. This feature allows easy substitution of alternate parameter sets when conducting tradeoff studies and sensitivity analyses. Simulation data are stored in a flight data recorder for use in post-mission analysis and display functions. (Author)
SF- AIAA
DE- <MAJOR> *COMPUTER GRAPHICS; *COMPUTERIZED SIMULATION; *FIXED WINGS; *MAN-COMPUTER INTERFACE; *ROTORCRAFT AIRCRAFT
DE- DATA BASES; MISSION PLANNING; TERRAIN ANALYSIS; WEAPON SYSTEMS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01982386
AN- <AEROSPACE> A92-14050
TI- Perceptual style and tracking performance
AU- ATCHLEY, PAUL (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 1, no. 3, 1991, p. 255-259.
PY- 1991
PD- 199100
RF- 13
SN- 1050-8414
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9203
AB- The relationship between perceptual style and tracking of a target was examined. Four pilots were given the Embedded Figures Test to assess their degrees of field dependence or independence. Then they flew in a helicopter simulator and attempted to track an airborne target. A high negative correlation was found between perceptual style and tracking performance. Field-independent subjects were able to track the target for longer periods than field-dependent subjects. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *HELICOPTERS; *HELMET MOUNTED DISPLAYS; *PILOT TRAINING; *TRACKING (POSITION)
DE- HUMAN BEHAVIOR; PILOT PERFORMANCE; TARGET ACQUISITION; TRAINING EVALUATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01981352
AN- <AEROSPACE> A92-13016
TI- Personality, task characteristics and helicopter pilot stress
AU- HARSS, CLAUDIA; KASTNER, MICHAEL; BEERMAN, LILLY (Universitaet der

Bundeswehr, Munich, Federal Republic of Germany)
SO- IN: Stress and error in aviation (A92-13015 02-53). Aldershot, England and Brookfield, VT, Avebury Technical, 1991, p. 3-14.
PY- 1991
PD- 199100
RF- 14
LA- English
GL- Germany
CP- United Kingdom
DT- ANALYTIC OF COLLECTED WORK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9202
AB- The transactional view of stress is examined in helicopter pilots flying at low-altitude with night-vision goggles (NVGs). The sample of 50 pilots includes 27 NVG pilots, 12 daytime pilots as a control group, and 11 NVG technicians, and data from a total of 119 flights and 290 flight situations. Objective and subjective characteristics are assessed for personal, situational, and transactional variables by collecting psychological, physiological, and observational data before, during, and after the tests. Recommendations regarding flight safety are developed based on the identification of situations that lead to critical flight situations and stress. The situation-person interactions that lead to stress most regularly are the risk-taking and anxiety situations, in which the pilots' perceptions of the situations and themselves are the least accurate. The more 'daring' pilots also tended to influence the occurrence of difficult situations. (C.C.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *PERSONALITY; *PILOT PERFORMANCE; *STRESS (BIOLOGY)
DE- FLIGHT SAFETY; NIGHT VISION; PHYSIOLOGICAL FACTORS; PSYCHOLOGICAL FACTORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01981351
AN- <AEROSPACE> A92-13015
TI- Stress and error in aviation
TI- <EXTENSION> Book
AU- FARMER, ERIC, ED. (RAF, Institute of Aviation Medicine, Farnborough, England)
SO- Aldershot, England and Brookfield, VT, Avebury Technical, 1991, 170 p. For individual items see A92-13016 to A92-13027.
PY- 1991
PD- 199100
LA- English
GL- United Kingdom
CP- United Kingdom
DT- COLLECTED WORK
JA- IAA9202
AB- The present conference on stress and error in aviation encompasses issues relating stress with workload, sleep management, aviation safety, testing systems, the effects of trauma, transmeridian travel, and human factors. Specific issues addressed include personality and task characteristics in helicopter pilot stress, a psychophysiological assessment test system, the assessment of pilot and weapon-system operator workloads, the development of a working model of flight-crew underload, the long-term psychological consequences of a major aircraft accident, and trauma-induced cyclothymia. Also addressed are the implications of irregular work and rest in civil air operations, a comparison of fatigue-related accidents across modes of transport, human factors in cabin safety, and the importance of type-II error in aviation safety research. (C.C.S.)
SF- AIAA
DE- <MAJOR> *PILOT ERROR; *PILOT PERFORMANCE; *STRESS (BIOLOGY)
DE- AIRCRAFT ACCIDENTS; FLIGHT CREWS; FLIGHT FATIGUE; FLIGHT SAFETY; PERSONALITY; PSYCHOPHYSIOLOGY; SLEEP; WORK-REST CYCLE; WORKLOADS
(PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01979543
AN- <AEROSPACE> A92-11207
TI- Field of view effects on a simulated flight task with head-down and head-up sensor imagery displays
AU- BRICKNER, MICHAEL S. (Pamam Human Factors Engineering, Ltd., Ramat-Hasharon, Israel); FOYLE, DAVID C. (NASA, Ames Research Center, Moffett Field, CA)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 2 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 1567-1571.
PY- 1990
PD- 199000
RF- 14
LA- English
GL- Israel
CP- United States
DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- Field-of-view (FOV) effects are investigated in simulated flights with sensor imagery appearing on a head-up display (HUD) and a head-down display (HDD). The pilots fly a simulated slalom course and are given information from a sensor image with a 25-, 40-, or 50-deg FOV and no additional information. The factors which most significantly affect performance are thereby identified, and the speed of flying, level of training, and FOV are found to be the most important characteristics. FOV affects performance regardless of the choice of HUD or HDD, and the narrow FOV caused the pilots to fly closer to the obstacles than the wider FOVs. No statistically significant difference between the use of HUD and HDD is identified, but the pilots appear to regard the displays in general as the entire world and not as a 'window on the world'. (C.C.S.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *FIELD OF VIEW; *FLIGHT SIMULATION; *HEAD-UP DISPLAYS; *IMAGING TECHNIQUES; *PILOT PERFORMANCE
DE- FLIGHT ENVELOPES; HELICOPTER CONTROL; INDEPENDENT VARIABLES; PILOT TRAINING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01979527
AN- <AEROSPACE> A92-11191
TI- A model for evaluation and training in aircrew coordination and cockpit resource management
AU- SIMON, ROBERT; RISSER, DANIEL T.; PAWLIK, EUGENE A., SR. (Dynamics Research Corp., Wilmington, MA); LEEDOM, DENNIS K. (U.S. Army, Research Institute, Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 2 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 1377-1381.
PY- 1990
PD- 199000
RF- 6
CN- DAHC35-89-D-0030
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- Measures of aircrew coordination for analytical use are proposed to address the need for an aircrew-coordination framework based on attitudes and behavior. The conceptual framework for operator behaviors is presented in which consideration is given to both alternative decision-making models and task 'coupling'. The evaluation of the framework is conducted by means of a questionnaire, an aircrew-coordination evaluation checklist, and revised aircrew training manual tasks. The model is reported to be in use in aircrew coordination evaluations of 20 Black Hawk helicopter crews, and the methods are being applied to the investigation of accidents. The methods presented are concluded to be more coherent and rigorous measures of cockpit resource management and aircrew coordination than previously employed methods. (C.C.S.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DECISION MAKING; *FLIGHT CREWS; *GROUP DYNAMICS; *PILOT PERFORMANCE
DE- AIRCRAFT ACCIDENT INVESTIGATION; COORDINATION; HELICOPTER CONTROL; PILOT TRAINING; RESOURCES MANAGEMENT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01979526
AN- <AEROSPACE> A92-11190
TI- A comparison of two types of training interventions of team communication performance
AU- LASSITER, DONALD L.; VAUGHN, JEREMY S.; SMALTZ, VIRGINIA E.; MORGAN, BEN B., JR. (Central Florida, University, Orlando, FL); SALAS, EDUARDO (U.S. Navy, Naval Training Systems Center, Orlando, FL)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 2 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 1372-1376.
PY- 1990
PD- 199000
RF- 20
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- The purpose of this research was to examine the effects of different

types of training interventions on team communication. Forty-five teams of two persons each viewed one of three training videotapes and then performed a low-fidelity helicopter simulation exercise. Trained raters were used to rate teams in terms of levels of their communications and mission performances. Finally, attitudes concerning aircrew coordination were measured before and after training. Results indicated that team communication skills were affected by the type of training intervention the team received. Specifically, the communication of teams in the skills group was significantly better than that of the other two groups. No significant effect of training intervention was found for the mission performance or the attitude data, although a significant correlation was found between team communication performance and team mission performance. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *PERSONNEL DEVELOPMENT; *PILOT TRAINING; *TRAINING EVALUATION
DE- FLIGHT SIMULATION; PILOT PERFORMANCE; VERBAL COMMUNICATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01979513
AN- <AEROSPACE> A92-11177
TI- Task Analysis/Workload (TAWL) - A methodology for predicting operator workload
AU- HAMILTON, DAVID B.; BIERBAUM, CARL R. (Anacapa Sciences, Inc., Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 2 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 1117-1121.
PY- 1990
PD- 199000
RF- 12
CN- MDA903-87-C-0523
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- The TAWL methodology, developed to predict operator workload utilizing the information from a task analysis of the system, is described. By employing this methodology an analyst can develop a model of a system and utilize the model's output to determine the half-second intervals in which crewmembers experience high workload, which crewmembers experience high workload, and the components in which crewmembers experience high workload. These data enable system designers to redistribute or reduce workload over time, components, or crewmembers, and to identify design alternatives that result in lower workload. (R.E.P.)
SF- AIAA
DE- <MAJOR> *BIOLOGICAL MODELS (MATHEMATICS); *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *OPERATOR PERFORMANCE; *WEAPON SYSTEMS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMPUTERIZED SIMULATION; FLIGHT CREWS; LIGHT HELICOPTERS; MAN MACHINE SYSTEMS; TASKS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01979500
AN- <AEROSPACE> A92-11164
TI- An anthropometric evaluation of the TH-57 Jetranger helicopter
AU- CHAPLESKI, ROBERT C.; ADRIAN, EDWARD D. (Louisiana State University, Baton Rouge)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 1 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 710-714.
PY- 1990
PD- 199000
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- Results of a questionnaire and field study evaluating the TH-57 Jetranger helicopter are summarized. The questionnaire was distributed among student pilots asking their opinions on the operation of the helicopter. The problem with a cramped cockpit environment, obstructed visibility, difficulties in reaching and even seeing some instruments and gages, and several comfortability factors were revealed. The field test indicated that this helicopter is deficient in accommodating individuals within the allowable anthropometric ranges for student pilots. (O.G.)
SF- AIAA

DE- <MAJOR> *ANTHROPOMETRY; *HELICOPTER PERFORMANCE; *HUMAN FACTORS
ENGINEERING; *TRAINING AIRCRAFT
DE- COMFORT; MAN MACHINE SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01979481
AN- <AEROSPACE> A92-11145
TI- A secondary analysis comparing subjective workload assessments with U.S. Army Aircrew Training Manual ratings of pilot performance
AU- STEWART, JOHN E., II; LOFARO, RONALD J. (U.S. Army, Research Institute for the Behavioral and Social Sciences, Alexandria, VA)
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 1 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 104-108.
PY- 1990
PD- 199000
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- The present research effort sought to determine the validity of subjective workload estimates for Aircrew Training Manual (ATM) tasks for the UH-60 helicopter generated via a modified Delphi technique. Delphi weights were found to predict performance ratings on the ATM tasks; ATM tasks associated with accidents also had higher Delphi weights than did those not so associated. (Author)
SF- AIAA
DE- <MAJOR> *MANUALS; *PILOT PERFORMANCE; *PILOT TRAINING; *TRAINING EVALUATION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DELPHI METHOD (FORECASTING); RATINGS; UH-60A HELICOPTER
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01979474
AN- <AEROSPACE> A92-11138
TI- TASKILLAN II - Pilot strategies for workload management
AU- SEGAL, LEON D.; WICKENS, CHRISTOPHER D. (Illinois, University, Savoy)
CS- Illinois Univ., Savoy.
CS- <CODE> IB586416
SO- IN: Human Factors Society, Annual Meeting, 34th, Orlando, FL, Oct. 8-12, 1990, Proceedings. Vol. 1 (A92-11126 01-54). Santa Monica, CA, Human Factors Society, 1990, p. 66-70.
PY- 1990
PD- 199000
RF- 25
CN- NAG2-38
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9201
AB- This study focused on the strategies used by pilots in managing their workload level, and their subsequent task performance. Sixteen licensed pilots flew 42 missions on a helicopter simulation, and were evaluated on their performance of the overall mission, as well as individual tasks. Pilots were divided in four groups, defined by the presence or absence of scheduling control over tasks and the availability of intelligence concerning the type and stage of difficulties imposed during the flight. Results suggest that intelligence supported strategies that yielded significant higher performance levels, while scheduling control seemed to have no impact on performance. Both difficulty type and the stage of difficulty impacted performance significantly, with strongest effects for time stresss and difficulties imposed late in the flight. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT CONDITIONS; HELICOPTERS; STRESS (PSYCHOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01976000
AN- <AEROSPACE> N91-30703
TI- Task analysis and workload prediction model of the MH-60K mission and a comparison with UH-60A workload predictions. Volume 3: Appendixes H through N
TI- <SUPPLEMENT> Interim Report, Dec. 1988 - Apr. 1990
AU- BIERBAUM, CARL R.; HAMILTON, DAVID B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL.
CS- <CODE> AU848387
PY- 1990
PD- 199010

PG- 259P.
CN- MDA903-87-C-0523
RN- AD-A229408; ASI690-328-90-III-VOL-3; ARI-RN-91-02-VOL-3
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A12/MF A03
JA- STAR9122
AB- For this research, a mission scenario was used to conduct a comprehensive task analysis for MH-60K operations. The analysis used a top-down approach to identify 5 phases, 15 segments, 71 functions, and 230 tasks for the mission. Also, the crewmember performing each task was identified, and estimates of the task durations and the sensory, cognitive, and psychomotor workload associated with the tasks were derived. The mission/task/workload analysis data were used to develop a computer model of workload for MH-60K crewmembers. The model used a bottom-up approach to build mission functions from tasks and mission segments from functions. Decision rules were written to specify the procedure for combining tasks into functions and functions into segments. The model permitted an analysis of total workload experienced by the pilot and copilot in the performance of both sequential and concurrent tasks. The predicted workload for the MH-60K pilot and copilot was compared to the UH-60A baseline workload prediction to determine the impact of the MH-60K advanced technology. The comparison indicated very little difference in the predicted workload for the pilot and lower predicted workload for the copilot in the MH-60K. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *COMPUTERIZED SIMULATION; *HELICOPTERS; *PILOT PERFORMANCE; *PREDICTION ANALYSIS TECHNIQUES; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DECISION MAKING; EXPERIENCE; MATHEMATICAL MODELS; MISSION PLANNING; PHYSIOLOGICAL TESTS; PSYCHOMOTOR PERFORMANCE
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01975036
AN- <AEROSPACE> N91-29735
TI- Human factors of night vision devices: Anecdotes from the field concerning visual illusions and other effects
TI- <SUPPLEMENT> Final Report
AU- CROWLEY, JOHN S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1991
PD- 199105
PG- 49P.
RN- AD-A237641; USAARL-91-15
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9121
AB- To investigate the breadth of visual illusions experienced by aviators flying with night vision devices (NVDs), an open-ended questionnaire was distributed to the military helicopter community in the fall of 1989. Of the 242 returned questionnaires, there were 221 night vision goggle (NVG) reports and 21 thermal imaging system (FLIR) reports. Most sensory events occurred at night, during low illumination, good weather, and over varied terrain. Contributing factors included inexperience, division of attention, and fatigue. Frequently reported illusions were misjudgements of drift, clearance, height above the terrain, and attitude. Also reported were illusions due to external lights, and distributed depth perception caused by differences in brightness between NVG tubes. Other respondents cited hardware problems and physiological effects. There were no obvious differences between the experiences of NVG users and FLIR users. Although incidence rates cannot be inferred from these data, the variety of expected aviator anecdotes in this report will be useful to all those concerned with human factors and safety of NVDs. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIR DETECTORS; *GOGGLES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *ILLUSIONS; *NIGHT VISION; *PHYSIOLOGICAL EFFECTS; *SPACE PERCEPTION
DE- ARMED FORCES (UNITED STATES); LAND; LUMINOUS INTENSITY; RATES (PER TIME); TERRAIN
SH- <COSATI> 23B Human Factors engineering & Man Made Machines
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01975031

AN- <AEROSPACE> N91-29730
TI- Performance of several different Naval aviator communities on a cognitive/psychomotor test battery: Pipeline comparison and prediciton
TI- <SUPPLEMENT> Interim Report, Dec. 1988 - Dec. 1989
AU- SHULL, R. N.; GRIFFIN, G. R.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1990
PD- 199012
PG- 18P.
RN- AD-A238564; NAMRL-1361
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9121
AB- Research is currently being conducted to develop reliable predictor tests which might aid in the making of decisions concerning aircrew assignment. The current approach involves comparing the performance of several different aviator communities on a test battery measuring various aspects of cognitive and psychomotor functioning. Four groups of pilots (two experienced jet groups, one experienced helicopter (helo) group, and one untrained student group) were tested on this battery. Overall, the jet groups performed in general. Within this student group, pilot trainees who were assigned to the jet pipeline did significantly better on several of these tests than those trainees who were assigned to either helicopter or land-based fixed-wing pipelines. Many of the test performance differences seen between these jet and helo student pipeline groups were also seen between the experienced jet and helo pilots tested. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *COGNITION; *FLIGHT CREWS; *PHYSIOLOGICAL TESTS; *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE
DE- EXPERIENCE; FIXED WINGS; HELICOPTERS; PERFORMANCE PREDICTION; PILOT TRAINING; TRAINING EVALUATION
SH- <COSATI> 5H Man-machine Relations
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01975030
AN- <AEROSPACE> N91-29729
TI- Performance of Marine AV-8B (Harrier) pilots on a cognitive/psychomotor test battery: Comparison and prediction
TI- <SUPPLEMENT> Interim Report, Jan. - Jul. 1990
AU- SHULL, R. N.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1990
PD- 199012
PG- 15P.
RN- AD-A238563; NAMRL-1362
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9121
AB- Several studies have suggested the possibility of predicting pilot flight performance in various aviation environments. The current report concerns the use of an automated performance-based test battery, measuring various aspects of cognitive and psychomotor function, to eventually predict the flight performance of Marine jet pilots during various stages of flight training while comparing their test results to those of other aviation communities. A group of Marine jet pilots assigned to operate the AV-8B vertical takeoff/landing attack jet were tested. No significant differences in test performance were found among the various subgroups of student and experienced AV-8B pilots tested. The subject group, as a whole, performed most like pilots of other types of jet aircraft on some tests and more like helicopter pilots on other tests. (DTIC)
SF- DTIC
DE- <MAJOR> *COGNITION; *FLIGHT TRAINING; *PHYSIOLOGICAL TESTS; *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE
DE- AIRCRAFT PILOTS; HARRIER AIRCRAFT; JET AIRCRAFT; PERFORMANCE PREDICTION ; V/STOL AIRCRAFT
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01974038
AN- <AEROSPACE> N91-28733
TI- Human body protection in a dynamic environment. Cushioning mechanics

TI- <SUPPLEMENT> M.S. Thesis
AU- ZANGER, ISRAEL
CS- Tel-Aviv Univ. (Israel). Dept. of Interdisciplinary Studies.
CS- <CODE> TK227150
PY- 1989
PD- 198907
PG- 101P.
RN- ITN-91-85149
LA- MULTIPLE
LA- <NOTE> In HEBREW; ENGLISH summary
LA- <SUMMARY LANGUAGE> ENGLISH
GL- Israel
CP- Israel
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Tel-Aviv Univ., Exact Sciences Library, Ramat Aviv 69978, Israel
JA- STAR9120
AB- The principles of cushioning mechanics were defined and the transfer of vibration to a sitting human body in a dynamic environment was analyzed. The vibration damping properties of potential cushioning materials were classified. A mathematical approximation was established, which relates the damping efficiency of cushioning materials to the contact pressure. Several cushioning mechanics principles were formulated: An optimal domain for each material contact pressure; quasi-uniformity of contact pressure distribution; directional damping properties; and optimal damping of wide-spectrum vibration. Attention to these principles can lead to the design of cushions with optimal damping efficiencies. A test stand was assembled on which a series of transducers measured the acceleration transmitted through a cushioned chair into a sitting human body. The measured filtering efficiencies agreed well with predictions made according to the above principles. The principles were used to develop a methodology for the design of protective dynamic cushions, which can be applied to protection of instruments and delicate structures as well as to human protection. The methodology was applied to the design of cushions for a helicopter seat and for a combat vehicle seat; both proved superior to the articles in current use. (ISA)
DE- <MAJOR> *ACCELERATION PROTECTION; *CONTACT LOADS; *CUSHIONS; *FOAMS; *SEATS; *VIBRATION DAMPING; *VIBRATION ISOLATORS
DE- DYNAMIC PRESSURE; HUMAN BODY; HUMAN FACTORS ENGINEERING; MATERIALS TESTS; PHYSIOLOGICAL EFFECTS; PRESSURE DISTRIBUTION; SITTING POSITION; TRANSDUCERS; VIBRATION MEASUREMENT; VIBRATIONAL STRESS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01970946
AN- <AEROSPACE> N91-25611
TI- Contact lenses in the US Army attack helicopter environment
AU- LATTIMORE, MORRIS R., JR.
CS- Army Aeromedical Research Lab., Fort Rucker, AL. Visual Sciences Branch.
CS- <CODE> AY826435
PY- 1991
PD- 199105
NT- In AGARD, Ocular Hazards in Flight and Remedial Measures 3 p (SEE N91-25602 17-54)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A02
JA- STAR9117
AB- Recent technological advances have had a major impact on military aviation. While modern methods of providing visual information via electro-optics/visionics systems have extended the aviator's operational envelope, these devices are becoming increasingly incompatible with spectacle wear. Since approximately 20 percent of Army aviators are ametropic (spectacle wearing), alternative means of providing a refractive error correction need to be investigated. One alternative being considered is the use of a contact lense correction. For the past year, the U.S. Army Aeromedical Research Laboratory (USAAEL) has been conducting a worldwide, AH-64 Apache contact lense research project in order to develop a comprehensive database on contact lens wear in a variety of environments. A three-tier contact lens fitting system is being used: two different types of soft lenses and one rigid gas permeable (RGP) lens type. The wearing schedule is set at a maximum of 7 days/6 nights of extended lens wear. Fundamental operational data is being chronicled by unit flight surgeons. Standard clinical data is being used in on-going command deliberations on future medical policy decisions concerning contact lens wear by Army aviators. Basic research information is being gathered in an effort to determine the fundamental physiological response to the cornea to the presence of

a contact lens. Up-to-date results are presented as an introduction to interactive discussions. The subjective assessment of contact lens applications within the aviation community is universal acceptance. While current clinical data indicate some ocular health risk, flight safety risks are minimal. Establishment of long-term contact lens efficiency likely will depend on the ensuing analysis of physiological data. (Author)
DE- <MAJOR> *AEROSPACE MEDICINE; *CONTACT LENSES; *ERROR ANALYSIS; *FLIGHT
SAFETY; *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *POLICIES; *REFRACTIVITY; *VISUAL PERCEPTION
DE- CORNEA; DATA BASES; FLIGHT SURGEONS; HELICOPTERS; RISK; SCHEDULES
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01966011
AN- <AEROSPACE> N91-20633
TI- A meta-analytic approach for relating subjective workload assessments with US Army Aircrew Training Manual (ATM) ratings of pilot performance
TI- <SUPPLEMENT> Final Report, Jun. 1986 - Nov. 1989
AU- STEWART, JOHN E., II; LOFARO, RONALD J.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
CS- <CODE> A2025595
PY- 1990
PD- 199009
PG- 27P.
RN- AD-A230127; ARI-TR-913
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9112
AB- In 1985 Lofaro, using a modified Delphi technique, had subject matter experts (SMEs) generate estimated ratings of the subjective workload imposed by various Aircrew Training Manual (ATM) tasks for several Army helicopters, including the UH-60 Blackhawk. For each task, ratio-scaled estimates of difficulty and time to perform were derived. This research was performed to determine the validity of the UH-60 ATM estimates by correlating them with instructor pilot (IP) ratings of checkride performance from two other unrelated research projects. The other efforts investigated the decay of ATM task-related skills among Reserve and regular Army aviators. A second phase of this project compared the difficulty ratings of ATM tasks associated with UH-60 accidents over FY 1980 to 1988 with those not associated with UH-60 accidents. A negative correlation between the modified Delphi weights assigned to ATM tasks and IP ratings on these tasks was hypothesized; the hypothesis was confirmed. Analysis of the UH-60 accident data confirmed the second hypothesis. (DTIC)
SF- DTIC
DE- <MAJOR> *EDUCATION; *FLIGHT CREWS; *MANUALS; *MILITARY HELICOPTERS;
*PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT PILOTS; DELPHI METHOD (FORECASTING); HYPOTHESES; INSTRUCTORS;
MANUAL CONTROL; RATINGS; TASK COMPLEXITY
SH- <COSATI> 1C Aircraft
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01966002
AN- <AEROSPACE> N91-20624
TI- Visual Survey of Apache Aviators (VISAA)
TI- <SUPPLEMENT> Final Report
AU- BEHAR, ISAAC; WILEY, ROGER W.; LEVINE, RICHARD R.; RASH, CLARENCE E.; WALSH, DAVID J.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1990
PD- 199009
PG- 75P.
CN- USAARL-90-15; DA PROJ. 3M1-62787-A-879
RN- AD-A230201
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR9112
AB- A three-part study was conducted to assess the visual status of AH-64 pilots. The first part consisted of an anonymous questionnaire returned by 58 Fort Rucker instructor pilots. More than 80 percent of the pilots registered at least one visual complaint (visual discomfort, headache, double vision, blurred vision, disorientation, or afterimages)

associated with flying or after flying the Apache aircraft. Many of their comments indicated that symptoms occurred during long flights and/or flying with poor quality or out-of-focus display symbology. In the second part, a comprehensive visual functions test battery was completed on 10 volunteer, highly experienced AH-64 aviators. In the third part, measurements were made on the flight line of the Helmet Mounted Display diopter focus settings made by Apache IPs and students. The diopter settings ranged from 0 to -5.25 with a mean of -2.28. The required positive accommodation by the eye to offset these negative focus settings is very likely a source of visual discomfort and headache during and after long flights. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *PHYSIOLOGICAL FACTORS; *PILOT PERFORMANCE;
*SIGNS AND SYMPTOMS; *VISUAL STIMULI
DE- AFTERIMAGES; AH-64 HELICOPTER; DISORIENTATION; EYE (ANATOMY); HEADACHE;
HELMET MOUNTED DISPLAYS; INSTRUCTORS
SH- <COSATI> 6D Bionics
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01965465
AN- <AEROSPACE> N91-20086
TI- Aeropropulsion 1991
CS- National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
CS- <CODE> ND315753
PY- 1991
PD- 199103
PG- 574P.
NT- Conference held in Cleveland, OH, 20-21 Mar. 1991
CN- RTOP 505-62-00
RN- NASA-CP-10063; E-5954; NAS 1.55:10063
LA- English
GL- United States
CP- United States
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A24/MF A04
JA- STAR9112
AB- For the 50th anniversary, a review was provided of recent accomplishments of the ongoing programs at Lewis Research Center. The Lewis Aeropropulsion Program has the charter to develop advanced airbreathing propulsion technology for applications of national interest. To implement this program, Lewis concentrates its basic research in the critical disciplines of internal fluid mechanics, instrumentation and control, and structures and materials. The efforts are focused on developing new science, often implemented through advanced computer codes. Carefully designed experiments provide the data required to validate the advanced codes. Recent results and planned accomplishments in these areas are reviewed. From this firm foundation technology is investigated for a number of applications including propulsion, high performance and hypersonic aircraft, rotorcraft, and general aviation. For individual titles, see N91-20087 through N91-20121.
DE- <MAJOR> *AIR BREATHING ENGINES; *AIRCRAFT DESIGN; *AIRCRAFT ENGINES;
*COMPUTER PROGRAMS; *CONTROL SYSTEMS DESIGN; *FLUID MECHANICS;
*PROPULSION SYSTEM CONFIGURATIONS; *STRUCTURAL DESIGN
DE- CODING; FIGHTER AIRCRAFT; GENERAL AVIATION AIRCRAFT; HYPERSONIC AIRCRAFT; ROTARY WING AIRCRAFT; SUPERSONIC AIRCRAFT
SH- <COSATI> 21E Jet & Gas Turbine Engines
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01959287
AN- <AEROSPACE> N91-13872
TI- Time-sharing performance as a factor for success in flight training: Test development and validation
TI- <SUPPLEMENT> Final Report
AU- JORNA, P. G. A. M.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> IK311704
PY- 1989
PD- 198912
PG- 33P.
CN- A81/KM/126
RN- IZF-1989-58; TD-89-4556; ETN-91-98307
LA- English
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Institute for Perception RVO-TNO, P.O. Box 23, 3769 ZG Soesterberg, Netherlands
JA- STAR9105
AB- A test based on dual-task performance developed to investigate the

trainability of aspirant pilots to perform under demanding conditions is described. The dual-task is a combination of a pursuit tracking task with preview and a Continuous Memory Task (CMT). Aspirant pilots practice the tracking task and are tested under single and dual task conditions. Dual-task performance is expected to be related to pilot aptitude as assessed by other criteria. Predictive validity is evaluated in a stepwise validation with increasing levels of pilot aptitude as assessed by traditional selection procedures. A flight simulator test and advanced flight training for the Lockheed Orion and Westland Lynx helicopter are used. Successful aspirants, now operational pilots, are characterized by their excellent performance under dual-task conditions as well as under single-task conditions, depending on how soon they failed in the selection and training process. Prior flying experience did not influence tracking performance and was not found to be a critical factor in predicting success in advanced or operational flight training. (ESA)
DE- <MAJOR> *FLIGHT SIMULATORS; *PILOT PERFORMANCE; *PILOT SELECTION; *SENSORIMOTOR PERFORMANCE
DE- AVIATION PSYCHOLOGY; HUMAN PERFORMANCE; PSYCHOLOGICAL TESTS; PSYCHOMOTOR PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01953096
AN- <AEROSPACE> A91-54709
TI- CL-227 Sentinel - Maritime operations
AU- RAFF, S. G. (Canadair, Inc., Montreal, Canada)
SO- IN: Remotely piloted vehicles; International Conference, 8th, Bristol, England, Apr. 2-4, 1990, Proceedings (A91-54701 23-05). Bristol, England, University of Bristol, 1990, p. 12.1-12.10.
PY- 1990
PD- 199000
RF- 4
LA- English
GL- Canada
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9123
AB- The design, development and flight test demonstration of CL-227 rotary wing RPV are described. Target spotting missions require the RPV to take off and land from a small ship, and be vectored to a target boat with bearing and range provided by a radar carried in a small aerostat surveillance system tethered to the ship. Attention is given to various aspects of the demonstration sequence including operational requirements, special procedures required at sea, flight crew duties and skill levels, and system installation and interfaces with the ship. Results of the demonstration flights are discussed. (R.E.P.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER DESIGN; *MARINE ENVIRONMENTS; *REMOTELY PILOTED VEHICLES; *ROTARY WING AIRCRAFT; *SURVEILLANCE RADAR
DE- FLIGHT CONTROL; FLIGHT CREWS; NAVIGATION AIDS; PILOTLESS AIRCRAFT; VERTICAL TAKEOFF AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01953047
AN- <AEROSPACE> A91-54660
TI- Recent research results in stereo 3-D pictorial displays at Langley Research Center
AU- PARRISH, RUSSELL V.; BUSQUETS, ANTHONY M.; WILLIAMS, STEVEN P. (NASA, Langley Research Center, Hampton, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
SO- IN: IEEE/AIAA/NASA Digital Avionics Systems Conference, 9th, Virginia Beach, VA, Oct. 15-18, 1990, Proceedings (A91-54576 23-06). New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p. 529-539.
PY- 1990
PD- 199000
RF- 20
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9123
AB- Recent results from a NASA-Langley program which addressed stereo 3D pictorial displays from a comprehensive standpoint are reviewed. The program dealt with human factors issues and display technology aspects, as well as flight display applications. The human factors findings include addressing a fundamental issue challenging the application of stereoscopic displays in head-down flight applications, with the determination that stereoacuity is unaffected by the short-term use of stereo 3D displays. While stereoacuity has been a traditional

measurement of depth perception abilities, it is a measure of relative depth, rather than actual depth (absolute depth). Therefore, depth perception effects based on size and distance judgments and long-term stereo exposure remain issues to be investigated. The applications of stereo 3D to pictorial flight displays within the program have repeatedly demonstrated increases in pilot situational awareness and task performance improvements. Moreover, these improvements have been obtained within the constraints of the limited viewing volume available with conventional stereo displays. A number of stereo 3D pictorial display applications are described, including recovery from flight-path offset, helicopter hover, and emulated helmet-mounted display. (I.E.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *STEREOSCOPY; *VISUAL PERCEPTION
DE- HUMAN FACTORS ENGINEERING; PERCEPTUAL ERRORS; SPACE PERCEPTION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01952445
AN- <AEROSPACE> A91-54058
TI- UH-60 Airloads Program - Status and plans
AU- KUFELD, ROBERT M.; LOSCHKE, PAUL C. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- AIAA, AHS, and ASEE, Aircraft Design Systems and Operations Meeting, Baltimore, MD, Sept. 23-25, 1991. 12 p.
PY- 1991
PD- 199109
RF- 15
RN- AIAA PAPER 91-3142
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9123
AB- The present paper addresses the background of the UH-60 Airloads Program, the instrumentation, data requirements, and the development of the data collection and storage systems. An outline of the data points to be collected and detail of data access are presented. The Outside Experiment Program, in which researchers outside of NASA propose potential flight experiments, is described. Attention is given to the development of research systems necessary to conduct the program. Significant improvements in data acquisition, processing, and storage quality are stated as the primary objectives as dictated from lessons learned during past rotor airloads flight research programs. (P.D.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *ROTOR AERODYNAMICS; *ROTOR BLADES; *UH-60A HELICOPTER; *WIND TUNNEL TESTS
DE- DATA ACQUISITION; PRESSURE SENSORS; ROTORCRAFT AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01952283
AN- <AEROSPACE> A91-53896
TI- Heat stress on helicopter pilots during ground standby
AU- FROOM, PAUL; SHOCHAT, IGAL; STRICHMAN, LIORA; COHEN, ALEX (Israel Air Force, Aeromedical Center, Ramat Gan); EPSTEIN, YORAM (Heller Institute of Medical Research, Ramat Gan, Israel)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 62, Oct. 1991, p. 978-981.
PY- 1991
PD- 199110
RF- 24
SN- 0095-6562
LA- English
GL- Israel
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9123
AB- Measurements of ambient thermal conditions are used to characterize and predict thermal conditions in the cockpit before takeoff and during an hour standby period of two helicopters with a crew of two and with the cockpit doors opened. Dry-bulb, wet-bulb, and globe temperatures were measured on 28 separate summer days. The wet bulb globe temperature index (WBGT) was used to estimate heat stress. Ambient WBGT at time 0 ranged from 13 to 31 C. There was a 2.9 + or - 3.7 deg difference in WBGT between ambient and cockpit conditions at time 0 which increased to 7.2 + or - 3.5 deg after 1 h. An inverse correlation was found between the cockpit WBGT at time 0 and the change in cockpit WBGT in the 1-h period. It is concluded that the greenhouse effect results in a cockpit which is significantly higher than ambient conditions.

Subsequent changes in cockpit WBGT depend on the balance between heat transfer from the pilots' bodies to the cockpit and the loss of heat after the helicopter doors are opened. (P.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *AMBIENT TEMPERATURE; *COCKPITS; *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *THERMAL POLLUTION
DE- GREENHOUSE EFFECT; HELICOPTERS; PHYSICAL FITNESS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01949480
AN- <AEROSPACE> A91-51093
TI- Fundamental monocular/binocular HMD human factors
AU- LIPPERT, THOMAS M. (Honeywell, Inc., Minneapolis, MN)
SO- IN: Helmet-mounted displays II; Proceedings of the Meeting, Orlando, FL, Apr. 19, 20, 1990 (A91-51076 22-54). Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1990, p. 185-191.
PY- 1990
PD- 199000
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9122
AB- Five laboratory studies were conducted in order to establish image alignment tolerances for wide field of view monocular/biocular/binocular helmet mounted displays (HMD). Apache Helicopter-type production HMD oculars were used by night vision trained pilots in the studies, the results of which underscore the operational advantage of maintaining one dark adapted eye and quantify the pilots' perceptual sensitivities to display system sources of binocular misalignment. (Author)
SF- AIAA
DE- <MAJOR> *BINOCULAR VISION; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *MONOCULAR VISION; *PILOT PERFORMANCE; *VISUAL ACUITY
DE- AIRCRAFT PILOTS; DARK ADAPTATION; IMAGE RESOLUTION; INFRARED IMAGERY; NIGHT FLIGHTS (AIRCRAFT); NIGHT VISION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01949476
AN- <AEROSPACE> A91-51089
TI- The development of an aviators helmet mounted night vision goggle system
AU- WILSON, G. H.; MCFARLANE, R. J. (GEC Ferranti Defence Systems, Ltd., Displays Systems Div., Edinburgh, Scotland)
SO- IN: Helmet-mounted displays II; Proceedings of the Meeting, Orlando, FL, Apr. 19, 20, 1990 (A91-51076 22-54). Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1990, p. 128-139.
PY- 1990
PD- 199000
RF- 9
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9122
AB- Helmet-Mounted Systems (HMS) must be lightweight, balanced, and compatible with life support and head protection assemblies. This paper discusses the design of one particular HMS, the Nite-Op/Nightbird aviator's Night Vision Goggle (NVG) developed under contracts to the Ministry of Defence for all three services in the United Kingdom (UK) for Rotary Wing and fast jet aircraft. The existing equipment constraints, safety, human factor, and optical performance requirements are discussed before the design solution is presented after consideration of these material and manufacturing options. (Author)
SF- AIAA
DE- <MAJOR> *GOGGLES; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *NIGHT VISION; *SYSTEMS ENGINEERING
DE- EYEPIECES; HEAD-UP DISPLAYS; IMAGE RESOLUTION; LENSES; NIGHT FLIGHTS (AIRCRAFT); SAFETY FACTORS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01949463
AN- <AEROSPACE> A91-51076
TI- Helmet-mounted displays II; Proceedings of the Meeting, Orlando, FL, Apr. 19, 20, 1990
AU- LEWANDOWSKI, RONALD J., ED. (Honeywell, Inc., Minneapolis, MN)
SO- Meeting sponsored by SPIE. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 1290), 1990, 273 p.

For individual items see A91-51077 to A91-51100.
PY- 1990
PD- 199000
RN- SPIE-1290
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9122
AB- Various papers on helmet-mounted displays are presented. Individual topics addressed include: holographic helmet-mounted display (HMD) application for the extravehicular mobility unit, development of the combiner-eyepiece night-vision goggle, developments in CRTs for HMD applications, low-light-level television systems in HMDs, use of holographic optical elements in HMDs, route map as a helmet display option, requirements of an HMS/D for a night-flying helicopter, design and flight testing of an electronic visibility system. Also discussed are: real-time space-stabilized digital gimbal, development of an aviator's helmet-mounted night-vision goggle system, implications of visual processing for HMDs, fundamental monocular/binocular HMD human factors, development and usage of HMDs, F-16 HMD flight evaluations, evaluation of virtual cockpit concepts during simulated missions, head movement during simulated air-to-air engagements, aim sight. (C.D.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *HELMET MOUNTED DISPLAYS; *HOLOGRAPHY; *HUMAN FACTORS ENGINEERING
DE- GOGGLES; INFRARED IMAGERY; NIGHT FLIGHTS (AIRCRAFT); NIGHT VISION; PATTERN RECOGNITION; PERFORMANCE TESTS; SYSTEMS ENGINEERING; SYSTEMS SIMULATION; TRACKING (POSITION); USER REQUIREMENTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01948212
AN- <AEROSPACE> A91-49825
TI- Simulation evaluation of the effects of time delay and motion on rotorcraft handling qualities
AU- MITCHELL, DAVID G. (Systems Technology, Inc., Hawthorne, CA); HOH, ROGER H. (Hoh Aeronautics, Inc., Lomita, CA); ATENCIO, ADOLPH, JR.; KEY, DAVID L. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
SO- AIAA, Atmospheric Flight Mechanics Conference, New Orleans, LA, Aug. 12-14, 1991. 16 p. Research sponsored by U.S. Army.
PY- 1991
PD- 199108
RF- 21
CN- NAS2-13127
RN- AIAA PAPER 91-2892
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9121
AB- A study aimed at determining the effects of simulator characteristics on perceived handling qualities is discussed. Evaluations were conducted with a baseline set of rotorcraft dynamics, using a simple transfer-function model of an uncoupled helicopter, under different conditions of visual and overall time delays. As the visual and motion parameters were changed, differences in pilot opinion were found reflecting a change in the pilots' perceptions of handling qualities, rather than changes in the aircraft model itself. It is concluded that it is necessary to tailor the motion washout dynamics to suit the task, with reduced washouts for precision maneuvering as compared to aggressive maneuvering. Visual-delay data suggest that it may be better to allow some time delay in the visual path to minimize the mismatch between visual and motion, rather than eliminate the visual delay entirely through lead compensation. (O.G.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *AIRCRAFT MODELS; *FLIGHT CONTROL; *FLIGHT SIMULATION; *ROTORCRAFT AIRCRAFT
DE- GROUND TESTS; PILOT PERFORMANCE; TRANSFER FUNCTIONS; VERTICAL MOTION SIMULATORS; VISUAL PERCEPTION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01947045
AN- <AEROSPACE> A91-48658
TI- Rotorcraft human factors - Man...machine...environment
AU- WILKINS, ROBERT R. (Boeing Defense and Aerospace Group, Helicopter Div., Philadelphia, PA)
SO- SAE, Aerospace Technology Conference and Exposition, Long Beach, CA, Oct. 1-4, 1990. 28 p.

PY- 1990
PD- 199010
RF- 11
RN- SAE PAPER 902001
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9121
AB- The emergence of such radically novel VTOL technologies as the tilt-rotor configuration, fly-by-wire, multifunction cockpit displays, night vision systems, and cockpit resource management techniques, have increased the human factors design-related task facing rotorcraft engineers. Attention is given to the illustrative case of the V-22 tiltrotor aircraft's Vertical and Horizontal Situation Displays. Recommendations are made with respect to crew training, tiltrotor task training, and operational safety. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *NAVIGATION AIDS; *PILOT TRAINING; *ROTORCRAFT AIRCRAFT
DE- ACCIDENT PREVENTION; COCKPITS; CREW WORKSTATIONS; GLOBAL POSITIONING SYSTEM; TILT ROTOR AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01946933
AN- <AEROSPACE> A91-48546
TI- Minicomputer part-task simulation for helicopter development - An economical approach
AU- DORMAN, JEFFREY (McDonnell Douglas Helicopter Co., Mesa, Az)
SO- SAE, Aerospace Technology Conference and Exposition, Long Beach, CA, Oct. 1-4, 1990. 12 p.
PY- 1990
PD- 199009
RN- SAE PAPER 901814
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9121
AB- An economical part-task simulator for providing quantitative optimization of helicopter cockpit layout and displays has been built. The steps followed to confer real-time minicomputer application of a simplified flight model (FLYRT) is outlined, as is the control law development needed for 4-axis sidearm controller application. Instrument display variable synthesis, based on calculated variables is discussed. (Author)
SF- AIAA
DE- <MAJOR> *COCKPIT SIMULATORS; *ECONOMIC FACTORS; *HELICOPTER DESIGN; *MINICOMPUTERS; *OPTIMIZATION
DE- FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING; REAL TIME OPERATION; STRUCTURAL DESIGN
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 01943790
AN- <AEROSPACE> A91-45403
TI- The involuntary participation of a human pilot in a helicopter collective control loop
AU- MAYO, JOHN R. (Sikorsky Aircraft, Stratford, CT)
SO- European Rotorcraft Forum, 15th, Amsterdam, Netherlands, Sept. 12-15, 1989, Paper. 13 p.
PY- 1989
PD- 198909
RF- 11
LA- English
GL- United States
CP- Netherlands
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9119
AB- The purpose of the study is to investigate the vibration interference for a pilot in a collective-loop closure, arising from helicopter's unique vertical degree of freedom. Bioresponse data for a pilot at the collective control of a helicopter is analyzed in the 1-5 Hz frequency range, then the collective axis pilot transfer function is coupled with a high-order linear helicopter model including rigid-body, flexible-fuselage, rotor flapping and lagging, inflow, and external-load dynamics. In the final phase of study, a low-pass filter design is implemented in the collective-control axis of the linear model in order to attenuate passive pilot feedthrough. A reduction of the pilot/vehicle interactions and, therefore, an increase in vehicle

stability margins as a result of this step are observed. (V.T.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC LOADS; *FEEDBACK CONTROL; *HELICOPTER CONTROL;
*MAN MACHINE SYSTEMS; *PILOT INDUCED OSCILLATION; *PILOT PERFORMANCE
DE- AIRCRAFT MODELS; AIRCRAFT STABILITY; BIOFEEDBACK; CONTROL STICKS; HEAVY
LIFT HELICOPTERS; HUMAN REACTIONS; LINEAR SYSTEMS; MANUAL CONTROL;
TRANSFER FUNCTIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01943787
AN- <AEROSPACE> A91-45400
TI- Human factor implications of the Aerospatiale AS332L Super Puma cockpit
AU- PADFIELD, R. R. (Helikopter Service A/S, Oslo, Norway)
SO- European Rotorcraft Forum, 15th, Amsterdam, Netherlands, Sept. 12-15, 1989, Paper. 20 p.
PY- 1989
PD- 198909
RF- 10
LA- English
GL- Norway
CP- Netherlands
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9119
AB- Human-factor problems that might occur in modern civilian helicopters are analyzed by examining human-factor implications of the cockpit design of the Aerospatiale AS332L Super Puma cockpit. Attention is focused on hardware, software, environment, and 'liveware' factors (the latter includes leadership, communications, crew coordination, personal relations, and discipline). Engine malfunction warnings, autopilot system, navigation equipment, landing lights, and intercom switching are discussed as well as the main-gear-box lubrication-system warning light, hydraulic panel, fuel-flow control levers, autopilot panel, rotor-brake system, and heater distributor valve control. Emphasis is placed on the participation of line pilots and instructors in the cockpit design of any aircraft. (V.T.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC PILOTS; *COCKPITS; *DISPLAY DEVICES; *HELICOPTER
DESIGN; *HUMAN FACTORS ENGINEERING; *WARNING SYSTEMS
DE- COMPUTER PROGRAMS; CONTROL SYSTEMS DESIGN; DISTANCE MEASURING EQUIPMENT
; HELICOPTER CONTROL; IN-FLIGHT MONITORING; NAVIGATION AIDS; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01939232
AN- <AEROSPACE> A91-40845
TI- Frames of reference for helicopter electronic maps - The relevance of spatial cognition and componential analysis
AU- HARWOOD, KELLY; WICKENS, CHRISTOPHER D. (Illinois, University, Urbana)
CS- Illinois Univ., Urbana.
CS- <CODE> IB647432
SO- International Journal of Aviation Psychology (ISSN 1050-8414), vol. 1, no. 1, 1991, p. 5-23.
PY- 1991
PD- 199100
RF- 25
SN- 1050-8414
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9117
AB- Computer-generated map displays for NOE and low-level helicopter flight were formed according to prior research on maps, navigational problem solving, and spatial cognition in large-scale environments. The north-up map emphasized consistency of object location, wheareas, the track-up map emphasized map-terrain congruency. A component analysis indicates that different cognitive components, e.g., orienting and absolute object location, are supported to varying degrees by properties of different frames of reference. (R.E.P.)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *MAPS; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE; *REFERENCE SYSTEMS; *SPACE PERCEPTION
DE- AIR NAVIGATION; AIRCRAFT INSTRUMENTS; COGNITION; DESIGN ANALYSIS; FLIGHT SIMULATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01929682
AN- <AEROSPACE> A91-31295
TI- NASA/Army rotor system flight research leading to the UH-60 airloads program
AU- SNYDER, W. J.; CROSS, J. L.; KUFELD, ROBERT (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: Innovations in rotorcraft test technology for the 90's; Proceedings of the AHS National Technical Specialists' Meeting, Scottsdale, AZ, Oct. 8-12, 1990 (A91-31284 12-01). Alexandria, VA, American Helicopter Society, Inc., 1990, 50 p.
PY- 1990
PD- 199000
RF- 66
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9112
AB- A review is presented of some of the early rotor systems flight research leading to the present comprehensive NASA/Army rotor system airloads program with the UH-60 helicopter. The experimental and analytical plans and progress for this program are described, including the design and development of a rotor blade which incorporated 242 pressure transducers buried in the surface of the blade, and also the development of calibration hardware for regular calibration and testing of the transducers. Supporting analytical developments based on the comprehensive analytical model of rotorcraft aerodynamics and dynamics (CAMRAD) and various CFD codes are discussed. The highly instrumented UH-60 as well as companion programs of full-scale and model wind tunnel tests of the UH-60 rotor with identical instrumentation will provide the opportunity to explore a full range of rotor experiments and the data necessary to validate the advanced methodologies under development. (R.E.P.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC LOADS; *PRESSURE SENSORS; *ROTOR AERODYNAMICS; *ROTOR BLADES; *UH-60A HELICOPTER
DE- COMPUTATIONAL FLUID DYNAMICS; PRESSURE MEASUREMENT; ROTARY WINGS; WIND TUNNEL TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01929679
AN- <AEROSPACE> A91-31292
TI- Resonance and control response tests using a control stimulation device
AU- MUELLER, HUBERT; GRUENEWALD, ALFRED (MBB GmbH, Munich, Federal Republic of Germany)
SO- IN: Innovations in rotorcraft test technology for the 90's; Proceedings of the AHS National Technical Specialists' Meeting, Scottsdale, AZ, Oct. 8-12, 1990 (A91-31284 12-01). Alexandria, VA, American Helicopter Society, Inc., 1990, 9 p.
PY- 1990
PD- 199000
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9112
AB- This paper presents the main functions of the STIMULI-system currently utilized for ground and flight testing of the BO 108. Using this system reduces the pilot's workload considerably as he only has to stabilize the initial flight condition while the automatic main rotor control input occurs. From the helicopter's instrumentation pack a list of up to 15 channels can be indicated on the screen in text mode. For each measurement signal a digital on-line information is given about minima and maxima, respectively. Further details for the STIMULI system are furnished that cover component description, computer unit, operation and program menu, ground and air resonance tests, and engine resonance testing. (R.E.P.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *GROUND TESTS; *HELICOPTER CONTROL; *RESONANCE TESTING; *RESONANT VIBRATION
DE- CONTROL SYSTEMS DESIGN; DISPLAY DEVICES; HYDROELASTICITY; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01929348
AN- <AEROSPACE> A91-30961
TI- Quantitative method for relating helicopter crew task performance and

mission success
AU- ASKREN, WILLIAM B. (Universal Energy Systems, Inc., Dayton, OH); BOYETT, JOSEPH E. (Management and Engineering, Inc., Montgomery, AL)
SO- IN: NAECON 90; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 21-25, 1990. Vol. 2 (A91-30851 12-01). New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p. 825-830. U.S. Army-sponsored research.
PY- 1990
PD- 199000
CN- F41698-84-D-0052
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9112
AB- A quantitative method that relates aviator performance at the cockpit task level to system performance at the mission level is described. A series of hierarchical, probabilistic conceptual models were developed that link helicopter crew task performance to mission combat success. The models were fashioned so that predictions can be made from crew task performance, through system function performance, through flight segment performance to mission success. The models allow prediction of the relative contribution of each task, function, and segment to mission success. The models link crew task performance to four mission scores: probability of target kill, probability of surviving an enemy threat, probability of surviving ground hazards, and probability of hitting a navigation window. A proof-of-concept of the models was accomplished using subject matter expert (SME) data that were collected for AH-64 helicopter combat operations. This resulted in the production of a total of 236 equations that predict from task performance to mission success, and from mission success to task performance. (I.E.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *QUANTITATIVE ANALYSIS
DE- AIR NAVIGATION; AIRCRAFT SURVIVABILITY; COCKPITS; TARGET ACQUISITION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01927840
AN- <AEROSPACE> A91-29453
TI- MTR390 turboshaft development programme update
AU- TRAPPMANN, K. (MTU Motoren -und Turbinen-Union Muenchen GmbH, Munich, Federal Republic of Germany); DUCOS, J. S. (Turbomeca, Bordes, France); SANDERSON, A. R. (Rolls-Royce, PLC, Leavesden, England)
SO- IN: Rotary Wing Propulsion Specialists' Meeting, Williamsburg, VA, Nov. 13-15, 1990, Proceedings (A91-29451 11-07). Alexandria, VA, American Helicopter Society, 1990, 7 p.
PY- 1990
PD- 199000
RF- 5
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9111
AB- Detailed design of the MTR390 turboshaft engine began in 1988 after an intense period of parametric studies to optimize the configuration to take advantage of the most up to date technology and research developments. The main requirements call for ample emergency power for the one engine out condition, high alternating load capability, low fuel consumption under partial load, good acceleration characteristics, and low life cycle cost. Comprehensive instrumentation on the first test-bench engines including more than 600 measurement points has permitted the recording and analysis of considerable amounts of important data on overall performance, engine behavior, and the performance of internal systems and major components. The test results to date show that the specification targets will be achieved within the program timescale. (R.E.P.)
SF- AIAA
DE- <MAJOR> *ENGINE DESIGN; *HELICOPTER ENGINES; *TURBOSHAFTS
DE- AEROTHERMODYNAMICS; MILITARY HELICOPTERS; PROPULSION SYSTEM CONFIGURATIONS; PROPULSION SYSTEM PERFORMANCE
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01926859
AN- <AEROSPACE> A91-28472
TI- Recent results of in-flight simulation for helicopter ACT research
AU- PAUSDER, HEINZ-JUERGEN; BOUWER, GERHARD (DLR, Institut fuer Flugmechanik, Brunswick, Federal Republic of Germany)
SO- (European Rotorcraft Forum, 15th, Amsterdam, Netherlands, Sept. 1989) Vertica (ISSN 0360-5450), vol. 14, no. 4, 1990, p. 557-572.
PY- 1990
PD- 199000
RF- 10

SN- 0360-5450
LA- English
GL- Germany
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9111
AB- The role of in-flight simulation in the development of Active Control Technology (ACT) systems is discussed. This technique yields information which allows the helicopter system dynamics to be tailored to the specific mission demands and the ability of the human pilot. It is pointed out that ACT performance evaluation is an evaluation of an integrated system and therefore a test facility is required that allows a flight examination in an environment with an acceptable fidelity. The main elements of influence which have to be considered in the development of ACT for a helicopter include the basic helicopter response characteristics, the ACT components, the pilot's controller characteristics, and the format of information displayed for the pilot. (L.K.S.)
SF- AIAA
DE- <MAJOR> *ACTIVE CONTROL; *CONTROL THEORY; *FLIGHT SIMULATION; *FLIGHT TESTS; *HELICOPTER CONTROL
DE- CONTROL SYSTEMS DESIGN; CONTROLLERS; FEEDBACK CONTROL; FEEDFORWARD CONTROL; HUMAN FACTORS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01925177
AN- <AEROSPACE> A91-26782
TI- Aviation psychology
TI- <EXTENSION> Book
AU- JENSEN, RICHARD S., ED. (Ohio State University, Columbus)
SO- Aldershot, England and Brookfield, VT, Gower Technical, 1989, 438 p. For individual items see A91-26783 to A91-26797.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United Kingdom
DT- COLLECTED WORK
JA- IAA9110
AB- Topics presented include a study of the human factors in the super cockpit, the cognitive demands of automation in aviation, some implications of automation on air traffic control, and special considerations for helicopter safety. Also presented are personality assessment in aviator selection, the selection and screening programs for air traffic control specialists, aircrew performance assessment, and human performance aspects of aircraft accidents. (R.E.P.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *FLIGHT CREWS; *HUMAN PERFORMANCE
DE- AIR TRAFFIC CONTROL; AIRCRAFT ACCIDENTS; AUTOMATION; COCKPITS; COGNITIVE PSYCHOLOGY; DECISION MAKING; DISPLAY DEVICES; FLIGHT SIMULATION; HELICOPTERS; HUMAN FACTORS ENGINEERING; PILOT ERROR; PILOT PERFORMANCE; PILOT SELECTION; SPEECH RECOGNITION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01924188
AN- <AEROSPACE> A91-25793
TI- Simulation studies of the pilot-helicopter system under abnormal conditions
TI- <ORIGINAL> Badania symulacyjne ukladu pilot-smiglowiec w warunkach transgresji
AU- SZUMANSKI, KAZIMIERZ (Instytut Lotnictwa, Warsaw, Poland)
SO- Rozprawy Inzynierskie (ISSN 0035-9408), vol. 37, no. 1, 1989, p. 3-39. In Polish.
PY- 1989
PD- 198900
RF- 9
SN- 0035-9408
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9109
AB- The paper is concerned with the dynamics of the system pilot-helicopter under extreme conditions, including cases where some consecutive limits have been exceeded. The aim of the study includes both estimation of helicopter loading and determination of the control methods under given conditions. The discussion covers simulation analyses using mathematical models, flight simulator tests, and actual flight tests. (

V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *EXTREMUM VALUES; *HELICOPTERS; *PILOT
PERFORMANCE
DE- FLIGHT SIMULATORS; FLIGHT TESTS; MATHEMATICAL MODELS; PILOT INDUCED
OSCILLATION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01922715
AN- <AEROSPACE> A91-24320
TI- The NOE flights and their effect upon a pilot
AU- WITKOWSKI, R. (Instytut Lotnictwa, Warsaw, Poland)
SO- IN: ICAS, Congress, 17th, Stockholm, Sweden, Sept. 9-14, 1990, Proceedings. Vol. 1 (A91-24301 09-01). Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1990, p. 151-157.
PY- 1990
PD- 199000
RF- 6
LA- English
GL- Poland
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9109
AB- The effects of NOE helicopter flight on pilot emotional state and eyesight use are discussed in view of flight tests, encompassing six 'horizontal' and four 'vertical' maneuvers, which were conducted by a Mi-2 helicopter. These tests have revealed a differentiation in the effect of maneuvers on the emotional state of the pilot; the most distressing maneuvers were those involving a coupling of vertical maneuvers with rapid descent. Heartbeat rates exceeding normal by 60 percent were recorded in such cases. Oculographic tests confirmed that the pilot's sight is not stabilized in one direction during NOE, but rather alternates between the outside and the instrument panel. This underscores the need for incorporating HUDs on NOE-mission helicopters. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT STRESS (BIOLOGY); *NAP-OF-THE-EARTH
NAVIGATION; *PILOT PERFORMANCE; *PSYCHOLOGICAL FACTORS; *VISUAL FLIGHT
DE- AIRCRAFT MANEUVERS; EMOTIONS; FLIGHT TESTS; HELICOPTERS; HUMAN
REACTIONS; PHYSIOLOGICAL TESTS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01922696
AN- <AEROSPACE> A91-24301
TI- ICAS, Congress, 17th, Stockholm, Sweden, Sept. 9-14, 1990, Proceedings. Vols. 1 & 2
SO- Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1990, p. Vol. 1, 1279 p.; vol. 2, 1203 p. For individual items see A91-24302 to A91-24534.
PY- 1990
PD- 199000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9109
AB- The present conference discusses issues in the fields of aeroelasticity, multidisciplinary design integration, slipstreams and jet interference, the aeroacoustics of advanced propellers, simulation technologies for human factors, boundary-layer testing, aircraft sensors and subsystems, high-alpha and vortex flows, rotorcraft design, novel test facilities, high-alpha flow over wings, buckling and postbuckling structural behavior, inlet and nozzle design, simulation and flighttesting, aeroelastic response, systems architecture and integration, unsteady aerodynamics, fatigue and fracture mechanics, and propulsion-system integration. Also discussed are CFD configurations, trajectory optimization and guidance, high-alpha dynamics, combustion phenomena, experimental techniques, structural dynamics and impact effects, computational aids for transport aircraft, drag reduction methods, high-temperature materials, aircraft control methods, impact and crash resistance, transport aircraft design integration, subsonic wings, hypersonic propulsion, structural testing, ATC, high-temperature structures, airworthiness and reliability, military aircraft, composite materials fabrication, nonlinear flight dynamics, and mathematical modeling. (O.C.)
SF- AIAA
DE- <MAJOR> *AERODYNAMICS; *AERONAUTICS; *AIRCRAFT DESIGN; *CONFERENCES
DE- AEROACOUSTICS; AEROELASTICITY; AIRCRAFT CONSTRUCTION MATERIALS; AIRCRAFT CONTROL; COMPUTATIONAL FLUID DYNAMICS; ENGINE INLETS; FLIGHT

TESTS; FRACTURE MECHANICS; HUMAN FACTORS ENGINEERING; HYPERSONIC
AIRCRAFT; NOZZLES; ROTARY WING AIRCRAFT; SUPERSONIC AIRCRAFT; TRANSPORT
AIRCRAFT; UNSTEADY AERODYNAMICS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01921355
AN- <AEROSPACE> A91-22960
TI- Closed-loop assessment of flight simulator fidelity
AU- HESS, RONALD A. (California, University, Davis); MALSBURY, TERRY
CS- California Univ., Davis.
CS- <CODE> CC907079
SO- (AIAA, Aerospace Sciences Meeting, 27th, Reno, NV, Jan. 9-12, 1989, AIAA Paper 89-0014) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 14, Jan.-Feb. 1991, p. 191-197. Research supported by the U.S. Army. Previously cited in issue 09, p. 1393, Accession no. A89-25010.
PY- 1991
PD- 199102
RF- 12
SN- 0731-5090
CN- NAG2-482
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9108
SF- AIAA
DE- <MAJOR> *CONTROL SIMULATION; *FLIGHT SIMULATION; *FLIGHT SIMULATORS;
*MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AIRCRAFT PILOTS; HOVERING; SISO (CONTROL SYSTEMS); UH-60A HELICOPTER
SH- 7514 Ground Support Systems & Facilities--Space (1975-)

AN- <DIALOG> 01919005
AN- <AEROSPACE> A91-20610
TI- DISCUS - A failure-tolerant Fbw/Fbl-experimental system
TI- <ORIGINAL> DISCUS - Ein fehlertolerantes Fbw/Fbl-Experimentalsystem
AU- MANSFELD, GUENTER; BENDER, KLAUS; HOLLE, KLAUS-DIETER (DLR, Institut fuer Flugfuehrung, Brunswick, Federal Republic of Germany)
SO- DLR-Nachrichten (ISSN 0937-0420), Nov. 1990, p. 6-11. In German.
PY- 1990
PD- 199011
SN- 0937-0420
LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9107
AB- The DISCUS (Digital Self-healing Control for Upgraded Safety) system for helicopters is discussed. DISCUS offers one-fail-op capability, flexible hardware structure, modular construction capability, high performance due to multiprocessor capability, and adaptability to higher computer languages. The DISCUS computer architecture and its fly-by-wire/fly-by-night system are examined. The DISCUS yaw control concept and flight measurement technology are described. (C.D.)
SF- AIAA
DE- <MAJOR> *ARCHITECTURE (COMPUTERS); *FAULT TOLERANCE; *FLY BY LIGHT
CONTROL; *FLY BY WIRE CONTROL; *HELICOPTER CONTROL; *NAVIGATION AIDS;
*YAW
DE- DIRECTIONAL CONTROL; DISPLAY DEVICES; PILOT PERFORMANCE; SIGNAL TRANSMISSION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01916041
AN- <AEROSPACE> A91-17646
TI- Estimation of UH-60 blade aerodynamic loads and rotor impedance using generalized strain pattern/Kalman filter approach
AU- BRUHIS, OFER; DUVAL, RONALD W. (Advanced Rotorcraft Technology, Inc., Mountain View, CA); IDAN, MOSHE (Stanford University, CA)
CS- Advanced Rotorcraft Technology, Inc., Mountain View, CA.
CS- <CODE> AD237073
SO- AHS, Annual Forum and Technology Display, 46th, Washington, DC, May 21-23, 1990, Paper. 13 p.
PY- 1990
PD- 199005
RF- 10
CN- NAS2-12915

LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- The purpose of the study is to develop and verify a methodology capable of predicting the vibration levels and estimating the aerodynamic loads and rotor impedance of a rotorcraft blade. Simulated flight test data is generated, blade airloads and elastic hub motions are estimated from the simulated data through the use of the Kalman filter/smoother, simulation upgrading and parameter identification are performed, and the ability to identify rotor impedance from a simulation by isolating the rotor model and providing a prescribed motion for the hub as rotor excitation is demonstrated. It is pointed out that the statistical estimation procedure utilized in the proposed methodology minimizes the impact of sensor noise, truncation error, and instrumentation bias on the results. (V.T.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC LOADS; *AEROELASTICITY; *KALMAN FILTERS; *ROTOR AERODYNAMICS; *STRAIN DISTRIBUTION; *UH-60A HELICOPTER
DE- AIRFRAMES; HELICOPTER DESIGN; ROTORCRAFT AIRCRAFT; VIBRATORY LOADS; WIND TUNNEL TESTS
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 01915643
AN- <AEROSPACE> A91-17248
TI- Helicopter crew station design using a computerized human model
AU- BOLUKBASI, A. O.; BERTONE, C. M. (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 649-654.
PY- 1990
PD- 199000
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- A computerized modeling system, Program MACMAN (McDonnell Anthropometric Computerized Man-Model), has been developed to assist in designing helicopter crew stations. MACMAN combines a three-dimensional representation of the human body with the crew station geometry. The human body model consists of twelve segments whose dimensions and kinematic constraints have been determined from studies of human anthropometry. MACMAN is menu-driven and very user-friendly. The human model sizes can be interactively changed to represent 5th percentile female through 95th percentile male crew members. The human model can also be animated to evaluate reach envelopes and collision and interaction detection. MACMAN has been validated and used in design of the MD900 crew station, dramatically reducing the time needed to construct mockups and design iterations. (Author)
SF- AIAA
DE- <MAJOR> *COMPUTERIZED SIMULATION; *CREW WORKSTATIONS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- ANTHROPOMETRY; COMPUTER AIDED DESIGN; DESIGN ANALYSIS; FLIGHT CREWS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01915641
AN- <AEROSPACE> A91-17246
TI- A synthesis of MicroSAINT computer simulation and McCracken-Aldrich workload estimates to predict the impact of Automatic Target Handoff System Avionics Integration on AH-64A operator performance
AU- HARDIN, DEBORAH L.; OLSSON, THOMAS W. (Rockwell International Corp., Collins Government Avionics Div., Cedar Rapids, IA); SZABO, SANDRA M. (CAE-Link Corp., Link Flight Simulation Div., Binghamton, NY)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 631-644.
PY- 1990
PD- 199000
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
SF- AIAA

DE- <MAJOR> *AH-64 HELICOPTER; *AVIONICS; *COMPUTERIZED SIMULATION; *PILOT
PERFORMANCE; *TARGET ACQUISITION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT CONFIGURATIONS; HARDWARE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01915640
AN- <AEROSPACE> A91-17245
TI- The role of mission/task analysis in reducing weapon system costs and risks
AU- ALDRICH, THEODORE B.; HAMILTON, BRUCE E. (Sikorsky Aircraft, Stratford, CT); SZABO, SANDRA M. (CAE-Link Corp., Binghamton, NY)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 619-629.
PY- 1990
PD- 199000
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- This paper describes current and proposed applications of the Army's Task Analysis Workload (TAWL) prediction methodology. The methodology was first applied during the Advanced Rotorcraft Technology Integration (ARTI) program to estimate operator mental workload associated with varying degrees of automation for one- and two-crewmember Light Helicopter Experimental (LHX) configurations. Workload estimates produced by the methodology also were used to guide tradeoffs between development risks and program costs. Currently, the Boeing-Sikorsky First Team is using a refinement of TAWL as an analysis tool in the implementation of the Army's Manpower and Personnel Integration (MANPRINT) Program. The refined TAWL is being used to predict operator workload, to document crew station design requirements, to assess operator workload in conjunction with full mission simulation, and to guide training system development. Proposed innovative applications of TAWL include assisting in the determination of processor throughput requirements and the allocation of software resources. (Author)
SF- AIAA
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *PILOT
PERFORMANCE; *SYSTEMS SIMULATION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AUTOMATION; COCKPITS; COST REDUCTION; DESIGN ANALYSIS; FLIGHT CREWS;
LIGHT HELICOPTERS
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 01915639
AN- <AEROSPACE> A91-17244
TI- ADDSS/EDRAS influencing preliminary design for enhanced supportability
TI- <EXTENSION> Boeing Helicopters' Automated Design Decision Support Systems/Electronic Document Retrieval and Annotation System
AU- BEGGS, ROBERT M. (Boeing Helicopters, Philadelphia, PA)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 605-611.
PY- 1990
PD- 199000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- This paper presents an overview of an Automated Design Decision Support System (ADDSS). It has long been recognized that the most cost effective place to improve the Supportability/Operability (S/O) of a weapons platform is in the preliminary design phase when Reliability, Maintainability, Safety and Human Factors features can be easily integrated into the system configuration. ADDSS is a computer based preliminary design environment that encourages design for S/O along with traditional performance related goals. ADDSS operates in concert with the Electronic Document Retrieval and Annotation System (EDRAS) which provides easy access to existing databases and automates the computation of baseline statistics. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *BOEING AIRCRAFT; *COMPUTER AIDED DESIGN;
*HELICOPTER DESIGN; *MILITARY HELICOPTERS; *SUPPORT SYSTEMS
DE- AIRCRAFT MAINTENANCE; AIRCRAFT RELIABILITY; DATA RETRIEVAL; LOGIC DESIGN
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01915631
AN- <AEROSPACE> A91-17236
TI- Integrated Design Environment-Aircraft (IDEA) - An approach to concurrent engineering
AU- MEYER, STEPHEN A. (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 509-522.
PY- 1990
PD- 199000
RF- 22
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- The evaluation of the interrelationship between subsystems and design disciplines such as reliability, producibility, maintainability and human factors engineering, and life cycle design criteria during development is an example of the systems approach to design called concurrent engineering. IDEA enables rapid access of disparate design information and establishes a substantiation trail for design decisions, and allows rapid communication of product changes to other members of the development team and provides an efficient, paperless, integrated database for the entire design team to employ during fullscale development. (R.E.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *COMPUTATIONAL GEOMETRY; *COMPUTER AIDED DESIGN; *COMPUTER AIDED MANUFACTURING; *ENVIRONMENT SIMULATION; *ROTORCRAFT AIRCRAFT
DE- AIRCRAFT STRUCTURES; DATA BASES; DECISION MAKING; LIFE CYCLE COSTS; STRUCTURAL DESIGN; WEAPON SYSTEMS
SH- 7581 Administration & Management (1975-)

AN- <DIALOG> 01915624
AN- <AEROSPACE> A91-17229
TI- Application of nonlinear programming techniques to dynamic correlation and design of helicopter structures
AU- CHEN, T. L. C.; PIZZOLATO, S.; TWOMEY, W. J. (Sikorsky Aircraft, Stratford, CT)
SO- IN: AHS, Annual Forum, 46th, Washington, DC, May 21-23, 1990, Proceedings. Volume 1 (A91-17201 05-01). Alexandria, VA, American Helicopter Society, 1990, p. 417-427.
PY- 1990
PD- 199000
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9105
AB- A significant improvement has been obtained in analysis/test result correlation as a result of the incorporation of the PAREDYM FEM model of a shake-test suspension system with the model of a UH-60A helicopter airframe. PAREDYM has helped to reduce vibration at the blade-passage frequency by not only moving the natural frequencies away from it, but adding mode-shape alteration. Application of PAREDYM without constraints resulted in a 67-percent reduction in pilot response; application with weight-change and stiffness constraints, in order to obtain realistic structural design change calculation results, yielded a vibration reduction of 39 percent. (O.C.)
SF- AIAA
DE- <MAJOR> *COMPUTER AIDED DESIGN; *HELICOPTER DESIGN; *NONLINEAR PROGRAMMING; *UH-60A HELICOPTER
DE- FINITE ELEMENT METHOD; PILOT PERFORMANCE; RESONANT FREQUENCIES; STRUCTURAL DESIGN CRITERIA; VIBRATION DAMPING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01915118
AN- <AEROSPACE> A91-16723
TI- The effects of simulator visual-motion asynchrony on simulator induced sickness
AU- MCCAULEY, MICHAEL E.; HETTINGER, LAWRENCE J.; SHARKEY, THOMAS J. (Monterey Technologies, Inc., Carmel, CA); SINACORI, JOHN B. (John B. Sinacori Associates, Pebble Beach, CA)
SO- AIAA, Flight Simulation Technologies Conference and Exhibit, Dayton, OH, Sept. 17-19, 1990. 9 p.
PY- 1990
PD- 199009
RF- 7

RN- AIAA PAPER 90-3172
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9104
AB- The relationship between visually implied and actually accomplished motions was investigated using the NASA Vertical Motion Simulator in four consecutive 10-min segments of increasing maneuverability under one of four motion conditions. Simulator sickness, found in all tests, increases with the exposure time and maneuvering level. The study is intended to develop criteria for the phenomenon and determine whether the conflict between the visually implied motion and the acceleration imparted by the actual motion is a factor contributing to the sickness. (B.P.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *MOTION SICKNESS; *MOTION SIMULATORS; *PILOT PERFORMANCE; *VISUAL FIELDS
DE- AEROSPACE MEDICINE; NASA PROGRAMS; ROTORCRAFT AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01907208
AN- <AEROSPACE> N90-28982
TI- Counterair situation awareness display for Army aviation
AU- SMYTH, CHRISTOPHER C.; MALKIN, FRANK J.; DEBELLIS, WILLIAM B.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1990
PD- 199004
NT- In AGARD, Situational Awareness in Aerospace Operations 10 p (SEE N90-28972 23-53)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9023
AB- An air combat display concept is proposed for Army aviation helicopter cockpits. The effects of the choice of the display size, the display symbol size, and the area of coverage as a counterair situation awareness display are discussed. The display shows the tracks of aircraft about the host helicopter on a Planar Position Indicator (PPI) graph via the open broadcast radio net of the division-wide air defense radar coverage. The display is used to alert the aircrew to the presence of aircraft in the area and cue to the location of enemy threats for the counterair role. It is concluded that with the relatively small display sizes used in helicopters, an accurate determination of the position of enemy threats during air-to-air combat cannot be made by an aviator from the PPI alone. It must be interactive allowing access to detailed information about a track of interest to be useful. (Author)
DE- <MAJOR> *AIR DEFENSE; *COMBAT; *COUNTERMEASURES; *DISPLAY DEVICES; *PILOT PERFORMANCE
DE- AIRCRAFT DESIGN; AIRCRAFT DETECTION; COCKPITS; CUES; FLIGHT CREWS; HELICOPTERS; HUMAN FACTORS ENGINEERING; POSITION INDICATORS; RADAR TRACKING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01905925
AN- <AEROSPACE> N90-27696
TI- Integration of externally carried weapon systems with military helicopters
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Mechanics Panel.
CS- <CODE> AD455458
PY- 1990
PD- 199000
PG- 102P.
RN- AGARD-AR-247; ISBN-92-835-0556-5; AD-A223938
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A06/MF A02
JA- STAR9022
AB- Detailed discussions of the aeromechanical aspects of helicopter weapons integration are contained. Particular emphasis is placed on flying qualities and performance with externally mounted weapons systems as well as weapons separation characteristics. In addition, structural mechanics topics, operational issues, and special problems

are discussed. Each technical area is discussed in terms of analytic methodology, ground testing, and flight testing procedures, instrumentation, and an assessment of the state-of-the-art, where possible. Appendix 1 is a synoptic table which relates each particular undesirable characteristic to various effects and results and, further, suggests solutions. Appendix 2 is a listing of known helicopter weapons certification programs completed to date that have either produced experimental results or a fully qualified system. Appendix 3 is a compendium of case histories which are referred to by the text and which will serve to explain more fully the phenomena discussed. (Author)
DE- <MAJOR> *CERTIFICATION; *EXTERNAL STORES; *FLIGHT CHARACTERISTICS;
*MILITARY HELICOPTERS; *STRUCTURAL ANALYSIS; *WEAPON SYSTEMS
DE- CASE HISTORIES; FLIGHT TESTS; GROUND TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01903003
AN- <AEROSPACE> N90-24721
TI- Activities report of the National Aerospace Medical Center
TI- <ORIGINAL> STICHTING NATIONAL LUCHT- EN RUIMTEVAARTGENEESKUNDIG
CENTRUM, JAARVERSLAG 1988
TI- <SUPPLEMENT> Annual Report, 1988
CS- National Aerospace Medical Centre, Soesterberg (Netherlands).
CS- <CODE> NE795999
PY- 1988
PD- 198800
PG- 39P.
RN- ETN-90-96936
LA- Dutch
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR9018
AB- The personnel selection examinations performed in 1988 are tabulated, and the evolution of the examinations since 1952 is given. The psychological test apparatus was extended and modernized in order to meet the strongly increased demand for psychological aptitude tests. The mental stress of civilian helicopter pilots was investigated. The study of the visual behavior of presbyopic pilots and the use of optical aids was continued. Vestibular effects of gravitational loading were examined using a human centrifuge. (ESA)
DE- <MAJOR> *AIRCRAFT PILOTS; *PERSONNEL SELECTION; *PHYSICAL EXAMINATIONS;
*PILOT PERFORMANCE; *PSYCHOLOGICAL TESTS
DE- APTITUDE; HELICOPTERS; HUMAN CENTRIFUGES; PRESBYOPIA; STRESS (PSYCHOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01902558
AN- <AEROSPACE> N90-24275
TI- Helicopter controllability
TI- <SUPPLEMENT> M.S. Thesis
AU- CARICO, DEAN
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> NS368219
PY- 1989
PD- 198909
PG- 218P.
RN- AD-A220078
LA- English
GL- United States
CP- United States
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A10/MF A03
JA- STAR9018
AB- The concept of helicopter controllability is explained. A background study reviews helicopter development in the U.S. General helicopter configurations, linearized equations of motion, stability, and piloting requirements are discussed. Helicopter flight controls, handling qualities and associated specifications are reviewed. Analytical, simulation, and flight test methods for evaluating helicopter automatic flight control systems are discussed. A generic simulation is also conducted. This thesis is intended to be used as a resource document for a helicopter stability and control course at the Naval Postgraduate School. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT CONFIGURATIONS; *AIRCRAFT STABILITY; *AUTOMATIC FLIGHT CONTROL; *CONTROLLABILITY; *FLIGHT SIMULATION; *FLIGHT TESTS; *HELICOPTER CONTROL; *HELICOPTER PERFORMANCE; *HELICOPTERS; *PILOT
PERFORMANCE
DE- EQUATIONS OF MOTION; LINEAR EQUATIONS; SCHOOLS

SH- <COSATI> 1C Aircraft
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01902166
AN- <AEROSPACE> N90-23883
TI- Mode of presentation of cues in policy capturing: A comparison between verbal and pictorial presentation of targets in judgement of probability to fire
AU- CARLSTROEM, ANDERS
CS- National Defence Research Establishment, Stockholm (Sweden). Dept. of Human Studies.
CS- <CODE> NH887250
PY- 1989
PD- 198911
PG- 23P.
SN- 0347-7665
RN- FOA-C-50074-5.2; ETN-90-96594
LA- English
GL- Sweden
CP- Sweden
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9017
AB- The effect of differences in modes of cue format on ratings of cues in a target selection task was studied using policy capturing. Two different modes of presentation were used: written description versus photographic slides. The subjects were U.S. and Swedish army aviators. In the written description situation the subjects used two cues and in the pictorial situation only one cue for their judgement. Concerning which cue was most important, the utility/transport helicopter pilots made the same judgement in the two conditions while the attack/anti-tank helicopter pilots made different judgements in the two situations. It is possible that this difference is due to divergences in personal involvment in the situations presented. The difference in utilization of the cues in the two modes of presentation should be noticed in tactical training. (ESA)
DE- <MAJOR> *HELICOPTERS; *JUDGMENTS; *PILOT PERFORMANCE; *PRESENTATION;
*TARGET ACQUISITION; *THREAT EVALUATION
DE- SELECTION; TARGETS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01902165
AN- <AEROSPACE> N90-23882
TI- Target selection in anti-tank operations: Effects of experience
AU- CARLSTROEM, ANDERS
CS- National Defence Research Establishment, Stockholm (Sweden). Dept. of Human Studies.
CS- <CODE> NH887250
PY- 1989
PD- 198911
PG- 21P.
SN- 0347-7665
RN- FOA-C-50073-5.2; ETN-90-96593
LA- English
GL- Sweden
CP- Sweden
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9017
AB- Target evaluation judgements in anti-tank helicopter operations were studied using policy capturing with clarity, importance of target, and threat as cues. The subjects were helicopter pilots from U.S. and the Swedish army aviation with different levels of experience. The general finding was an overall similarity in judgements showing clarity to have the highest weight for decision to fire a missile. However, for scout helicopter pilots threat received the highest weight. The divergence could be explained by difference in experience. The results could have application for tactical training. (ESA)
DE- <MAJOR> *EXPERIENCE; *HELICOPTERS; *JUDGMENTS; *PILOT PERFORMANCE;
*TARGET ACQUISITION; *THREAT EVALUATION
DE- SELECTION; TARGETS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01902164
AN- <AEROSPACE> N90-23881
TI- Target selection in anti-tank helicopter operations: Relative weight of cues in target evaluation judgements
AU- CARLSTROEM, ANDERS
CS- National Defence Research Establishment, Stockholm (Sweden). Dept. of Human Studies.
CS- <CODE> NH887250

PY- 1989
PD- 198911
PG- 20P.
SN- 0347-7665
RN- FOA-C-50072-5.2; ETN-90-96592
LA- English
GL- Sweden
CP- Sweden
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9017
AB- Target evaluation judgements in anti-tank helicopter operations were studied using policy capturing. The subjects were Swedish army helicopter pilots with different levels of experience of anti-tank helicopters and a group of helicopter mechanics. The results showed that the cues tactical importance of target and clarity received high weights while the cue distance to target received weight near zero. It is possible that pilots pay only small attention to distance due to confidence in the weapon system as long as it is operated within its normal range. (ESA)
DE- <MAJOR> *HELICOPTERS; *JUDGMENTS; *PILOT PERFORMANCE; *TARGET ACQUISITION; *THREAT EVALUATION
DE- SELECTION; TARGETS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01901652
AN- <AEROSPACE> N90-23368
TI- Aeronautical decisionmaking for air ambulance program administrators
TI- <SUPPLEMENT> Final Report
AU- ADAMS, R. J.; MCCONKEY, E. D.
CS- Systems Control Technology, Inc., Arlington, VA.
CS- <CODE> S9210736
PU- <PLACE> Washington, DC
PU- <PUBLISHER> FAA
PY- 1990
PD- 199002
PG- 20P.
CN- DTFA01-87-C-00014
RN- DOT/FAA/DS-88/8
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9017
AB- This manual discusses five of the most critical administrative aeronautical decision areas. The treatment is brief to ensure that the important, basic aeronautical limits will be read and understood by the largest possible audience. The concerns are: accident characteristics, pilot characteristics, weather restrictions, training needs, and risk management. Each of these concerns is discussed in a summary format. The summaries begin with a concise statement of the problem. The statement is followed by a discussion of the governing regulations, an explanation of the underlying reasons for the limitation, and recommended solutions an administrator could implement to reduce the impact of, or eliminate, the risk. This summary material is supplemented by appropriate references for use by the reader who would like to explore on or more of these areas in greater detail. This administrator's manual is one of an integrated set of five Aeronautical Decisionmaking (ADM) manuals developed by the Federal Aviation Administration in a concerted effort to reduce the number of human factor related helicopter accidents. It can be used as one element of a comprehensive program for improving safety, reducing risk, and, hopefully, the high cost of helicopter hull and liability insurance. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT SAFETY; *DECISION MAKING; *FLIGHT SAFETY; *HELICOPTER PERFORMANCE; *HUMAN PERFORMANCE; *MEDICAL SERVICES; *PILOT SELECTION; *PILOT TRAINING
DE- AMBULANCES; HELICOPTERS; INSURANCE (CONTRACTS); MANUALS; PILOT PERFORMANCE; REGULATIONS; RISK; WEATHER
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01899291
AN- <AEROSPACE> N90-21003
TI- An early overview of tiltrotor aircraft characteristics and pilot procedures in civil transport applications
TI- <SUPPLEMENT> Final Report
AU- GREEN, DAVID L.; ANDREWS, HAROLD; SARANIERO, MICHAEL
CS- Starmark Corp., Arlington, VA.
CS- <CODE> S0527066
PY- 1989
PD- 198912
PG- 77P.

NT- Prepared in cooperation with Federal Aviation Administration, Washington, DC
CN- DTFA01-89-P-01074
RN- DOT/FAA/DS-89/37; PB90-211061
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR9014
AB- A brief description is provided of tiltrotor aircraft, and some of their projected operating characteristics are identified. Two operations are of particular interest: steep approaches into a confined metropolitan vertiport; and approaches into a vertiport without sufficient clear airspace for a conventional missed approach from a low decision height. Both operations are of interest in order to minimize the airspace needed to conduct such operations. A brief simulation was conducted to support the analysis using a fixed base simulator. The flight simulation involved a quick look at innovative and tiltrotor unique maneuvers to identify and evaluate operations at or near the operational limits. The tiltrotor shows promise of permitting much steeper approach and departure maneuvers than what can be done with either an airplane or a helicopter. (Author)
DE- <MAJOR> *AIRSPACE; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *TILT ROTOR AIRCRAFT
DE- AERODYNAMIC CHARACTERISTICS; AIRCRAFT DESIGN; CONFINEMENT; GENERAL OVERVIEWS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01898028
AN- <AEROSPACE> N90-19739
TI- Activities in aerospace medicine
TI- <ORIGINAL> JAARVERSLAG 1987
TI- <SUPPLEMENT> Annual Report, 1987
CS- National Aerospace Medical Centre, Soesterberg (Netherlands).
CS- <CODE> NE795999
PY- 1987
PD- 198700
PG- 41P.
RN- ETN-90-95468
LA- Dutch
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9012
AB- The medical examinations of the personnel are tabulated and discussed. Research and development activities were performed in fields of psychodiagnostic examination and selection, ophthalmology, general medical examination, flight physiology, and the mental stress of helicopter pilots. (ESA)
DE- <MAJOR> *AEROSPACE MEDICINE; *MEDICAL SERVICES; *PHYSICAL EXAMINATIONS
DE- OPHTHALMOLOGY; PERSONNEL SELECTION; PHYSIOLOGICAL TESTS; PILOT PERFORMANCE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01895592
AN- <AEROSPACE> N90-17293
TI- Prediction of success in flight training by single- and dual-task performance
AU- JORNA, P. G. A. M.
CS- Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CS- <CODE> IK311704
PY- 1989
PD- 198906
NT- In AGARD, Human Behaviour in High Stress Situations in Aerospace Operations 10 p (SEE N90-17275 09-53)
LA- English
GL- Netherlands
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A02/MF A03
JA- STAR9009
AB- Advanced technology has changed the type and the amount of information a pilot has to process. The military pilot is particularly involved in performing multiple tasks under difficult working conditions. Some aspirant pilots are not able to finish advanced training, apparently for reasons of an insufficient multiple task performance. A reduction of such attrition is highly desirable to reduce the cost of training. A test based on dual-task performance was developed to investigate the

trainability of aspirant pilots to perform under such demanding conditions. The dual-task was a combination of a pursuit tracking task with preview and a continuous memory task (CMT). Aspirant pilots practiced the tracking task and were tested under single- and dual-task conditions. Dual-task performance was expected to be related to pilot aptitude as assessed by other criteria. The results were validated against the level of pilot aptitude as assessed by traditional selection procedures, a flight simulator test and advanced flight training for the Lockheed Orion and the Westland Lynx helicopter. Successful aspirants, now operational pilots, were characterized by their excellent performance under dual-task conditions. Less successful aspirants performed less efficient under dual-task conditions as well as single-task conditions, depending on how soon they failed in the selection and training process. Prior flying experience did not influence tracking performance and was not found to be a critical factor in predicting success in advanced or operational flight training. (Author)
DE- <MAJOR> *FLIGHT TRAINING; *INFORMATION PROCESSING (BIOLOGY); *PERFORMANCE PREDICTION; *TASK COMPLEXITY; *TRAINING EVALUATION
DE- DECISION MAKING; FLIGHT SIMULATION; MEMORY; MENTAL PERFORMANCE; PILOT PERFORMANCE; TRACKING (POSITION)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01895535
AN- <AEROSPACE> N90-17235
TI- NASA aerodynamics program
TI- <SUPPLEMENT> Annual Report, 1989
AU- HOLMES, BRUCE J.; SCHAIRER, EDWARD; HICKS, GARY; WANDER, STEPHEN; BLANKSON, ISIAIAH; ROSE, RAYMOND; OLSON, LAWRENCE; UNGER, GEORGE
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1990
PD- 199002
PG- 445P.
CN- NASW-4430
RN- NASA-TM-4175; NAS 1.15:4175
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A19/MF A04
JA- STAR9009
AB- Presented here is a comprehensive review of the following aerodynamics elements: computational methods and applications, computational fluid dynamics (CFD) validation, transition and turbulence physics, numerical aerodynamic simulation, drag reduction, test techniques and instrumentation, configuration aerodynamics, aeroacoustics, aerothermodynamics, hypersonics, subsonic transport/commuter aviation, fighter/attack aircraft and rotorcraft. (Author)
DE- <MAJOR> *AEROACOUSTICS; *AEROTHERMODYNAMICS; *COMPUTATIONAL FLUID DYNAMICS; *COMPUTERIZED SIMULATION; *DRAG REDUCTION; *HYPERSONICS
DE- AERODYNAMIC CONFIGURATIONS; FIGHTER AIRCRAFT; RADIO FREQUENCIES; ROTARY WING AIRCRAFT; TURBULENCE
SH- <COSATI> 4B Meteorology
SH- 7547 Meteorology & Climatology (1975-)

AN- <DIALOG> 01893914
AN- <AEROSPACE> N90-15592
TI- Development of the AH-64 display symbology training module
TI- <SUPPLEMENT> Interim Report, Dec. 1986 - Apr. 1989
AU- RUFFNER, JOHN W.; COKER, GARY W.; WEETER, RICHARD D.
CS- Anacapa Sciences, Inc., Fort Rucker, AL.
CS- <CODE> AU848387
PY- 1989
PD- 198908
PG- 337P.
CN- MDA903-87-C-0523
RN- AD-A213456; ASI690-322-89; ARI-RN-89-41
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A15/MF A03
JA- STAR9007
AB- To become fully qualified in the AH-64A attack helicopter, a student aviator must learn to identify and interpret the individual symbols presented on the helicopter's visual displays and to interpret the information provided by groups of symbols. A training module for teaching aviators to identify and interpret the symbology used on the AH-64A visual displays is described. The training module, known as the

Symbology Tutor, consists of an introductory section, a help system, and five lessons that provide instruction on the symbols contained in the AH-64A flight symbology set. The lessons cover symbols dealing with: (1) position and movement, (2) attitude and altitude, (3) heading and navigation, (4) cueing and reference, and (5) weapons usage. Each lesson is divided into a tutorial and a quiz. Storyboards were developed for each of the five lessons and are included in the appendixes. Computer programs were completed for the first two lessons. The completed portions of the Symbology Tutor is described and the required computer hardware is identified. (DTIC)
SF- DTIC
DE- <MAJOR> *COMPUTER ASSISTED INSTRUCTION; *COMPUTER PROGRAMS; *DISPLAY
DEVICES; *PILOT TRAINING; *SYMBOLS; *TRAINING DEVICES
DE- AH-64 HELICOPTER; EDUCATION; NAVIGATION; PILOT PERFORMANCE
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01891716
AN- <AEROSPACE> N90-13375
TI- Software and hardware description of the helicopter motion equations for VAX computers
TI- <SUPPLEMENT> Final Report
AU- DELCLOPEZ, MARIA
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1989
PD- 198908
PG- 101P.
RN- AD-A213248; HEL-TN-8-89
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A06/MF A02
JA- STAR9005
AB- The Human Factors Cockpit Research, Experimentation, and Workload (CREW) Simulator is a fixed base, generic helicopter simulator that provides the flexibility to explore state-of-the-art aircrew/display/control interaction. The CREW simulator involves four major components: the visual system, the graphics system, the data collection, and the flight equations. HEL uses the UH60 Blackhawk version of the standard kinematic equations for an aircraft (herein called HAC equations) when conducting experiments on the CREW simulator. The HAC equations were acquired from NASA Ames, in Mountain View, California, with the objective of simulating aerodynamic characteristics of a helicopter in a part-task simulator for human factors studies related to displays and controls. The HAC equations also allows the simulation of nap-of-the-earth (NOE) flight. The software design and the hardware configuration used to execute the HAC equations on a MicroVAX II VAXLab computer under the VMS operating system using VAX FORTRAN is described. The HAC equations are not described in detail. For more detailed information, refer to McFarland (1975). The objective is to provide internal documentation and also to provide a description of design for others desiring to implement these or similar equations of motion under the VAX/VMS (Virtual Address EXtension/Virtual Memory System) operating system in a real-time, manned interactive simulation. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *COMPUTER PROGRAMS; *EQUATIONS
OF MOTION; *FLIGHT SIMULATORS; *HELICOPTER PERFORMANCE; *HUMAN FACTORS
ENGINEERING; *VAX COMPUTERS
DE- AVIONICS; COCKPITS; COMPUTER GRAPHICS; COMPUTERIZED SIMULATION; CREWS;
DATA ACQUISITION; FLIGHT CHARACTERISTICS; KINEMATICS; MAN MACHINE SYSTEMS
SH- <COSATI> 12E Computer Programming and Software
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01889790
AN- <AEROSPACE> N90-11446
TI- Task analysis of the UH-60 mission and decision rules for developing a UH-60 workload prediction model. Volume 1: Summary report
TI- <SUPPLEMENT> Interim Report, Dec. 1986 - Dec. 1987
AU- BIERBAUM, CARL R.; SZABO, SANDRA M.; ALDRICH, THEODORE B.
CS- Anacapa Sciences, Inc., Fort Rucker, AL.
CS- <CODE> AU848387
PY- 1989
PD- 198902
PG- 43P.
CN- MDA903-87-C-0523; AF PROJ. 793
RN- AD-A210763; ASI690-302-87-VOL-1; ARI-RP-89-08-VOL-1
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9002
AB- A composite scenario was used to conduct a comprehensive task analysis of the UH-60 mission. The analysis used a top-down approach to identify the mission's phases, functions, and tasks. Nine phases, 34 segments, 48 functions, and 138 tasks were identified. The crewmember performing each task was identified, and estimates of the sensory, cognitive, and psychomotor workload associated with the tasks were derived. Estimates of the task times were also derived. The mission/task analysis data were used to develop a computer model of workload for UH-60 crewmembers. The model used a bottom-up approach to build mission functions from tasks and mission segments from functions. Decision rules were written to specify the procedure for combining the tasks into functions and the functions into segments. The model permitted an analysis of total workload experienced by each crewmember in the performance of both sequential and concurrent tasks. (DTIC)
SF- DTIC
DE- <MAJOR> *COMPUTERIZED SIMULATION; *DECISION THEORY; *FLIGHT CREWS;
*HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *MISSION PLANNING;
*TIME SERIES ANALYSIS; *UH-60A HELICOPTER
DE- MATHEMATICAL MODELS; PHYSIOLOGICAL TESTS; PSYCHOMOTOR PERFORMANCE; WORK
FUNCTIONS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01883003
AN- <AEROSPACE> A90-47731
TI- Flight investigation of variations in rotorcraft control and display dynamics for hover
AU- ESHOW, MICHELLE M. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: AIAA Guidance, Navigation and Control Conference, Portland, OR, Aug. 20-22, 1990, Technical Papers. Part 2 (A90-47576 21-08). Washington, DC, American Institute of Aeronautics and Astronautics, 1990, p. 1514-1526.
PY- 1990
PD- 199000
RF- 17
RN- AIAA PAPER 90-3482
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9021
AB- Results are presented from a flight test of experimental control/display systems for the U.S. Army/NASA CH-47B variable-stability research helicopter in hovering maneuvers, supplementing the preliminary report of Eshow et al. (1987). The display format was a simplified version of the pilot night-vision system for the Apache AH-64, and the tests measured pilot performance in hover-pad capture and hover-pad tracking tasks (under simulated zero visibility) using displays based on (1) gainlike and (2) integratorlike controlled-element responses to control inputs. The implementation of the vehicle-response dynamics through an explicit model-following control system and the derivation of the display laws are described, and the test results are presented in extensive tables and graphs. Display type (1) was found to be preferred by the pilots and to give generally better performance than type (2). (T.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *AUTOMATIC FLIGHT CONTROL; *FLIGHT SIMULATION; *HOVERING; *ROTORCRAFT AIRCRAFT
DE- AIRCRAFT MANEUVERS; AIRCRAFT PERFORMANCE; DISPLAY DEVICES
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01880514
AN- <AEROSPACE> A90-45242
TI- Compatibility of aircraft cockpit lighting and image intensification night imaging systems
AU- RASH, CLARENCE E. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, AL); VERONA, ROBERT W. (U.S. Army, Center for Night Vision and Electro-Optics, Fort Belvoir, VA)
SO- Optical Engineering (ISSN 0091-3286), vol. 29, Aug. 1990, p. 863-869.
PY- 1990
PD- 199008
RF- 5

SN- 0091-3286
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9020
AB- The performance of military night vision-imaging systems (NVISs) employing image-intensification tubes is subject to deterioration by the presence of cockpit light sources such as instrument lamps and caution lights. These lights activate the automatic gain control circuits of the intensification tubes, thereby reducing their sensitivity to external illumination. The triservice MIL-L-85762 specification of 1986 defines the measurement instrumentation and methods required for the certification of lighting components as 'NVIS-compatible'; the characterization of lighting incompatibilities in U.S. Army aircraft, the modification of lighting in NVIS-incompatible cockpits, and the certification of proposed lighting components, are all being conducted under MIL-L-85762 guidelines. (O.C.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *IMAGE INTENSIFIERS; *LIGHTING EQUIPMENT; *NIGHT VISION
DE- HELICOPTER PERFORMANCE; VISUAL TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01880491
AN- <AEROSPACE> A90-45219
TI- Predicting the performance of night vision devices using a simple contrast model
AU- DECKER, WILLIAM M. (U.S. Army, Center for Night Vision and Electro-Optics, Fort Belvoir, VA)
SO- IN: Helmet-mounted displays; Proceedings of the Meeting, Orlando, FL, Mar. 28, 29, 1989 (A90-45201 20-54). Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1989, p. 162-169.
PY- 1989
PD- 198900
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9020
AB- A spreadsheet model producing spectral transmission curves and computing the apparent contrast for night-vision devices is considered. The program retrieves the necessary data, calculates a relative intensity for both the target and background, produces graphic displays, and calculates the contrast. Target and background measurements and atmospheric transmission data necessary for the model's data base are described, along with data acquisition and processing. In addition, data files for the various sky irradiance sources are outlined, and target and background reflectivity files as well as atmospheric attenuation and filter transmission files are covered. A sample of the relative response curves is also presented. (V.T.)
SF- AIAA
DE- <MAJOR> *HEAD-UP DISPLAYS; *HELICOPTER PERFORMANCE; *IMAGE INTENSIFIERS
; *NIGHT VISION; *PILOT PERFORMANCE
DE- CONTRAST; OPTICAL FILTERS; SPECTRAL SENSITIVITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01880476
AN- <AEROSPACE> A90-45204
TI- Helmet-mounted displays for helicopter pilotage - Design configuration trade-offs, analyses, and test
AU- LOHMANN, ROBERT A.; WEISZ, ALEXANDER Z. (Hughes Aircraft Display Systems Laboratory, Los Angeles, CA)
SO- IN: Helmet-mounted displays; Proceedings of the Meeting, Orlando, FL, Mar. 28, 29, 1989 (A90-45201 20-54). Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1989, p. 27-32.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9020
AB- A helmet-mounted display combining the functions of display presentation with the head and facial protection is described. Human engineering factors applicable to the design of helmet-mounted displays for use with night-vision sensors are assessed, including operational stability, acceptance by the pilot community, crew training requirements, flight safety, and flight control workload. Attention is focused on biocular displays, FOV/resolution trade-offs, single- versus

dual-CRT configurations, day operation and visual meteorological condition operation, and CRT dynamic range utilization. It is concluded that the designer should avoid introducing design features interfering with the visual search or perceptual habits. (V.T.)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *HELMET MOUNTED DISPLAYS; *PILOT PERFORMANCE
DE- HUMAN FACTORS ENGINEERING; NIGHT VISION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01880448
AN- <AEROSPACE> A90-45176
TI- Handling qualities research at the Flight Research Laboratory, NAE/NRC, 1980 - 1990 and beyond
AU- BAILLIE, STEWART W. (National Aeronautical Establishment, Flight Research Laboratory, Ottawa, Canada)
SO- IN: AIAA Atmospheric Flight Mechanics Conference, Portland, OR, Aug. 20-22, 1990, Technical Papers (A90-45134 20-08). Washington, DC, American Institute of Aeronautics and Astronautics, 1990, p. 465-472.
PY- 1990
PD- 199000
RF- 12
RN- AIAA PAPER 90-2848
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9020
AB- A summary of the handling qualities research performed at the Flight Research Laboratory, NAE/NRC, over the past 10 years is presented. Three major areas are discussed, the study of advanced military rotorcraft handling qualities requirements, the integration and development of 4-axis side-arm controllers for rotorcraft, and investigations regarding the expansion of rotorcraft IFR operations.(Author)
SF- AIAA
DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *CONTROLLABILITY; *CONTROLLERS; *INSTRUMENT FLIGHT RULES; *MILITARY HELICOPTERS
DE- FLIGHT SIMULATION; FLY BY WIRE CONTROL; HUMAN FACTORS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01880431
AN- <AEROSPACE> A90-45159
TI- A pilot rating scale for evaluating failure transients in electronic flight control systems
AU- HINDSON, WILLIAM S.; SCHROEDER, JEFFERY A. (NASA, Ames Research Center, Moffett Field, CA); ESHOW, MICHELLE M. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: AIAA Atmospheric Flight Mechanics Conference, Portland, OR, Aug. 20-22, 1990, Technical Papers (A90-45134 20-08). Washington, DC, American Institute of Aeronautics and Astronautics, 1990, p. 270-284.
PY- 1990
PD- 199000
RF- 14
RN- AIAA PAPER 90-2827
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9020
AB- A pilot rating scale was developed to describe the effects of transients in helicopter flight-control systems on safety-of-flight and on pilot recovery action. The scale was applied to the evaluation of hardovers that could potentially occur in the digital flight-control system being designed for a variable-stability UH-60A research helicopter. Tests were conducted in a large moving-base simulator and in flight. The results of the investigation were combined with existing airworthiness criteria to determine quantitative reliability design goals for the control system. (Author)
SF- AIAA
DE- <MAJOR> *CONTROL STABILITY; *CONTROL SYSTEMS DESIGN; *CONTROLLABILITY; *ELECTRONIC CONTROL; *FLY BY WIRE CONTROL; *HELICOPTER CONTROL
DE- EVALUATION; FLIGHT TESTS; PILOT PERFORMANCE; STABILITY AUGMENTATION; UH-60A HELICOPTER
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01877767
AN- <AEROSPACE> A90-42495
TI- Helicopter store separation - Predictive techniques and flight testing
AU- TREMBLAY, M. (DND, Ottawa, Canada)
SO- Associazione Industrie Aerospaziali and Associazione Italiana di Aeronautica ed Astronautica, European Rotorcraft Forum, 14th, Milan, Italy, Sept. 20-23, 1988, Paper. 22 p.
PY- 1988
PD- 198809
RF- 17
LA- English
GL- Canada
CP- Italy
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9018
AB- The analyses and test methods that are currently used to certify the safe separation of a store (e.g., fuel tanks, photographic and survival equipment, and weapons) from a helicopter are briefly reviewed. In particular, attention is given to helicopter/store aerodynamics, helicopter flowfield environment, and methods for predicting the store separation trajectory, including theoretical, analogy, and empirical predictive methods. The discussion also covers wind tunnel and flight testing, test instrumentation, and instrumentation tolerances. (V.L.)
SF- AIAA
DE- <MAJOR> *EXTERNAL STORE SEPARATION; *FLIGHT MECHANICS; *FLIGHT TESTS; *MILITARY HELICOPTERS; *PERFORMANCE PREDICTION
DE- EXTERNAL TANKS; HELICOPTER PERFORMANCE; WEAPON SYSTEMS; WIND TUNNEL TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01877764
AN- <AEROSPACE> A90-42492
TI- Design and manufacturing of composite materials blade models
AU- DUPRIEZ, F.; GEOFFROY, P.; PALUCH, B. (Lille I, Universite, Villeneuve-d'Ascq, France)
SO- Associazione Industrie Aerospaziali and Associazione Italiana di Aeronautica ed Astronautica, European Rotorcraft Forum, 14th, Milan, Italy, Sept. 20-23, 1988, Paper. 21 p.
PY- 1988
PD- 198809
RF- 9
LA- English
GL- France
CP- Italy
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9018
AB- Methods and tools used in the design of helicopter rotor blade models in structural composites for wind tunnel testing are briefly reviewed. In particular, attention is given to structural design using finite beam and shell elements, aerodynamic methods, dynamic methods, and the material data base. The discussion also covers design software, blade model instrumentation, and quality control. (V.L.)
SF- AIAA
DE- <MAJOR> *COMPOSITE MATERIALS; *ROTARY WINGS; *ROTOR BLADES; *STRUCTURAL DESIGN
DE- EIGENVECTORS; FINITE ELEMENT METHOD; QUALITY CONTROL; WIND TUNNEL TESTS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01876999
AN- <AEROSPACE> A90-41727
TI- ATTHeS - A helicopter in-flight simulator for ACT testing
TI- <ORIGINAL> ATTHeS - Ein Hubschrauber-In-Flight-Simulator fuer ACT-Erprobung
AU- PAUSDER, HEINZ-JUERGEN; BOUWER, GERHARD; VON GRUENHAGEN, WOLFGANG (DLR, Institut fuer Flugmechanik, Brunswick, Federal Republic of Germany)
SO- DLR-Nachrichten (ISSN 0937-0420), May 1990, p. 2-6. In German.
PY- 1990
PD- 199005
RF- 10
SN- 0937-0420
LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9018
AB- An Advanced Technology Testing Helicopter System (ATTHeS) helicopter

in-flight simulator is discussed which can be used in the research and development of helicopter Advanced Control Technology (ACT). The model control system for the in-flight simulation is examined, including its design, on-board system, and real-time realization. Preliminary results with ATTHeS are summarized. (C.D.)
SF- AIAA
DE- <MAJOR> *ACTIVE CONTROL; *FLIGHT SIMULATORS; *HELICOPTER CONTROL;
*PILOT PERFORMANCE; *REAL TIME OPERATION
DE- AIRBORNE/SPACEBORNE COMPUTERS; ANALOG TO DIGITAL CONVERTERS; SIGNAL
PROCESSING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01875254
AN- <AEROSPACE> A90-39982
TI- Rotating system load monitoring using minimum fixed system instrumentation
AU- GUNSALLUS, C. T. (Kaman Aerospace Corp., Bloomfield, CT)
SO- IN: Fatigue methodology III; Proceedings of the AHS National Technical Specialists' Meeting on Advanced Rotorcraft Structures, Scottsdale, AZ, Oct. 3-5, 1989 (A90-39976 17-05). Alexandria, VA, American Helicopter Society, 1989, 11 p.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9017
AB- A general helicopter load monitoring system has been developed and demonstrated in flight test. The chief features of this system are minimum fixed system inputs, no rotating system instrumentation, and accurate real time output for any number of fixed or rotating system parameters. This paper contains examples of rotating system parameters as synthesized from fixed system recorded strains with comparison to rotating system data recorded directly via slip rings. Also, test results using recorded and in-flight data and two generations of the load monitoring system are presented. (Author)
SF- AIAA
DE- <MAJOR> *BENDING FATIGUE; *FLIGHT TESTS; *LOAD DISTRIBUTION (FORCES);
*ROTATING BODIES; *VIBRATORY LOADS
DE- AERODYNAMIC LOADS; BENDING MOMENTS; ROTARY WINGS; ROTOR BLADES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01875248
AN- <AEROSPACE> A90-39976
TI- Fatigue methodology III; Proceedings of the AHS National Technical Specialists' Meeting on Advanced Rotorcraft Structures, Scottsdale, AZ, Oct. 3-5, 1989
SO- Meeting sponsored by AHS. Alexandria, VA, American Helicopter Society, 1989, 201 p. For individual items see A90-39977 to A90-39993.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9017
AB- Papers on rotorcraft and fatigue methodology are presented, covering topics such as reliability design for rotorcraft, a comparison between theory and fatigue test data on stress concentration factors, the retirement lives of rolling element bearings, hydrogen embrittlement risk analysis for high hardness steel parts, and rotating system load monitoring with minimum fixed system instrumentation. Additional topics include usage data collection to improve structural integrity of operational helicopters, usage monitory of military helicopters, improvements to the fatigue substantiation of the H-60 composite tail rotor blade, helicopter surviellance programs, and potential application of automotive fatigue technology in rotorcraft design. Also, consideration is given to fatigue evaluation of C/MH-53 E main rotor damper threaded joints, SH-2F airframe fatigue test program, a ply termination concept for improving fracture and fatigue strength of composite laminates, the analysis and testing of composite panels subject to muzzle blast effects, the certification plan for an all-composite main rotor flexbeam, and the effects of stacking sequence on the flexural strength of composite beams. (R.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *COMPOSITE MATERIALS; *CONFERENCES; *FATIGUE
(MATERIALS); *RELIABILITY ENGINEERING; *ROTORCRAFT AIRCRAFT
DE- AIRFRAME MATERIALS; FATIGUE TESTS; H-60 HELICOPTER; HARDNESS TESTS;

HELICOPTER TAIL ROTORS; HIGH STRENGTH STEELS; HYDROGEN EMBRITTLEMENT;
LAMINATES; LOAD TESTS; METAL JOINTS; MILITARY HELICOPTERS; PLY ORIENTATION; ROLLER BEARINGS; ROTOR BLADES; STRESS CONCENTRATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01869178
AN- <AEROSPACE> A90-33906
TI- Techniques for improving precision of flying qualities assessment
AU- HEFFLEY, ROBERT K. (Robert Heffley Engineering, Los Altos, CA)
SO- IN: AIAA/SFTE/DGLR/SETP, Biannual Flight Test Conference, 5th, Ontario, CA, May 22-24, 1990, Technical Papers (A90-33886 14-05). Washington, DC, American Institute of Aeronautics and Astronautics, 1990, p. 206-214.
PY- 1990
PD- 199000
RF- 8
RN- AIAA PAPER 90-1285
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9014
AB- As flight test task performance requirements are increased, there may initially be little effect on pilot workload; in due course, however, a threshold is reached at which such effects become significant. Examples of this are presently discussed for the cases of helicopter nap-of-the-earth and air combat maneuvering tasks, as well as for a fixed-wing aircraft's carrier landing. In all cases, the time required for a vehicle to respond can be directly related to the time available, as defined by task or maneuver constraints. This fact furnishes a useful basis for the assessment of handling qualities having time-response implications. (O.C.)
SF- AIAA
DE- <MAJOR> *CONTROLLABILITY; *FLIGHT TESTS; *HUMAN FACTORS ENGINEERING
DE- COMBAT; NAP-OF-THE-EARTH NAVIGATION; PILOT PERFORMANCE; WORKLOADS
(PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01866658
AN- <AEROSPACE> A90-31386
TI- Operator workload in the UH-60A Black Hawk - Crew results vs. TAWL model predictions
AU- IAVECCHIA, HELENE P. (Analytics, Inc., Willow Grove, PA); LINTON, PAUL M. (Sikorsky Aircraft, Stratford, CT); BITTNER, ALVAH C., JR. (Battelle Human Affairs Research Center, Seattle, WA); BYERS, JAMES C. (EG&G Idaho National Engineering Laboratory, Idaho Falls)
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 2 (A90-31326 12-54). Santa Monica, CA, Human Factors Society, 1989, p. 1481-1485.
PY- 1989
PD- 198900
RF- 10
CN- MDA903-86-C-0384
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- An empirical study was undertaken to collect real-time workload estimates of pilots and copilots performing a resupply mission in a UH-60A flight simulator. Overall and peak workload (OW and PW) ratings were collected for 12 mission segments. These ratings were compared with OW and PW values predicted by the task-analysis/workload (TAWL) simulation model. High correlations were found between TAWL-based predictions and crew results for OW (r = 0.82 - 0.95; p less than 0.01). Lower correlations were found for PW (r = 0.62; p less than 0.05). (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *PILOT PERFORMANCE; *UH-60A HELICOPTER; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT SIMULATION; REAL TIME OPERATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01866644
AN- <AEROSPACE> A90-31372
TI- Incorporating dynamic field of view information to design the next-generation Black Hawk helicopter cockpit
AU- SIMON, ROBERT; DUNN, DENNIS (Dynamics Research Corp., Wilmington, MA)
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 2 (A90-31326 12-54). Santa Monica, CA,

Human Factors Society, 1989, p. 1124-1128.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- The limited field of view (FOV) of the Army UH-60A Black Hawk helicopter was studied. Changing flight tactics, increased use of night vision goggles, and a greater amount of obstacle strikes were taken into consideration. Several options produced by the study, that can improve and/or enhance the next-generation Black Hawk's FOV, are presented and discussed. Out of three categories of suggested improvements, the first category contains improvements that are either not practical or create undesirable hazards; the second category has direct impact on the FOV; and the third category does not have a direct physical impact on the helicopter FOV, but will decrease the pilot visual workload and increase out-of-cockpit viewing time. (V.T.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *FIELD OF VIEW; *HELICOPTER DESIGN; *HUMAN FACTORS
ENGINEERING; *UH-60A HELICOPTER
DE- DYNAMICAL SYSTEMS; NIGHT VISION; VISUAL FIELDS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01866621
AN- <AEROSPACE> A90-31349
TI- Task network modeling as a basis for analyzing operator workload
AU- LAUGHERY, K. RONALD, JR. (Micro Analysis and Design, Boulder, CO)
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 1 (A90-31326 12-54). Santa Monica, CA, Human Factors Society, 1989, p. 110-114.
PY- 1989
PD- 198900
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- This paper discusses a technique for predicting human workload, which is based around task network modeling. Task network modeling allows task analyses to be simulated on a computer to study dynamic system behavior through the addition of information, primarily task time, and sequencing. A technique was developed by McCracken and Aldrich (1984) and modified by Drews et al. (1985) which permits the inclusion of workload information into a task network model. From these workload models, predictions can be made about where points of excessive operator overload are likely to occur. This paper will briefly describe a software tool for using the technique as well as the perceived theoretical shortcomings of the technique in its current form. (Author)
SF- AIAA
DE- <MAJOR> *BIOLOGICAL MODELS (MATHEMATICS); *COMPUTERIZED SIMULATION;
*OPERATOR PERFORMANCE; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DYNAMICAL SYSTEMS; HELICOPTER DESIGN; LIGHT HELICOPTERS; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01866618
AN- <AEROSPACE> A90-31346
TI- Predictive performance models and multiple task performance
AU- WICKENS, CHRISTOPHER D.; LARISH, INGE; CONTORER, AARON (Illinois, University, Savoy)
CS- Illinois Univ., Savoy.
CS- <CODE> IB586416
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 1 (A90-31326 12-54). Santa Monica, CA, Human Factors Society, 1989, p. 96-100.
PY- 1989
PD- 198900
RF- 8
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- Five models that predict how performance of multiple tasks will interact in complex task scenarios are discussed. The models are shown in terms of the assumptions they make about human operator divided

attention. The different assumptions about attention are then empirically validated in a multitask helicopter flight simulation. It is concluded from this simulation that the most important assumption relates to the coding of demand level of different component tasks. (R.E.P.)
SF- AIAA
DE- <MAJOR> *BIOLOGICAL MODELS (MATHEMATICS); *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE; *PERFORMANCE PREDICTION
DE- FLIGHT SIMULATION; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01866613
AN- <AEROSPACE> A90-31341
TI- Touch panel sampling strategies and keypad performance comparisons
AU- BERINGER, DENNIS B. (New Mexico State University, Las Cruces)
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 1 (A90-31326 12-54). Santa Monica, CA, Human Factors Society, 1989, p. 71-75. Research supported by the McDonnell Douglas Helicopter Co.
PY- 1989
PD- 198900
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- A study was conducted to improve accuracy of touch input devices to be used in helicopter environments through serial sampling and minima selection algorithms. Neither first nor last contact point was congruent with point of minimum error and sampling techniques were derived to reduce error without using 'touch-mouse' strategies, being most effective for the infrared panel. Wearing flight gloves and using the nonpreferred hand had no practical detrimental effects on performance for a high-resolution touch-input task. In a second study several types of mechanical keypads were compared with the two types of tough-input devices. Results obtained with this menu-selection task suggested no practical degradation in performance when substituting the touch-input devices for bezel-mounted hardware keys. This was true of both error rate (in a qualified sense) and response time. It was concluded that the touch-input devices could provide flexibility for high-resolution input using maps and other spatial forms of data while allowing effective use of previously developed menus and menu-selection routines without the need for auxiliary bezel-mounted mechanical keys. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *COCKPITS; *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- HELICOPTERS; OPTOELECTRONIC DEVICES; PILOT PERFORMANCE; THIN FILMS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01866601
AN- <AEROSPACE> A90-31329
TI- Cognitive perspectives on map displays for helicopter flight
AU- HARWOOD, KELLY (Illinois, University, Champaign)
CS- Illinois Univ., Champaign.
CS- <CODE> IB342352
SO- IN: Human Factors Society, Annual Meeting, 33rd, Denver, CO, Oct. 16-20, 1989, Proceedings. Volume 1 (A90-31326 12-54). Santa Monica, CA, Human Factors Society, 1989, p. 13-17.
PY- 1989
PD- 198900
RF- 14
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- Currently accessible technologies are providing entirely new display concepts for enhancing helicopter navigation. Yet the effectiveness of such displays depends on the extent to which they are configured according to principles from research on human performance. Computer generated map displays in the present study were configured according to previous research on maps, navigational problem solving, and spatial cognition in large scale environments. Interest centered on the representation of different spatial relationships that would best support helicopter navigational problem solving. One map display emphasized the global relationships between objects in the environment. The other map showed the pilot's relationship to objects as he traveled

through the environment. Twenty skilled pilots used the maps to complete several navigational tasks that occurred within a realistic simulation program tailored for helicopter navigation. Findings indicate that the type of task and mode of flight (low level or Nap of the Earth (NOE)) are important determinants of map display effectiveness. (Author)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *DISPLAY DEVICES; *MAPS; *PILOT PERFORMANCE; *SPACE PERCEPTION
DE- FLIGHT ALTITUDE; HELICOPTERS; HUMAN FACTORS ENGINEERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01865388
AN- <AEROSPACE> A90-30116
TI- Simulation technology - A key to effective man-machine integration for future combat rotorcraft systems
AU- KERR, ANDREW W. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- Vertiflite (ISSN 0042-4455), vol. 36, Mar.-Apr. 1990, p. 24-29.
PY- 1990
PD- 199004
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9012
AB- The utilization of advanced simulation technology in the development of the non-real-time MANPRINT design tools in the Army/NASA Aircrew-Aircraft Integration (A3I) program is described. A description is then given of the Crew Station Research and Development Facilities, the primary tool for the application of MANPRINT principles. The purpose of the A3I program is to develop a rational, predictive methodology for helicopter cockpit system design that integrates human factors engineering with other principles at an early stage in the development process, avoiding the high cost of previous system design methods. Enabling technologies such as the MIDAS work station are examined, and the potential of low-cost parallel-processing systems is indicated. (N.B.)
SF- AIAA
DE- <MAJOR> *COCKPIT SIMULATORS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS
DE- ARCHITECTURE (COMPUTERS); COMPUTER AIDED DESIGN; COMPUTER GRAPHICS; HELICOPTER DESIGN; HELMET MOUNTED DISPLAYS; PARALLEL PROCESSING (COMPUTERS)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01864122
AN- <AEROSPACE> A90-28850
TI- The Modular Flighttest Instrumentation/MFI 90 - A helicopter measuring system
AU- MEYER, HORST (DLR, Institut fuer Flugmechanik, Brunswick, Federal Republic of Germany)
SO- IN: ITC/USA/'89; Proceedings of the International Telemetering Conference, San Diego, CA, Oct. 30-Nov. 2, 1989 (A90-28826 11-32). Research Triangle Park, NC, Instrument Society of America, 1989, p. 325-333.
PY- 1989
PD- 198900
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The Modular Flight-test Instrumentation 90 (MFI 90) system for measuring the stability/control characteristics of helicopters is designed to handle a limited (64-128) number of low-to-medium bandwidth signals. Because the MFI 90 is modular in architecture, it is highly adaptable and has consistent yielded problem-oriented configurations; it also operates reliably under rough testing conditions. The modest cost of the system is a consequence of its use of off-the-shelf, commercial standard interfaces for communication and general-purpose components. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *AIRCRAFT STABILITY; *DATA TRANSMISSION; *FLIGHT TEST INSTRUMENTS; *HELICOPTER CONTROL
DE- CALIBRATING; GROUND STATIONS; MAGNETIC DISKS; TELEMETRY

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01864121
AN- <AEROSPACE> A90-28849
TI- The rotor-signal-module of MFI90
TI- <EXTENSION> for digital data acquisition from BO-105 helicopter rotary wings
AU- HOLLAND, RAINER (DLR, Institut fuer Flugmechanik, Brunswick, Federal Republic of Germany)
SO- IN: ITC/USA/'89; Proceedings of the International Telemetering Conference, San Diego, CA, Oct. 30-Nov. 2, 1989 (A90-28826 11-32). Research Triangle Park, NC, Instrument Society of America, 1989, p. 315-324.
PY- 1989
PD- 198900
RF- 7
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- Instrumentation developed for the acquisition of rotor data from a BO105 helicopter is presented with a view to the design of its digital data acquisition and processing hardware, which was shaped by the limited space available on the system's mounting atop the main rotor hub. Attention is given to the method used for calibrating the measurement values from the rotor blades; data quality is evaluated by comparing measured rotor characteristics to the results of a nonlinear helicopter computer simulation. (O.C.)
SF- AIAA
DE- <MAJOR> *BO-105 HELICOPTER; *COMPUTERIZED SIMULATION; *DATA ACQUISITION ; *FLIGHT TEST INSTRUMENTS; *ROTARY WINGS
DE- ANALOG TO DIGITAL CONVERTERS; DIGITAL DATA; HARDWARE; MATHEMATICAL MODELS; ROTOR BLADES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01863509
AN- <AEROSPACE> A90-28237
TI- Flight control factors for a full-scale remotely piloted rotary wing target
AU- MAASS, DAVID R.; SHIPMAN, JOHN M.; IHLEIN, H. JOHN (Honeywell, Inc., Defense Avionics Systems Div., Albuquerque, NM)
SO- AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Paper. 8 p.
PY- 1989
PD- 198905
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The U.S. Army has awarded a contract to convert S-55 helicopters to Mi-24 Hind E look-alike target drones. Attention is given to the design issues encountered in development of a helicopter drone flight control system including: human factors, handling qualities, stability, failure effects, and safety. The complete avionics system design is presented, as well as the possibilities for growth, and for enhancing the effectiveness of the drone as a target. The problems involved in providing realistic target presentations in a variety of different flight conditions and scenarios are described. Flight control problems and system requirements that differ substantially from those encountered for a manned vehicle or for a subscale drone are discussed. Finally, expansion of the drone to applications beyond the target mission is explored. (R.E.P.)
SF- AIAA
DE- <MAJOR> *FLIGHT CONTROL; *REMOTELY PILOTED VEHICLES; *ROTARY WING AIRCRAFT; *TARGET DRONE AIRCRAFT
DE- ARMED FORCES (UNITED STATES); FULL SCALE TESTS; SIKORSKY AIRCRAFT
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01863494
AN- <AEROSPACE> A90-28222
TI- Adapting air-to-ground acquisition systems to the air-to-air task
AU- WILSON, EDWARD (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 921-925.
PY- 1989
PD- 198900
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The challenges facing the pilot of the AH-64A Apache attack helicopter in the use of existing sensors in combat are examined. The nature of the pilot's task and the characteristics of the sensors are described. Long-range, medium-range, and short-range air-to-air combat scenarios are examined, and the integration of the Apache's sensor package with man-in-the-loop skills and system capabilities during combat is discussed. Possible solutions during each combat scenario that have suggested themselves during air-to-air testing are pointed out. (C.D.)
SF- AIAA
DE- <MAJOR> *AH-64 HELICOPTER; *COMBAT; *TARGET ACQUISITION
DE- FLIGHT CREWS; FLIR DETECTORS; HELICOPTER PERFORMANCE; HELMET MOUNTED DISPLAYS; NIGHT VISION; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01863493
AN- <AEROSPACE> A90-28221
TI- Design criteria for helicopter night pilotage sensors
AU- VOLLMERHAUSEN, RICHARD H.; NASH, CAROLYN J. (U.S. Army, Center for Night Vision and Electro-Optics, Fort Belvoir, VA)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 911-919.
PY- 1989
PD- 198900
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The results are reported of research conducted to establish criteria for the design of night vision pilotage aids. It is shown that terrain flight can be accomplished with reasonable pilot workload using a sensor with 40 deg FOV and 0.6 cycles per milliradian resolution. This resolution is important and should not be traded for increased FOV. Further, a pilotage system which provides both thermal and I-squared imagery will significantly enhance system capability to support a variety of flight tasks under a wide range of environments. It is also concluded that solid state cameras with detector dwell time equal to the standard video field rate are not suitable for use in pilotage systems. The long dwell time leads to image blur due to the head and scene motion associated with many pilotage tasks. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *ELECTRO-OPTICS; *HELICOPTER CONTROL; *HELMET MOUNTED DISPLAYS; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION
DE- FIELD OF VIEW; FLIGHT TESTS; FUNCTIONAL DESIGN SPECIFICATIONS; IMAGE RESOLUTION; MOTION PERCEPTION; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01863490
AN- <AEROSPACE> A90-28218
TI- Helicopter obstacle avoidance system - The use of manned simulation to evaluate the contribution of key design parameters
AU- CERCHIE, P. H.; FLACKBERT, A. CLYDE (McDonnell Douglas Helicopter Co., Mesa, AZ); REAGO, DONALD (U.S. Army, Center for Night Vision and Electro-Optics, Fort Belvoir, VA)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 885-890.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- An ongoing man-in-the-loop simulation experiment is described. The object of the experiment is to examine selected design variables related to helicopter obstacle avoidance systems. Four candidate sensor models differing in field-of-view, frame rate, stabilization, slewing method, and detection range are defined. The study focuses on the use of a dome display helicopter simulator with host software and a visual data base specifically designed for trials simulating high-speed contour night flight. The 30 x-40-deg Integrateed Helmet and Display Sight System (IHADSS) forward-looking IR display provides all visual cues. (Author)
SF- AIAA

DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *FLIGHT SIMULATION; *HELMET MOUNTED
DISPLAYS; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION; *OBSTACLE AVOIDANCE
DE- FLIGHT SIMULATORS; FLIR DETECTORS; HELICOPTER CONTROL; PILOT PERFORMANCE; PILOT TRAINING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01863480
AN- <AEROSPACE> A90-28208
TI- Human factors in helicopters maintenance and inspection
AU- PIERCE, KEN; MORAN, JAMES T. (Aerospatiale Helicopter Corp., Grand Prairie, TX)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 751-756.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- Measures that can be taken to improve the diligence and expertise of helicopter maintenance personnel are discussed. Computer-aided maintenance and related expert systems are examined, and means of data reporting are described. The use of experts in helicopter maintenance is addressed, and the advantages and drawbacks of an aging maintenance workforce are considered. Training and certification of maintenance personnel is discussed. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HELICOPTERS; *HUMAN FACTORS ENGINEERING
; *INSPECTION
DE- AGE FACTOR; AUTOMATION; DATA RECORDING; EXPERT SYSTEMS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01863471
AN- <AEROSPACE> A90-28199
TI- Mission effectiveness testing of an adaptive electronic fuel control on an S-76A
AU- WALSH, DAVID M. (Sikorsky Aircraft, West Palm Beach, FL)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 605-616.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- Flight tests of a digital electronic adaptive fuel control (AFC) were conducted on an S-76A helicopter, and the results are reported. Quantitative measurements of improvement due to the AFC were obtained for aircraft maneuver times, measured pilot workload, target tracking accuracy and pilot ratings. Assessments of target tracking accuracy and measured pilot workload were made, and a laser weapons simulator was used to obtain target tracking data for a variety of air-to-ground and air-to-air scenarios. Results from the targeting maneuvers showed that operation in adaptive control enhanced aircraft maneuverability and improved pilot confidence, leading to reduced target acquisition times and improved target tracking. Measured pilot workload was also noticeably reduced when operation was in adaptive control. (C.D.)
SF- AIAA
DE- <MAJOR> *ADAPTIVE CONTROL; *ELECTRONIC CONTROL; *ENGINE CONTROL; *FUEL
CONTROL; *HELICOPTER PERFORMANCE; *MILITARY HELICOPTERS
DE- AIRCRAFT MANEUVERS; HELICOPTER CONTROL; MANEUVERABILITY; PILOT PERFORMANCE; TRACKING (POSITION); WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01863458
AN- <AEROSPACE> A90-28186
TI- Overview of NASA Rotorcraft Human Factors Research
AU- HART, SANDRA G. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 441-453.
PY- 1989

PD- 198900
RF- 34
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The principal areas of research supported by the NASA Rotorcraft Human Factors Research Branch are reviewed. The program elements addressed include situational awareness, pilot/vehicle interface, mission management, and training. Representative examples of research conducted in these areas since 1987 are summarized. (C.D.)
SF- AIAA
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *NASA PROGRAMS; *ROTORCRAFT AIRCRAFT; *SAFETY FACTORS
DE- DECISION MAKING; GENERAL OVERVIEWS; HELICOPTER DESIGN; OPTIMIZATION; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01863457
AN- <AEROSPACE> A90-28185
TI- Human factors in EMS helicopter operations
TI- <EXTENSION> Emergency Medical Service
AU- LAUBER, JOHN K.; KAYTEN, PHYLLIS J. (National Transportation Safety Board, Washington, DC)
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 437-440.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The characteristics of Emergency Medical Service (EMS) helicopter operations which may contribute to the high estimated accident rate of this service are addressed. The factors considered include EMS pilots flying in marginal weather conditions, poor judgment resulting from factors common in the EMS environment, and the on-call nature of the EMS environment which leads to chronic fatigue. Accidents illustrating these factors are described. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *HELICOPTER ENGINES; *HUMAN FACTORS ENGINEERING; *MEDICAL SERVICES
DE- HUMAN PERFORMANCE; SAFETY FACTORS; TURBINE ENGINES
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01863452
AN- <AEROSPACE> A90-28180
TI- Initial results from the joint NASA-Lewis/U.S. Army icing flight research tests
AU- BELTE, DAUMANTS (U.S. Army, Aviation Engineering Flight Activity, Edwards AFB, CA); RANAUDO, RICHARD J. (NASA, Lewis Research Center, Cleveland, OH)
CS- Army Aviation Engineering Flight Activity, Edwards AFB, CA.
CS- <CODE> AZ102498
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 379-392.
PY- 1989
PD- 198900
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- The U.S. Army/NASA joint testing of the various aspects of in-flight and ground-based icing simulation facilities and instrumentation is reviewed. The NASA DN-6 icing research aircraft, the U.S. Army JU-21A aircraft, the portable spray rig, helicopter icing spray system, and icing research tunnel are examined. Natural and artificial icing tests, turbulence measurements, and calibration and icing research tunnel tests are described and test results are reported. (C.D.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *GROUND TESTS; *ICE CLOUDS; *ICE FORMATION; *MILITARY HELICOPTERS; *WIND TUNNEL TESTS
DE- ARMED FORCES (UNITED STATES); NASA PROGRAMS; RESEARCH AIRCRAFT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01863439
AN- <AEROSPACE> A90-28167
TI- HARP model rotor test at the DNW
TI- <EXTENSION> Hughes Advanced Rotor Program
AU- DAWSON, SETH (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); JORDAN, DAVID; SMITH, CHARLES (NASA, Ames Research Center, Moffett Field, CA); EKINS, JAMES; SILVERTHORN, LOU (McDonnell Douglas Helicopter Co., Mesa, AZ)
CS- Army Aviation Systems Command, Moffett Field, CA.
CS- <CODE> AZ153632
SO- IN: AHS, Annual Forum, 45th, Boston, MA, May 22-24, 1989, Proceedings (A90-28151 11-01). Alexandria, VA, American Helicopter Society, 1989, p. 211-227.
PY- 1989
PD- 198900
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9011
AB- Data from a test of a dynamically scaled model of the Hughes Advanced Rotor Program (HARP) bearingless model main rotor and 369K tail rotor are reported. The history of the HARP program and its goals are reviewed, and the main and tail rotor models are described. The test facilities and instrumentation are described, and wind tunnel test data are presented on hover, forward flight performance, and blade-vortex interaction. Performance data, acoustic data, and dynamic data from near field/far field and shear layer studies are presented. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *BLADE-VORTEX INTERACTION; *HELICOPTER TAIL ROTORS; *ROTARY WINGS; *ROTOR AERODYNAMICS; *WIND TUNNEL TESTS
DE- INTERACTIONAL AERODYNAMICS; NASA PROGRAMS; ROTORCRAFT AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01861558
AN- <AEROSPACE> A90-26286
TI- TASKILLAN - A simulation to predict the validity of multiple resource models of aviation workload
AU- LARISH, INGE A.; WICKENS, CHRISTOPHER D.; SEGAL, LEON; SHERMAN, BILL; CONTORER, AARON M. (Illinois, University, Urbana)
CS- Illinois Univ., Urbana.
CS- <CODE> IB647432
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 2 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 761-766.
PY- 1989
PD- 198900
RF- 11
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- The extent to which flight simulation models of increasing complexity are successful in predicting pilot performance was investigated using four models of increasing sophistication addressed by the TASKILLAN (for task skill analysis) computer-generated helicopter simulation. At the simplest level of complexity was the total task model (Model T), followed by the demand model (Model D), the undifferentiated capacity model (Model U), and, ultimately, by the multiple resources model (Model M), which is at the highest level of sophistication addressed by the TASKILLAN project. It was found that the correlations between variables were higher with the two more sophisticated models (U and M), which impose a penalty for increased difficulty in time-sharing. The performance prediction was best with the Model U, while the best predictors of subjective measures were models D and M. (I.S.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- ALGORITHMS; COMPUTERIZED SIMULATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01861548
AN- <AEROSPACE> A90-26276
TI- Apparent limitations of head-up-displays and thermal imaging systems
AU- BRICKNER, MICHAEL S. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

CS- <CODE> NC473657
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 2 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 703-707.
PY- 1989
PD- 198900
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- A simulated helicopter flight through a slalom course was presented on a Silicon Graphics IRIS 3130. The display represented the major visual characteristics of thermal images. Subjects were asked to maintain a designated altitude, while flying a slalom course between regularly spaced pylons. The presence of some of the high frequency details in the image improved subjects' ability to reach and maintain the correct altitude. A head-up-display helped in maintaining altitude, but impaired maneuvering around the poles. The results are interpreted in terms of the competition for visual resources between the HUD and the world view. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *HEAD-UP DISPLAYS; *INFRARED IMAGERY; *PILOT PERFORMANCE
DE- FIELD OF VIEW; FLIGHT CONTROL; FLIGHT PATHS; HELICOPTERS; NIGHT VISION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01861532
AN- <AEROSPACE> A90-26260
TI- Cobra communications switch integration program
AU- SHIVELY, ROBERT J.; HAWORTH, LORAN A.; SZOBOSZLAY, ZOLTAN (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); MURRAY, F. GERALD (Sterling Software; NASA, Ames Research Center; Sterling Software, Moffett Field, CA)
CS- Army Aviation Systems Command, Moffett Field, CA.
CS- <CODE> AZ153632
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 2 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 605-610.
PY- 1989
PD- 198900
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- The paper describes a design modification to reduce the visual and manual workload associated with the radio selection and communications tasks in the U.S. Army AH-1 Cobra helicopter. The modification involves the integration of the radio selection and microphone actuating tasks into a single operation controlled by the transmit-intercom switch. Ground-based and flight tests were conducted to evaluate the modified configuration during twelve flight tasks. The results show that the proposed configuration performs twice as fast as the original configuration. (R.B.)
SF- AIAA
DE- <MAJOR> *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *RADIO COMMUNICATION ; *SWITCHES; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT TESTS; GROUND TESTS; HELICOPTER CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01861530
AN- <AEROSPACE> A90-26258
TI- The benefits and costs of automation in advanced helicopters - An empirical study
AU- BORTOLUSSI, MICHAEL R. (Western Aerospace Laboratories, Inc., Moffett Field, CA); VIDULICH, MICHAEL A. (USAF, Armstrong Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH)
CS- Western Aerospace Labs., Inc., Moffett Field, CA.
CS- <CODE> WN605068
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 2 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 594-599.
PY- 1989
PD- 198900
RF- 5
CN- NCC2-486
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- A helicopter simulation was conducted to examine the interaction between voice-activated controls and altitude-hold automation. A single-pilot scout/attack helicopter with conventional controls was simulated with full out-the-window computer-generated imagery. Helicopter pilots performed simulated missions which included hover, cruise and ground attack phases. For half of the flights, voice-activated controls were used instead of manual controls, for two flight tasks (weapon selection and data-burst transmission). Hover performance during data-burst hover improved when voice-activation was used. However, subjective ratings indicated higher workload levels with voice-activation. An altitude-hold automation manipulation was crossed with the voice-activation/manual manipulation. Altitude-hold automation provided two significant benefits: (1) pilots were able to hover with less lateral movement; and (2) pilots reported less workload. However, there was a performance cost associated with the automation. Pilots were significantly slower in responding to unexpected events during hover. (Author)
SF- AIAA
DE- <MAJOR> *ALTITUDE CONTROL; *AUTOMATION; *HELICOPTER CONTROL; *VOICE CONTROL
DE- HOVERING; MANUAL CONTROL; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01861521
AN- <AEROSPACE> A90-26249
TI- Measuring stress of helicopter pilots - An analysis of deficiencies in critical flight situations
AU- KASTNER, MICHAEL; HARSS, CLAUDIA; BEERMAN, LILLY (Muenchen, Universitaet der Bundeswehr, Munich, Federal Republic of Germany)
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 2 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 539-544.
PY- 1989
PD- 198900
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- A study on the stress and strain experienced by helicopter pilots engaging in low altitude night flight with night vision goggles is discussed. The theoretical background of the study is reviewed, focusing on the method of Stress-Coping Analysis (Kastner, 1986). The characteristics of the person, situation, and interactions in the study are evaluated. The psychological, physiological, and observational data used in the study are briefly described. Selected preliminary results of the study are given, including an example on the relationship between the risk-taking attitudes of pilots and their judgement and experience of stress during various flight situations. (R.B.)
SF- AIAA
DE- <MAJOR> *FLIGHT STRESS; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *PILOT PERFORMANCE; *STRESS (PSYCHOLOGY)
DE- INFORMATION PROCESSING (BIOLOGY); LOW ALTITUDE; PERSONALITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01861489
AN- <AEROSPACE> A90-26217
TI- Pilot assessment of the AH-64 helmet mounted display system
AU- HALE, STEVEN; PICCIONE, DINO (Essex Corp., Alexandria, VA)
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 1 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 307-312.
PY- 1989
PD- 198900
RF- 6
CN- DAAA15-88-C-0005
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- While intensive research has been conducted regarding the operational problems associated with the use of HUDs, much less work has been performed to assess the operational effectiveness of the helmet-mounted display (HMD). The current research was conducted to evaluate the performance of the HMD system used by AH-64A Apache aviators. A survey was conducted consisting of 37 items which addressed various human factor engineering aspects of the helmet display unit (HDU) and related systems. The items are categorized into four basic topic areas: (1)

size and distance perception, (2) FLIR image quality, (3) effects of monocular viewing, and (4) spatial disorientation. The results of the survey and pilot interviews are summarized in detail for each of the four topic areas, noting that all AH-64 aviators strongly feel that if HDU FLIR image resolution could be enhanced and the field of view increased, the system would be much more effective. (R.E.P.)
SF- AIAA
DE- <MAJOR> *AH-64 HELICOPTER; *COCKPITS; *HEAD-UP DISPLAYS; *HELMET MOUNTED DISPLAYS; *PILOT PERFORMANCE
DE- FLIGHT FATIGUE; FLIR DETECTORS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01861479
AN- <AEROSPACE> A90-26207
TI- Frame of reference for electronic maps - The relevance of spatial cognition, mental rotation, and componential task analysis
AU- WICKENS, CHRISTOPHER D.; ARETZ, ANTHONY (Illinois, University, Savoy); HARWOOD, KELLY (Computer Technology Associates, Inc., McLean, VA)
CS- Illinois Univ., Savoy.
CS- <CODE> IB586416
SO- IN: International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volume 1 (A90-26176 10-53). Columbus, OH, Ohio State University, 1989, p. 245-250.
PY- 1989
PD- 198900
RF- 12
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9010
AB- Three experiments are reported that examine the difference between north-up and track-up maps for airborne navigation. The results of the first two experiments, conducted in a basic laboratory setting, identified the cost associated with mental rotation, when a north-up map is used. However, the data suggest that these costs are neither large nor consistent. The third experiment examined a range of tasks in a higher fidelity helicopter flight simulation, and associated the costs of north-up maps with a cognitive component related to orientation, and the costs of track-up maps with a cognitive component related to inconsistent landmark location. Different tasks are associated with different dependence on these components. The results are discussed in terms of their implications for map design, and for cognitive models of navigational processes. (Author)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *IMAGE ROTATION; *MAN MACHINE SYSTEMS; *MAPS;
*PATTERN RECOGNITION; *SCENE ANALYSIS
DE- AIR NAVIGATION; FRAMES (DATA PROCESSING); HUMAN FACTORS ENGINEERING;
PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01861448
AN- <AEROSPACE> A90-26176
TI- International Symposium on Aviation Psychology, 5th, Columbus, OH, Apr. 17-20, 1989, Proceedings. Volumes 1 & 2
AU- JENSEN, RICHARD S., ED. (Ohio State University, Columbus)
SO- Symposium sponsored by the Ohio State University and Association of Aviation Psychologists. Columbus, OH, Ohio State University, 1989, p. Vol. 1, 521 p.; vol. 2, 492 p. For individual items see A90-26177 to A90-26309.
PY- 1989
PD- 198900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA9010
AB- Current research in aeronautical human factors is reviewed. Topics discussed include training, simulation, cockpit technology, expert systems, pilot judgment, communication, physiology, cockpit resource management, pilot reliability, rotorcraft human factors, pilot selection, visual perception, workload, accident investigation, ATC human factors, and performance assessment. (B.J.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *CONFERENCES; *HUMAN FACTORS ENGINEERING;
*PILOT PERFORMANCE
DE- AIR TRAFFIC CONTROL; AIRCRAFT ACCIDENT INVESTIGATION; AUTOMATIC CONTROL
; COCKPITS; FLIGHT SIMULATION; PILOT ERROR; PILOT SELECTION; PILOT TRAINING; VISUAL PERCEPTION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01854825
AN- <AEROSPACE> A90-19553
TI- Simulation investigation of the effects of helicopter hovering dynamics on pilot performance
AU- APONSO, BIMAL L.; MITCHELL, DAVID G.; HOH, ROGER H. (Systems Technology, Inc., Hawthorne, CA)
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
SO- (AIAA Guidance, Navigation and Control Conference, Monterey, CA, Aug. 17-19, 1987, Technical Papers. Volume 2, p. 1263-1272) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 13, Jan.-Feb. 1990, p. 8-15. Previously cited in issue 22, p. 3542, Accession no. A87-50535.
PY- 1990
PD- 199002
RF- 13
SN- 0731-5090
CN- NAS2-11304
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9006
SF- AIAA
DE- <MAJOR> *HOVERING STABILITY; *LOW SPEED; *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *TRANSFER FUNCTIONS
DE- COMPUTERIZED SIMULATION; FIXED WINGS; RESONANT FREQUENCIES
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01849697
AN- <AEROSPACE> A90-14425
TI- The effect of occupational work load on the functional state of naval-aviation flight personnel
TI- <ORIGINAL> Vliianie professional'noi nagruzki na funktsional'noe sostoianie letnogo sostava korabel'noi aviatsii
AU- MEL'NIK, S. G.; SHAKULA, A. V.; GLADKIKH, F. D.
SO- Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1989, p. 54-57. In Russian.
PY- 1989
PD- 198907
SN- 0026-9050
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9003
AB- Results are presented on several series of tests conducted on naval-helicopter pilots and navigators attached to long-term missions to determine the relationship between flight-connected work loads and the functional state of their cardiovascular and respiratory systems, as well as the reserve facilities of the organism. It was found that, at low latitudes, a 3-hr-long flight led to significant increases in the respiration frequency, a decrease in the breathing reserve of the subjects, and increases in arterial pressure and heart rate. These shifts failed to normalize after 58 hrs of rest (which was longer than the time allowed between two flight missions). At high latitudes, changes in these physiological parameters were more moderate and were found to return to normal levels after only 16 hours of rest, indicating that the long-lasting physiological shifts observed at low latitudes were caused by exposures to high temperatures during flight. (I.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CARRIERS; *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *TROPICAL REGIONS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- CARDIOVASCULAR SYSTEM; NAVY; PHYSIOLOGICAL FACTORS; RESPIRATORY SYSTEM
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01849015
AN- <AEROSPACE> A90-13743
TI- The occurrence of the vection illusion among helicopter pilots while flying over water
AU- UNGS, TIMOTHY J. (USCG, Kodiak, AK; Wright State University, Dayton, OH)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 60, Nov. 1989, p. 1099-1101.
PY- 1989
PD- 198911
RF- 12

SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9003
AB- U.S. Coast Guard helicopter pilots were questioned on the occurrence of the vection illusion while flying over water under different light and sea conditions. A total of 267 (79.9 percent) pilots completed the study questionnaire. The illusion of vection was experienced by 248 (92.5 percent) of these pilots. The majority of the pilots, 209 (84.6 percent), reported that dark rather than light visual conditions increased the likelihood of experiencing vection. Vection was considered likely to occur over rough seas by more pilots, 114 (46.2 percent) than over smooth seas, 81 (37.8 percent). Several pilots commented that they had responded to the illusion with aircraft movement. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTERS; *OCEAN SURFACE; *OPTICAL ILLUSION; *PILOT PERFORMANCE
DE- DISORIENTATION; FLIGHT OPERATIONS; FLIGHT SAFETY; NIGHT; SURFACE ROUGHNESS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01846668
AN- <AEROSPACE> A90-11396
TI- Placards, warning labels and operation manuals - An aircraft manufacturer's duty to warn
AU- LINK, JAMES E., II
SO- Journal of Air Law and Commerce (ISSN 0021-8642), vol. 55, Fall 1989, p. 265-302.
PY- 1989
PD- 198900
RF- 200
SN- 0021-8642
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9001
AB- The effectiveness of aircraft warnings is studied. Basic warning claims and their influence on manufacturers are discussed. Actual and proposed safety warnings are analyzed in terms of case law in this area. Human factor psychology and engineering are considered; particular attention is given to the limitations of traditional tort law in terms of warnings and instructions. (I.F.)
SF- AIAA
DE- <MAJOR> *AEROSPACE INDUSTRY; *AIR LAW; *AIRCRAFT RELIABILITY
DE- CESSNA AIRCRAFT; COCKPITS; FLIGHT CONTROL; HELICOPTERS; HUMAN FACTORS
ENGINEERING; LEGAL LIABILITY
SH- 8784 Law, Political Science & Space Policy (1987-)

AN- <DIALOG> 01846431
AN- <AEROSPACE> A90-11159
TI- New rotor test rig in the large Modane wind tunnel
AU- ALLONGUE, M. (Aerospatiale, Division Helicopteres, Marignane, France); DREVET, J.-P.; REMANDET, J.-N. (ONERA, Chatillon-sous-Bagneux, France)
SO- (European Rotorcraft Forum, 15th, Amsterdam, Netherlands, Sept. 12-15, 1989) ONERA, TP no. 1989-137, 1989, 16 p.
PY- 1989
PD- 198900
RF- 11
RN- ONERA, TP NO. 1989-137
LA- English
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA9001
AB- From now on, helicopter rotor tests in the large S1MA wind tunnel at the Modane-Avrieux Center of ONERA will be conducted with a new 'BERH' helicopter rotor test rig. The qualification tests were run in November 1987 and the first industrial test campaign - the tenth in S1MA - was conducted in August 1988. This document presents the possibilities of this new device and some results obtained during the tenth test campaign. The new bench is technically different from the previous one as concerns its support structure, drive system and instrumentation. These modifications have improved test productivity and measurement accuracy. With this new system, five rotors were tested in less than three weeks. The test method was thoroughly changed to include two major advantages. First, it avoids having to interpolate several times when comparing rotors. Secondly, the blade stresses on two rotors at the same lift and propulsive force are compared. To allow this

approach, a control aid program operates on line during the tests. During the tenth campaign, a large amount of data was generated, and the quality of the data was shown to be satisfactory. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *ROTARY WINGS; *TEST EQUIPMENT; *WIND TUNNEL TESTS
DE- BENDING MOMENTS; DYNAMOMETERS; ITERATIVE SOLUTION; TORQUEMETERS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01838564
AN- <AEROSPACE> N89-23406
TI- NASA aeronautics research and technology
TI- <SUPPLEMENT> Annual Report
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1986
PD- 198600
PG- 60P.
NT- Original doc. contains color illustrations
RN- NASA-EP-259; NAS 1.19:259
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR8917
AB- The technical accomplishments and research highlights of 1986 are featured, along with information on possible areas of future research. These include hypersonic, supersonic, high performance, subsonic, and rotorcraft vehicle technology. Fundamental disciplinary research areas discussed include aerodynamics, propulsion, materials and structures, information sciences and human factors, and flight systems/safety. A description of the NASA organization and facilities is given. (A.D.)
SF- NASA CASI
DE- <MAJOR> *AERODYNAMICS; *AERONAUTICAL ENGINEERING; *AIRCRAFT DESIGN; *AIRCRAFT ENGINES; *NASA PROGRAMS; *RESEARCH AND DEVELOPMENT
DE- AIRCRAFT PERFORMANCE; FLIGHT SAFETY; FLIGHT TEST INSTRUMENTS; HUMAN FACTORS ENGINEERING; HYPERSONIC VEHICLES; MATERIALS SCIENCE; ROTARY WING AIRCRAFT; SUPERSONIC AIRCRAFT; TEST FACILITIES
SH- <COSATI> 1B Aeronautics
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01836645
AN- <AEROSPACE> N89-21486
TI- The impact of the US Army's AH-64 helmet mounted display on future aviation helmet design
TI- <SUPPLEMENT> Final Report
AU- RASH, CLARENCE E.; MARTIN, JOHN S.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1988
PD- 198808
PG- 21P.
RN- AD-A202984; USAARL-88-13
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8914
AB- Historically, the goal of aviation helmet design has been to primarily provide impact and noise protection to the user. In 1984, the U.S. Army fielded an advanced attack helicopter which required a new helmet concept in which the role of the helmet was expanded to provided a visually coupled interface between the aviator and the aircraft. This new helmet system, the Integrated Helmet and Display Sighting System (IHADSS), uses a helmet fitted with infrared (IR) emitters and a monocular display. The IR emitters allow a slewable IR imaging sensor, mounted on the nose of the aircraft, to be slaved to the aviators head movements. Imagery from this sensor is presented to the aviator through the helmet mounted display. This type system generates several concerns, recognized early on, but still unresolved. These areas include questions of monocular vs. binocular imagery, eye dominance, and binocular rivalry. Additionally, the task of interfacing the aviator's head to the aircraft has introduced previously unrecognized problems relating to head anthropometry and facial anatomy. The fitting process has become a crucial factor in the aviator's ability to interface with the aircraft systems. The development and fielding of

the IHADSS helmet mounted display have expanded the role and importance of the helmet. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *HELMET MOUNTED DISPLAYS; *HELMETS; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS
DE- ANTHROPOMETRY; EYE (ANATOMY); EYE PROTECTION; FITTINGS; HEAD MOVEMENT; IMAGES; SYSTEMS INTEGRATION
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01834970
AN- <AEROSPACE> N89-19810
TI- Thermal stress in Ran Sea King Helicopter operations
AU- MANTON, J. G.; HENDY, K. C.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> AF441057
PY- 1988
PD- 198802
PG- 50P.
RN- ARL-SYS-R-40; AR-004-592
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8912
AB- Thermal stress in aircrew operating in the cabin and cockpit environment of the RAN's Sea King helicopter was examined. The high thermal loads experienced in the helicopter have previously been established and various options for ameliorating the conditions have also been proposed. A review of the literature on thermal stress research is presented. The development of an Index of Thermal Stress for the Sea King (SKITS) is reported along with the results of a study to determine the ameliorating effect of blown cooled air directed at the faces of subjects in a thermal chamber. (Author)
DE- <MAJOR> *FLIGHT CREWS; *OPERATOR PERFORMANCE; *SH-3 HELICOPTER; *STRESS (PHYSIOLOGY); *THERMAL STRESSES
DE- AIR COOLING; BODY TEMPERATURE; COGNITION; FATIGUE (BIOLOGY); HUMAN FACTORS ENGINEERING; SLEEP DEPRIVATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01833584
AN- <AEROSPACE> N89-18421
TI- Energy Absorption of Aircraft Structures as an Aspect of Crashworthiness
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
CS- <CODE> AD455458
PY- 1988
PD- 198812
PG- 327P.
NT- Meeting held in Luxembourg, 1-6 May 1988
RN- AGARD-CP-443; ISBN-92-835-0485-2; AD-A212606
LA- MULTIPLE
LA- <NOTE> In ENGLISH and FRENCH
GL- France
CP- International Organization
DT- COLLOQUIA
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A15/MF A03
JA- STAR8911
AB- Considerable effort was hitherto devoted to crash avoidance, but relatively little to crash survivability. In certain regimes the risk of accident remains, e.g., the low-altitude low-speed regime. There is a strong incentive to increase the prospects for occupant survival through improvements in airframe design. Information about structural behavior and characteristics under these conditions is very sparse and an exchange of information between the NATO nations is long overdue. At its sixty-sixth meeting, the Structures and Materials Panel held a conference of specialists, the aim of which was to stimulate an exchange of experience and development results. A further aim was to act as a focus for the discussion of those design philosophies which may be needed to provide the balance between survivability and functions. The document contains the papers presented. For individual titles, see N89-18422 through N89-18442.
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT RELIABILITY; *AIRCRAFT SURVIVABILITY; *CONFERENCES; *ENERGY ABSORPTION; *HUMAN FACTORS ENGINEERING; *SAFETY FACTORS
DE- AIRCRAFT STRUCTURES; AIRFRAMES; HELICOPTER DESIGN; HELICOPTERS; TRANSPORT AIRCRAFT

SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01833567
AN- <AEROSPACE> N89-18404
TI- Human factors: Aeronautics
AU- JENKINS, JAMES P.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1988
PD- 198809
NT- In its NASA Information Sciences and Human Factors Program p 147-177
(SEE N89-18397 10-99)
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR8910
AB- The objectives of the Aeronautics Human Factors Research and Technology program are to provide the technology base and capability to design effective crew-cockpit systems and to advance solutions to human problems affecting air transport and rotorcraft effectiveness and safety. Advanced automation technologies, information display capabilities under computer control, and concern for the effects of human error in flight operations are elements which drive the directions of the program. Thus, the program has four thrusts: flight management, human engineering methods, rotorcraft, and subsonic transports. (Author)
DE- <MAJOR> *EXPERT SYSTEMS; *HUMAN FACTORS ENGINEERING; *NAP-OF-THE-EARTH
NAVIGATION; *ROTARY WING AIRCRAFT; *SUBSONIC AIRCRAFT; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COLLISION AVOIDANCE; DISPLAY DEVICES; FAULT TOLERANCE; TRANSPORT AIRCRAFT; WIND SHEAR
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01831965
AN- <AEROSPACE> N89-16802
TI- Gas path analysis and engine performance monitoring in a Chinook helicopter
AU- GLENNY, D. E.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> AF441057
PY- 1988
PD- 198810
NT- In AGARD, Engine Condition Monitoring: Technology and Experience 14 p
(SEE N89-16780 09-06)
LA- English
GL- Australia
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR8909
AB- Periodic and consistent assessment of engine performance in military heicopters is essential if in-service operating margins are not to be eroded by harsh environmental conditions. Manually initiated GO-NO-GO pre-flight checks (HIT, etc.) or ad hoc in-flight performance checks rarely provide sufficiently reliable data for maintenance or diagnostic purposes. In contrast, performance assessment methods based on gas path analysis principles and engine/aircraft data, automatically recorded during flight, offer a potentially attractive alternative. ARL has investigated a number of these alternatives, and has carried out an in-service trial on a Boeing CH47C Chinook helicopter operated by the RAAF. In the trial existing aircraft/engine instrumentation was complemented by specially designed probes located at module interfaces while the data was recorded on an ARL designed acquisition system. The performance-fault algorithms used in the analyses were configured for a range of engine operating speeds. Results for the trial are presented in terms of deviations from pre-established baseline conditions. Statistical analyses using linear regression fits and Kalman filtering techniques have been investigated to minimize the effects of data uncertainty. The applicability of the procedures, including thermodynamic analyses and equipment are discussed in terms of fleetwide adoption of the Chinook. (Author)
DE- <MAJOR> *ENGINE MONITORING INSTRUMENTS; *GAS PATH ANALYSIS; *IN-FLIGHT
MONITORING; *MILITARY HELICOPTERS
DE- DIAGNOSIS; ENGINE TESTS; MAINTENANCE; PREFLIGHT ANALYSIS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01827766
AN- <AEROSPACE> N89-12570

TI- Design and numerical evaluation of full-authority flight control systems for conventional and thruster-augmented helicopters employed in NOE operations
TI- <SUPPLEMENT> Interim Report
AU- PERRI, TODD A.; MCKILLIP, R. M., JR.; CURTISS, H. C., JR.
CS- Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
CS- <CODE> P3732113
PY- 1987
PD- 198708
PG- 199P.
CN- NAG2-244
RN- NASA-CR-183311; NAS 1.26:183311; TR-1789T
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A09/MF A03
JA- STAR8904
AB- The development and methodology is presented for development of full-authority implicit model-following and explicit model-following optimal controllers for use on helicopters operating in the Nap-of-the Earth (NOE) environment. Pole placement, input-output frequency response, and step input response were used to evaluate handling qualities performance. The pilot was equipped with velocity-command inputs. A mathematical/computational trajectory optimization method was employed to evaluate the ability of each controller to fly NOE maneuvers. The method determines the optimal swashplate and thruster input histories from the helicopter's dynamics and the prescribed geometry and desired flying qualities of the maneuver. Three maneuvers were investigated for both the implicit and explicit controllers with and without auxiliary propulsion installed: pop-up/dash/descent, bob-up at 40 knots, and glideslope. The explicit controller proved to be superior to the implicit controller in performance and ease of design. (Author)
DE- <MAJOR> *AIRCRAFT MANEUVERS; *AUTOMATIC FLIGHT CONTROL; *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *TRAJECTORY OPTIMIZATION
DE- AH-1G HELICOPTER; COST ANALYSIS; DYNAMIC CONTROL; PILOT PERFORMANCE; THRUST AUGMENTATION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- <COSATI> 1C Aircraft
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01819676
AN- <AEROSPACE> A89-49468
TI- Light helicopter (LHX) program Demonstration/Validation program
AU- HUBBARD, ROBERT; CALDWELL, DARREL (U.S. Army, LHX Program Management Office, Saint Louis, MO)
SO- AIAA, AHS, and ASEE, Aircraft Design, Systems and Operations Conference, Seattle, WA, July 31-Aug. 2, 1989. 11 p.
PY- 1989
PD- 198907
RN- AIAA PAPER 89-2115
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8921
AB- The elements of the U.S. Army LHX Demonstration/Validation (DEM/VAL) program are overviewed together with the program's activities. The purpose of the LHX DEM/VAL phase is discussed, and the processes used to identify the critical technology candidates for risk-reduction and the technology developments and demonstration efforts currently underway are examined. Particular attention is given to the design parameters of the LHX concept and the improvements achieved in LHX survivability, dash speed, deployability, reliability and maintainability. Consideration is also given to the airborne adverse weather weapon system of the LHX. (I.S.)
SF- AIAA
DE- <MAJOR> *FLIGHT CONTROL; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING ; *LIGHT AIRCRAFT
DE- AH-1G HELICOPTER; AVIONICS; FLIGHT SIMULATION; FLIR DETECTORS; FOCAL PLANE DEVICES; OH-58 HELICOPTER; PROVING; VHSIC (CIRCUITS)
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01818620
AN- <AEROSPACE> A89-48412
TI- An experimenter operator station for helicopter flight simulator research and training
AU- KAYE, THOMAS A. (Bell Helicopter Textron, Fort Worth, TX); FREEMAN, L. MICHAEL (Alabama, University, Tuscaloosa)

SO- IN: AIAA Flight Simulation Technologies Conference and Exhibit, Boston, MA, Aug. 14-16, 1989, Technical Papers (A89-48376 21-09). Washington, DC, American Institute of Aeronautics and Astronautics, 1989, p. 293-303.
PY- 1989
PD- 198900
RN- AIAA PAPER 89-3304
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8921
AB- A multipurpose research-oriented operator support station for controlling a low-cost helicopter flight simulator while simultaneously monitoring and recording pilot performance data for subsequent display or statistical postprocessing is described. The system is a mouse-oriented menu-driven interactive program, with structured program design methods employed to create a modular software package capable of handling data acquisition and graphic display of flight performance variables at real-time speeds of up to 30 Hz. The system is also designed to handle intermittent user-requested simulator control directives. Recorded data files can be created during simulated flights for subsequent statistical analysis or flight replay, with application to the optimization of simulator pilot training. (R.R.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *PILOT TRAINING; *SAFETY FACTORS; *UH-1 HELICOPTER
DE- COMPUTER GRAPHICS; COMPUTER PROGRAMS; ECONOMIC ANALYSIS; REAL TIME OPERATION; TRAINING EVALUATION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01818612
AN- <AEROSPACE> A89-48404
TI- Man-in-the-loop simulation as a design tool
AU- CERCHIE, P. H. (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AIAA Flight Simulation Technologies Conference and Exhibit, Boston, MA, Aug. 14-16, 1989, Technical Papers (A89-48376 21-09). Washington, DC, American Institute of Aeronautics and Astronautics, 1989, p. 233-236.
PY- 1989
PD- 198900
RN- AIAA PAPER 89-3294
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8921
AB- The application of part-task and full man-in-the-loop (MITL) simulations at early stages of the avionics design process is discussed, with a focus on the case of a night-mission obstacle-avoidance system (OAS) for military helicopter pilots. An AH-64 engineering simulator with both a dome display and an integrated helmet and display sight system was employed to evaluate combinations of four OAS sensor models and two detection ranges, which were treated as software systems; the visual data base represented a 34-km-long winding canyon with high walls, trees, and obstacles such as power lines. After initial simulation trials of OAS prototypes were performed by software engineers, test pilots tested the OAS versions in a realistic simulation environment. The early use of simulations efficiently identified the most promising OAS versions and reduced the number of full simulations required in the later stages of development. (T.K.)
SF- AIAA
DE- <MAJOR> *ELECTRO-OPTICS; *FLIGHT SAFETY; *FLIGHT SIMULATION; *NIGHT VISION; *PILOT PERFORMANCE
DE- COST REDUCTION; FLIR DETECTORS; HELMET MOUNTED DISPLAYS; ITERATIVE SOLUTION; MILITARY HELICOPTERS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01817549
AN- <AEROSPACE> A89-47341
TI- The role of flight planning in aircrew decision performance
AU- PEPITONE, DAVE; KING, TERESA (San Jose State Foundation, CA); MURPHY, MILES (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: Aerospace Behavioral Technology Conference and Exposition, 7th, Anaheim, CA, Oct. 3-6, 1988, Proceedings (A89-47326 20-01). Warrendale, PA, Society of Automotive Engineers, Inc., 1989, p. 133-139.
PY- 1989
PD- 198900

RF- 15
RN- SAE PAPER 881517
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8920
AB- The role of flight planning in increasing the safety and decision-making performance of the air transport crews was investigated in a study that involved 48 rated airline crewmembers on a B720 simulator with a model-board-based visual scene and motion cues with three degrees of freedom. The safety performance of the crews was evaluated using videotaped replays of the flight. Based on these evaluations, the crews could be divided into high- and low-safety groups. It was found that, while collecting information before flights, the high-safety crews were more concerned with information about alternative airports, especially the fuel required to get there, and were characterized by making rapid and appropriate decisions during the emergency part of the flight scenario, allowing these crews to make an early diversion to other airports. These results suggest that contingency planning that takes into account alternative courses of action enhances rapid and accurate decision-making under time pressure. (I.S.)
SF- AIAA
DE- <MAJOR> *DECISION MAKING; *FLIGHT CREWS; *FLIGHT PATHS; *PILOT PERFORMANCE; *SAFETY FACTORS
DE- AVIONICS; FLIGHT TRAINING; NAP-OF-THE-EARTH NAVIGATION; PILOT TRAINING; ROTORCRAFT AIRCRAFT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01806783
AN- <AEROSPACE> A89-36575
TI- V-22 prepared for further expansion of flight envelope
AU- SHIFRIN, CAROLE A.
SO- Aviation Week and Space Technology (ISSN 0005-2175), vol. 130, April 10, 1989, p. 34-36, 40.
PY- 1989
PD- 198904
SN- 0005-2175
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8915
AB- The initial test sequences of the V-22 'Osprey' tilt-rotor VTOL aircraft have been sucessfully performed in the helicopter-hover mode during nine separate flights totaling 2.3 hours. The flight envelope will now be expanded to a 60-kt airspeed and a ground taxi speed of 40 kt. The first three flights were limited to a speed of 20 kt at 30-ft altitude. The complete process of initial envelope expansion is expected to take 20-40 weeks, while incorporating modifications and revising test instrumentation. The next major step in the process will be the expansion of the 'airplane' operation envelope, with the nacelles pointed fully forward. (O.C.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *V-22 AIRCRAFT
DE- FLIGHT ENVELOPES; LANDING GEAR; PROTOTYPES; TAXIING; VERTICAL TAKEOFF
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01804657
AN- <AEROSPACE> A89-34449
TI- Helicopter human factors
AU- HART, SANDRA G. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: Human factors in aviation (A89-34431 14-54). San Diego, CA, Academic Press, Inc., 1988, p. 591-638.
PY- 1988
PD- 198800
RF- 116
LA- English
GL- United States
CP- United States
DT- ANALYTIC OF COLLECTED WORK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8914
AB- The state-of-the-art helicopter and its pilot are examined using the tools of human-factors analysis. The significant role of human error in helicopter accidents is discussed; the history of human-factors research on helicopters is briefly traced; the typical flight tasks are described; and the noise, vibration, and temperature conditions typical

of modern military helicopters are characterized. Also considered are helicopter controls, cockpit instruments and displays, and the impact of cockpit design on pilot workload. Particular attention is given to possible advanced-technology improvements, such as control stabilization and augmentation, FBW and fly-by-light systems, multifunction displays, night-vision goggles, pilot night-vision systems, night-vision displays with superimposed symbols, target acquisition and designation systems, and aural displays. Diagrams, drawings, and photographs are provided. (T.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AIRCRAFT PILOTS; *HELICOPTER DESIGN;
*HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- AIRCRAFT NOISE; COCKPITS; HELICOPTER CONTROL; HELICOPTER PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01804639
AN- <AEROSPACE> A89-34431
TI- Human factors in aviation
TI- <EXTENSION> Book
AU- WIENER, EARL L. (Miami, University, Coral Gables, FL); NAGEL, DAVID C. (NASA, Ames Research Center, Moffett Field, CA), EDS.
CS- Miami Univ., Coral Gables, FL.
CS- <CODE> MW485674
SO- San Diego, CA, Academic Press, Inc., 1988, 704 p. For individual items see A89-34432 to A89-34450.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- COLLECTED WORK
JA- IAA8914
AB- The fundamental principles of human-factors (HF) analysis for aviation applications are examined in a collection of reviews by leading experts, with an emphasis on recent developments. The aim is to provide information and guidance to the aviation community outside the HF field itself. Topics addressed include the systems approach to HF, system safety considerations, the human senses in flight, information processing, aviation workloads, group interaction and crew performance, flight training and simulation, human error in aviation operations, and aircrew fatigue and circadian rhythms. Also discussed are pilot control; aviation displays; cockpit automation; HF aspects of software interfaces; the design and integration of cockpit-crew systems; and HF issues for airline pilots, general aviation, helicopters, and ATC. (T.K.)
SF- AIAA
DE- <MAJOR> *AERONAUTICS; *AIRCRAFT PILOTS; *COCKPITS; *HUMAN FACTORS
ENGINEERING; *SYSTEMS ENGINEERING
DE- AIR TRAFFIC CONTROL; DESIGN ANALYSIS; FLIGHT CREWS; FLIGHT TRAINING;
HUMAN PERFORMANCE; SAFETY FACTORS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01801886
AN- <AEROSPACE> A89-31678
TI- A dissociation of objective and subjective workload measures in assessing the impact of speech controls in advanced helicopters
AU- VIDULICH, MICHAEL A. (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH); BORTOLUSSI, MICHAEL R. (Western Aerospace Laboratories, Inc., Moffett Field, CA)
CS- Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, OH.
CS- <CODE> AG627259
SO- IN: Human Factors Society, Annual Meeting, 32nd, Anaheim, CA, Oct. 24-28, 1988, Proceedings. Volume 2 (A89-31601 12-54). Santa Monica, CA, Human Factors Society, 1988, p. 1471-1475.
PY- 1988
PD- 198800
RF- 14
CN- NCC2-486
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8912
AB- Among the new technologies that are expected to aid helicopter designers are speech controls. Proponents suggest that speech controls could reduce the potential for manual control overloads and improve time-sharing performance in environments that have heavy demands for manual control. This was tested in a simulation of an advanced single-pilot, scout/attack helicopter. Objective performance indicated

that the speech controls were effective in decreasing the interference of discrete responses during moments of heavy flight control activity. However, subjective ratings indicated that the use of speech controls required extra effort to speak precisely and to attend to feedback. Although the operational reliability of speech controls must be improved, the present results indicate that reliable speech controls could enhance the time-sharing efficiency of helicopter pilots. Furthermore, the results demonstrated the importance of using multiple assessment techniques to completely assess a task. Neither the objective nor the subjective measures alone provided complete information. It was the contrast between the measures that was most informative. (Author)
SF- AIAA
DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *HELICOPTER CONTROL; *VOICE CONTROL;
*WORKLOADS (PSYCHOPHYSIOLOGY)
DE- MANUAL CONTROL; MILITARY HELICOPTERS; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01801842
AN- <AEROSPACE> A89-31634
TI- Field study of communication and workload in police helicopters - Implications for AI cockpit design
AU- LINDE, CHARLOTTE (NASA, Ames Research Center, Moffett Field, CA); SHIVELY, ROBERT J. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: Human Factors Society, Annual Meeting, 32nd, Anaheim, CA, Oct. 24-28, 1988, Proceedings. Volume 1 (A89-31601 12-54). Santa Monica, CA, Human Factors Society, 1988, p. 237-241.
PY- 1988
PD- 198800
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8912
AB- This paper reports on the work performed by civilian helicopter crews, using audio and video recordings and a variety of workload measures (heart rate and subjective ratings) obtained in a field study of public service helicopter missions. The number and frequency of communications provided a significant source of workload. This is relevant to the design of automated cockpit systems, since many designs presuppose the use of voice I/O systems. Fluency of communications (including pauses, hesitation markers, repetitions, and false starts) furnished an early indication of the effects of fatigue. Three workload measures were correlated to identify high workload segments of flight, and to suggest alternate task allocations between crew members. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *COCKPITS; *HELICOPTER DESIGN; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- BELL AIRCRAFT; PILOT PERFORMANCE; POLICE; VIDEO EQUIPMENT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01801841
AN- <AEROSPACE> A89-31633
TI- An Empirically Validated Task Analysis (EVTA) of low level army helicopter operations
AU- SHAFFER, MARGARET T. (Paradigm, Inc., Potomac, MD); HENDY, KEITH C. (Defence and Civil Institute of Environmental Medicine, Downsview, Canada); WHITE, LOU R. (Canadian Marconi Co., Kanata, Canada)
SO- IN: Human Factors Society, Annual Meeting, 32nd, Anaheim, CA, Oct. 24-28, 1988, Proceedings. Volume 1 (A89-31601 12-54). Santa Monica, CA, Human Factors Society, 1988, p. 178-182. Sponsorship: Department of Supply and Services of Canada.
PY- 1988
PD- 198800
RF- 10
CN- DSS-01SE-W7711-7-7002
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8912
AB- A computer-based Empirically Validated Task Analysis (EVTA) of Canadian Forces light observation helicopter operations was conducted from video records of cockpit activity gathered during flight. The task analysis was performed in order to provide data for function analysis and workload prediction studies in support of the Canadian Forces Light Helicopter replacement project. Observable behaviors were categorized according to the type of activity involved and communications were

analyzed for content, agencies involved, and relevance to the crew's task. The results of this study indicate that data gathered from a controlled test environment can differ considerably from those obtained in operational settings and that miniature video cameras can be useful in obtaining information from environments which hitherto may have been inaccessible to all but operational personnel. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *MILITARY HELICOPTERS; *MILITARY OPERATIONS; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- LIGHT HELICOPTERS; PILOT PERFORMANCE; VIDEO EQUIPMENT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01801839
AN- <AEROSPACE> A89-31631
TI- TASKILLAN - A simulation to predict the validity of multiple resource models of aviation workload
AU- WICKENS, CHRISTOPHER D.; HARWOOD, KELLY; SEGAL, LEON; TKALCEVIC, INGE; SHERMAN, BILL (Illinois, University, Urbana)
CS- Illinois Univ., Urbana.
CS- <CODE> IB647432
SO- IN: Human Factors Society, Annual Meeting, 32nd, Anaheim, CA, Oct. 24-28, 1988, Proceedings. Volume 1 (A89-31601 12-54). Santa Monica, CA, Human Factors Society, 1988, p. 168-172.
PY- 1988
PD- 198800
RF- 13
CN- NAG2-308
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8912
AB- A study to establish the validity of five predictive models of workload in the context of a controlled helicopter mission, TASKILLAN, is presented. Ten subjects performed simulations involving combinations of a low level flight task with three cognitive side tasks pertaining to navigation, spatial awareness, and computation. It is found that the best predictors of subjective workload are relativly simple models that integrate the total demands of task over time. (R.B.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *FLIGHT SIMULATION; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIR NAVIGATION; COGNITION; HELICOPTERS; SPACE PERCEPTION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01801212
AN- <AEROSPACE> A89-31004
TI- Advanced instrumentation for advanced aircraft
AU- PENHARLOW, DAVID (Aydin Corp., Vector Div., Newtown, PA)
SO- IN: ITC/USA/'88; Proceedings of the International Telemetering Conference, Las Vegas, NV, Oct. 17-20, 1988 (A89-31001 12-32). Research Triangle Park, NC, Instrument Society of America, 1988, p. 49-56.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8912
AB- Novel distributed data-acquisition system designs allow flight test instrumentation engineers to select hardware with reduced volume and weight that requires minimal wiring among components while yielding improved accuracy and resolution. Data conditioning and encoding can be achieved near the sensors through a variety of remote units; the remote units for these applications differ with measurement type and test-program requirements. Attention is given to the illustrative cases of (1) a solid rocket booster motor; (2) a European advanced fighter aircraft; (3) a tilt-rotor aircraft; (4) an advanced tactical fighter; (5) a flying engine test-bed; and (6) several experimental commercial aircraft. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DATA ACQUISITION; *ENGINE TESTS; *FIGHTER AIRCRAFT; *FLIGHT TESTS; *SYSTEMS ENGINEERING
DE- ANALOG TO DIGITAL CONVERTERS; HARDWARE; SPACE SHUTTLE BOOSTERS; TEST EQUIPMENT; THERMOCOUPLES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01799556
AN- <AEROSPACE> A89-29348

TI- Notar reduces pilot workload, improves response in OH-6A
AU- KERNSTOCK, NICHOLAS C.
SO- Aviation Week and Space Technology (ISSN 0005-2175), vol. 130, Feb. 13, 1989, p. 44, 45, 47.
PY- 1989
PD- 198902
SN- 0005-2175
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8911
AB- The no-tail-rotor, or 'Notar' system whose performance in application to the OH-6A helicopter is presently flight test-evaluated employs a circulation-control tailboom, a direct-jet thruster, and a variable-pitch fan, to collectively counteract main rotor torque and furnish directional control at low speeds and at hover. Impressively high yaw rates are noted to be possible with Notar; rates in excess of 100 deg/sec have been demonstrated with no loss of attitude control. Because the direct-jet thruster sleeve is not spring-loaded, and no other aerodynamic forces are changing the opening of the jet, control forces are noted to be very light. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *HELICOPTER CONTROL; *OH-6 HELICOPTER; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY); *YAW
DE- ATTITUDE CONTROL; MCDONNELL DOUGLAS AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01798694
AN- <AEROSPACE> A89-28486
TI- Kinematics of U.S. Army helicopter crashes - 1979-85
AU- SHANAHAN, DENNIS F.; SHANAHAN, MAUREEN O. (U.S. Armed Forces Institute of Pathology, Washington, DC)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 60, Feb. 1989, p. 112-121.
PY- 1989
PD- 198902
RF- 12
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8910
AB- All records of U.S. Army Class A and B mishaps of four types of helicopters occurring from Oct. 1, 1979, through Sept. 30, 1985, were reviewed for terrain impact kinematic parameters. During this 6-year period, there were 298 mishaps involving 303 aircraft. Approximately 88 percent of these crashes were considered survivable. Mean and 95th percentile vertical velocity changes at the most severe terrain impact were similar for all aircraft types except the UH-60, which experienced significantly higher impact velocities. Overall 95th percentile vertical and horizontal velocity changes at the most severe terrain impact were 11.2 m/s and 25.5 m/s, respectively. Both these values are substantially different from values cited in current design standards. Roll, pitch, and yaw attitudes at impact were similar for all aircraft and agreed with the values in current design standards, except that the distribution of roll angles was considerably wider. The importance of using current kinematic parameters for crashworthiness design standards and crash injury prevention is stressed. Recommendations are made to improve crashworthiness design standards. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *CRASHES; *HELICOPTER DESIGN; *HELICOPTER PERFORMANCE; *SAFETY FACTORS
DE- ACCIDENT PREVENTION; AIRCRAFT RELIABILITY; AIRCRAFT STABILITY; HUMAN FACTORS ENGINEERING; MILITARY HELICOPTERS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01798434
AN- <AEROSPACE> A89-28226
TI- Human factors engineering workstation for model-based cockpit design
AU- PEW, RICHARD W.; CORKER, KEVIN M.; DAVIS, LAWRENCE
SO- SAE, Aerospace Technology Conference and Exposition, Anaheim, CA, Oct. 3-6, 1988. 9 p.
PY- 1988
PD- 198810
RF- 12
RN- SAE PAPER 881475
LA- English
GL- United States
CP- United States

DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8910
AB- A cockpit design workstation provides a graphic and software tool-based representation of the human operator, the goals, the task environment, the procedural constraints, and the equipment options. Simulations of man/machine system performance were used to study analytically the impact of system design on human performance. The merits of the object-oriented programming paradigm include the ability to combine object descriptions and the modular approach in the form of message interfaces. This programming approach was implemented in the cockpit automation technology program and in the Army/NASA aircrew/aircraft integration program. (A.A.F.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *COCKPITS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *OBJECT-ORIENTED PROGRAMMING; *WORKSTATIONS
DE- COMMAND AND CONTROL; FIGHTER AIRCRAFT; INTERFACES; MILITARY HELICOPTERS ; SYSTEMS SIMULATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01795218
AN- <AEROSPACE> A89-25010
TI- A methodology for the assessment of manned flight simulator fidelity
AU- HESS, RONALD A. (California, University, Davis); MALSBURY, TERRY N.
CS- California Univ., Davis.
CS- <CODE> CC907079
SO- AIAA, Aerospace Sciences Meeting, 27th, Reno, NV, Jan. 9-12, 1989. 13 p. Research supported by the U.S. Army.
PY- 1989
PD- 198901
RF- 14
CN- NAG2-482
RN- AIAA PAPER 89-0014
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8909
AB- A relatively simple analytical methodology for assessing the fidelity of manned flight simulators for specific vehicles and tasks is offered. The methodology is based upon an application of a structural model of the human pilot, including motion cue effects. In particular, predicted pilot/vehicle dynamic characteristics are obtained with and without simulator limitations. A procedure for selecting model parameters can be implemented, given a probable pilot control strategy. In analyzing a pair of piloting tasks for which flight and simulation data are available, the methodology correctly predicted the existence of simulator fidelity problems. The methodology permitted the analytical evaluation of a change in simulator characteristics and indicated that a major source of the fidelity problems was a visual time delay in the simulation. (C.D.)
SF- AIAA
DE- <MAJOR> *BIOLOGICAL MODELS (MATHEMATICS); *CONTROL SIMULATION; *FLIGHT SIMULATION; *FLIGHT SIMULATORS; *PILOT PERFORMANCE
DE- AIRCRAFT PILOTS; HOVERING; SISO (CONTROL SYSTEMS); UH-60A HELICOPTER
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01794573
AN- <AEROSPACE> A89-24365
TI- Simulator sickness in U.S. flight simulators
AU- KENNEDY, R. S.; BERBAUM, K. S.; BALTZLEY, D. R. (Essex Corp., Orlando, FL); LILIENTHAL, M. G. (U.S. Navy, Naval Training Systems Center, Orlando, FL); MCCAULEY, M. E. (Monterey Technologies, Inc., Carmel, CA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 60, Jan. 1989, p. 10-16.
PY- 1989
PD- 198901
RF- 24
SN- 0095-6562
CN- N61339-86-D-0026; N61339-81-C-0105
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8908
AB- This paper reports incidence data on flight-simulator-induced motion sickness, obtained from the U.S. Navy's surveys of ten flight simulators at six different Naval/Marine Corps Air Stations, where about 1200 simulator flights were recorded. Some simulators were found to induce severe motion sickness, and some induced unsteadiness

afterwards. The simulators which exhibited the highest incidences of sickness were helicopter simulators which use six-degrees-of-freedom moving-base systems and employ multiwindow CRTs to provide a wide field of view in visual displays. Among the displays studied, fixed-wing fixed-base dome displays had relatively low incidence of simulator sickness. (I.S.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *MOTION SICKNESS; *MOTION SIMULATION; *PILOT PERFORMANCE
DE- DISPLAY DEVICES; MOTION SIMULATORS; SIGNS AND SYMPTOMS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01793535
AN- <AEROSPACE> A89-23326
TI- Simulation tests of the pilot-helicopter system in overextreme conditions
AU- SZUMANSKI, K. (Instytut Lotnictwa, Warsaw, Poland)
SO- AAAF, European Rotorcraft Forum, 13th, Arles, France, Sept. 8-11, 1987, Paper. 22 p.
PY- 1987
PD- 198709
RF- 6
LA- English
GL- Poland
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8908
AB- This paper describes investigations in the area of complex pilot-controlled helicopter dynamic systems under extreme conditions as indicated by the structural limits of the helicopter parts and assemblies. Helicopter loading and handling technique under these conditions are evaluated using a model of handling representation of helicopter flight. The situations addressed include power plant failure, helicopter turnover during takeoff and landing on sloping terrain, and limit maneuvers during low flying or hedgehopping. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *FLIGHT SIMULATION; *HELICOPTERS; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AIRCRAFT MANEUVERS; AIRCRAFT STRUCTURES; CONTROL THEORY; DYNAMICAL SYSTEMS; ROTARY WINGS; UNSTEADY AERODYNAMICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01793521
AN- <AEROSPACE> A89-23312
TI- Technological improvements of rigs for structural testing of complex EH 101 helicopter components
AU- BRIVIO, A. (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy)
SO- AAAF, European Rotorcraft Forum, 13th, Arles, France, Sept. 8-11, 1987, Paper. 10 p.
PY- 1987
PD- 198709
LA- English
GL- Italy
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8908
AB- Recent attempts at improving test rig equipment are discussed. Of particular interest is the mechanical/hydraulic segment of the test rigs. Consideration is also given to the electronic control systems and the stress analysis instrumentation. (K.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT STRUCTURES; *HELICOPTER DESIGN; *TEST FACILITIES
DE- ACTUATORS; ELECTRONIC CONTROL; STRESS ANALYSIS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01793260
AN- <AEROSPACE> A89-23051
TI- Flying the XV-15 and V-22 tilt-rotors
AU- LAMBERT, MARK
SO- Interavia (ISSN 0020-5168), vol. 43, Dec. 1988, p. 1282-1286.
PY- 1988
PD- 198812
SN- 0020-5168
LA- English
GL- Switzerland
CP- Switzerland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8908
AB- Flight behavior impressions are presented for the two existing

tilt-rotor aircraft, as derived from actual flying of the once-developmental XV-15, and operation of an advanced and highly realistic flight simulator for the V-22, which has already entered production. Attention is given to the characteristics of transitioning maneuvers between vertical and horizontal flight, as well as to the cockpit instrumentation of both the XV-15 and V-22 simulator. The V-22's exceptionally refined stability and controllability derive from the use of fly-by-wire cockpit controls. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *FLIGHT CONTROL; *FLIGHT SIMULATORS; *V-22 AIRCRAFT; *XV-15 AIRCRAFT
DE- AERODYNAMIC STALLING; HELICOPTER CONTROL; TURBOPROP AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01790955
AN- <AEROSPACE> A89-20746
TI- HAP-PAH/HAC program
AU- ARRIBAT, J. C. (Aerospatiale, Division Helicopteres, Paris, France); SCHYMANIETZ, K. (Messerschmitt-Boelkow-Blohm GmbH, Munich, Federal Republic of Germany)
SO- Vertiflite (ISSN 0042-4455), vol. 34, Nov.-Dec. 1988, p. 56-63.
PY- 1988
PD- 198812
SN- 0042-4455
LA- English
GL- France
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- An account is given of the configurational features and performance capabilities of the French-German 'HAP-PAH/HAC' armed helicopter, whose distinct configurational types are the PAH/HAC, for day/night antitank missions, and the HAP, for ground combat support mission. The weapons and equipment specific to each version are arranged within a cohesive system designated the 'Missions Equipment Package'. Both versions employ air-to-air missiles for self-defense; the HAP incorporates a 30-mm wide-angle gun turret mounted at the bow. Attention is given to the detailed design of the cockpit controls and instrumentation, the MTM 390 turboshaft engine, the main gearbox, and the composite-hub main rotor system. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *MILITARY HELICOPTERS
DE- ANTITANK MISSILES; WEAPON SYSTEMS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01790954
AN- <AEROSPACE> A89-20745
TI- The V-22 - 'Am I gonna like it?'
AU- LAWRENCE, WILLIAM S. (U.S. Navy, Naval Air Systems Command, Washington, DC)
SO- Vertiflite (ISSN 0042-4455), vol. 34, Nov.-Dec. 1988, p. 51-55.
PY- 1988
PD- 198812
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- Full flight testing of the V-22 tilt-rotor VTOL aircraft will require about four years; this developmental testing will encompass performance and flying qualities, systems operability in combat and other hazardous conditions, structural durability, and propulsion reliability and maintainability. In order to accomplish this test program, six instrumented aircraft are undergoing preparation and will be assigned to geographically and climatologically appropriate test sites throughout the U.S. Attention is presently given to flight control and cockpit instrumentation features that will be important to the success of developmental flight testing. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *FLIGHT TESTS; *V-22 AIRCRAFT
DE- TILT ROTOR RESEARCH AIRCRAFT PROGRAM; VERTICAL TAKEOFF AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01789144
AN- <AEROSPACE> A89-18935
TI- Boeing Model 360 Advanced Technology Helicopter - Design features and flight test update
AU- HARTMAN, LAWRENCE J.; MECKLIN, RON; WIESNER, ROBERT
SO- AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Paper. 8 p.
PY- 1988

PD- 198806
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- This paper describes the design feature and fabrication methods involved in the Boeing Model 360 Advanced Technology Helicopter. The high-performance rotor, dry composite hub, composite upper controls, composite drive shafts, low-drag composite fuselage, vibration isolation system, integrated avionics system, and automatic flight control system are addressed. The flight test program is discussed, including the airborne instrumentation, aeromechanical stability, drive system verification, envelope expansion, performance, acoustics, and vibration are examined. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONSTRUCTION MATERIALS; *BOEING AIRCRAFT; *FLIGHT TESTS; *HELICOPTER DESIGN
DE- AIRCRAFT STABILITY; AUTOMATIC FLIGHT CONTROL; AVIONICS; HELICOPTER PERFORMANCE; ROTARY WINGS; VIBRATION ISOLATORS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01789114
AN- <AEROSPACE> A89-18905
TI- A comparison between various side-arm controller configurations in a fly-by-wire helicopter
AU- MORGAN, J. M. (National Research Council of Canada, Flight Research Laboratory, Ottawa)
SO- IN: AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings (A89-18851 06-01). Alexandria, VA, American Helicopter Society, 1988, p. 635-648. DND-supported research.
PY- 1988
PD- 198800
RF- 6
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- A piloted experiment was flown in the National Aeronautical Establishment variable stability Bell 205A-1 to examine the effects on both handling qualities and pilot performance of varying control configurations when using multi-axis sidestick controllers. Two types of controller were used in fully and partially integrated configurations, conventional controls were also evaluated in the same study to provide direct comparisons between the inceptor types. The flight control systems comprised rate command in pitch and roll, rate command heading hold in yaw and simple direct drive for collective. In general the data suggest that there was no clear or obvious preference for any particular inceptor or configuration. The performance analyses indicate that there was no significant change in the pilot's control capabilities as controllers or configurations were changed. (Author)
SF- AIAA
DE- <MAJOR> *CONTROL SYSTEMS DESIGN; *FLY BY WIRE CONTROL; *HELICOPTER CONTROL
DE- ACTIVE CONTROL; BLOCK DIAGRAMS; CONTROLLABILITY; PITCH (INCLINATION); ROLL
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01789080
AN- <AEROSPACE> A89-18871
TI- Helicopter vibration analysis and control
AU- CLAY, DALE (McDonnell Douglas Helicopter Co., Mesa, AZ); CHADWICK, JIM (Chadwick-Helmuth Co., Inc., El Monte, CA)
SO- IN: AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings (A89-18851 06-01). Alexandria, VA, American Helicopter Society, 1988, p. 243-250.
PY- 1988
PD- 198800
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- The present evaluation of available methods for helicopter vibration characteristics' determination-and-control projects prospective, Higher Harmonic Control (HHC) systems in light of both observed technology-performance trends and the features and capabilities of the

recently implemented OH-6A helicopter HHC system. In the OH-6A, the HHC hydraulic actuators have been placed in parallel with the existing control system to allow fail-safe reversion in the event of hydraulic failure. Attention is given to the effects of HHC on blade and pitch-link loads, tail boom vibrations, and transient maeuvers. (O.C.)
SF- AIAA
DE- <MAJOR> *FATIGUE LIFE; *HELICOPTER PERFORMANCE; *STRUCTURAL VIBRATION;
*VIBRATION DAMPING
DE- AIRCRAFT MAINTENANCE; HUMAN FACTORS ENGINEERING; LIFE CYCLE COSTS;
VIBRATION MEASUREMENT
SH- 7539 Structural Mechanics (1975-)

AN- <DIALOG> 01789077
AN- <AEROSPACE> A89-18868
TI- Airborne integrated monitoring system
AU- NEUBAUER, ALBERT H., JR. (Teledyne Controls, Los Angeles, CA)
SO- IN: AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings (A89-18851 06-01). Alexandria, VA, American Helicopter Society, 1988, p. 227-232.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- Goals and tasks of the onboard monitoring techniques to be implemented in the V-22 tiltrotor aircraft are discussed with a view to input and output signal interface goals and the microprocessor and memory technology required for successful implementation. Memory and recording call for solid-state nonvolatile devices able to furnish error-free, long-lasting data storage while withstanding hostile environments. Aircraft sensors will furnish the basic data analyzed and formatted by the monitoring system processor; the display of pertinent information for review by the flight crew is usually controlled by the primary flight computer via the system bus. (O.C.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *CHECKOUT; *FLIGHT SAFETY; *SYSTEMS INTEGRATION;
*TILT ROTOR AIRCRAFT
DE- AIRCRAFT INSTRUMENTS; AIRCRAFT MAINTENANCE; HELICOPTER ENGINES; ONBOARD
DATA PROCESSING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01789076
AN- <AEROSPACE> A89-18867
TI- Dynamic perspective displays and the control of tilt-rotor aircraft in simulated flight
AU- BENNETT, C. T.; JOHNSON, W. W. (NASA, Ames Research Center, Moffett Field, CA); O'DONNELL, K. A. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings (A89-18851 06-01). Alexandria, VA, American Helicopter Society, 1988, p. 219-226.
PY- 1988
PD- 198800
RF- 28
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- Two simulations were conducted to study the effect of dynamic perspective displays on performance measures collected during simulated flight. The first study was a pure altitude regulation task with simple first order plant dynamics. In the second simulation, pilots performed two basic rotary-wing flight tasks with dynamic perspective displays projected out-the-window (panoramic head up display) or on a panel mounted simulation of a sensor display. The data from the two studies, taken together, show that when such displays are used during flight, they will not degrade performance; and, under certain display configurations, they will minimize flight control errors. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *FLIGHT SIMULATION; *HEAD-UP DISPLAYS; *HELMET MOUNTED DISPLAYS; *SYSTEMS ENGINEERING; *TILT ROTOR AIRCRAFT
DE- ALTITUDE CONTROL; ERROR ANALYSIS; FIELD OF VIEW; HOVERING; PILOT PERFORMANCE

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01789075
AN- <AEROSPACE> A89-18866
TI- Rotorcraft pilot's associate
AU- TELLES, DAVID G.; WASSON, JAMES W. (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings (A89-18851 06-01). Alexandria, VA, American Helicopter Society, 1988, p. 213-218.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8906
AB- The Advanced Rotorcraft Technology Integration program sponsored by the U.S. Army's LHX Project Manager has formulated the characteristics of an AI technology-based Rotorcraft Pilot's Associate (RPA) which would proceed to reduce not only the overall piloting workload, but the cognitive workload of the pilot, as well. The RPA is based on a real-time implementation of cooperating expert systems capable of digesting large quantities of battlefield data and presenting clearly-defined recommendations to the pilot. (O.C.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *EXPERT SYSTEMS; *PILOT PERFORMANCE; *ROTORCRAFT AIRCRAFT; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMBAT; DECISION MAKING; SYSTEMS INTEGRATION; TECHNOLOGY ASSESSMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01789060
AN- <AEROSPACE> A89-18851
TI- AHS, Annual Forum, 44th, Washington, DC, June 16-18, 1988, Proceedings
SO- Forum sponsored by AHS. Alexandria, VA, American Helicopter Society, 1988, 910 p. For individual items see A89-18852 to A89-18930.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8906
AB- The present conference discusses topics in helicopter and tilt-rotor vehicle aerodynamics, military operations, avionics and systems, product-support, structural dynamics, structures and materials, configuration design, manufacturing method and product assurance, handling qualities, acoustics, advanced propulsion, and testing and evaluation methods. Attention is given to rotor/airframe interaction in tilt-rotor aircraft, the evolution of the V-22 tilt-rotor toward ASW, airframe and propulsion assessment for the LHX, human factors in the V-22's cockpit design, helicopter vibration analysis and control, structural dynamics of a helicopter rotor blade system, and five candidate designs for civil tilt-rotor aircraft. Also discussed are the processing and properties of Al-Li alloys, the aeroelastic optimization of a helicopter rotor, the determination of control laws for a single-pilot helicopter, the sand and ice ingestion behavior of dual centrifugal compressors, active acoustical control for cylindrical fuselage structures, and air-to-air combat helicopter development. (O.C.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *HELICOPTER DESIGN; *HELICOPTER PERFORMANCE; *ROTOR AERODYNAMICS
DE- AEROACOUSTICS; AIRCRAFT CONSTRUCTION MATERIALS; AIRCRAFT INSTRUMENTS; AIRCRAFT RELIABILITY; AVIONICS; DYNAMIC STRUCTURAL ANALYSIS; ICE FORMATION; LIGHT HELICOPTERS; MANUFACTURING; MILITARY HELICOPTERS; PERFORMANCE TESTS; ROTOR BODY INTERACTIONS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01788260
AN- <AEROSPACE> A89-18051
TI- AIAA/IEEE Digital Avionics Systems Conference, 8th, San Jose, CA, Oct. 17-20, 1988, Technical Papers. Parts 1 & 2
SO- Conference sponsored by AIAA and IEEE. Washington, DC, American Institute of Aeronautics and Astronautics, 1988, p. Pt. 1, 461 p.; pt. 2, 467 p. For individual items see A89-18052 to A89-18113, A89-18115 to A89-18188.
PY- 1988
PD- 198800

LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8905
AB- Various papers on avionics systems are presented. The general topics discussed include: modular avionics, design for testability, systems engineering methods and tools, vehicle management systems, Japanese avionics, pilot-vehicle interface, advanced aviation for next generation aircraft, fault-tolerant avionics, Ada applications, commercial avionics, rotorcraft avionics, optical technology and systems, advanced architecture and processing, and management techniques for software development. Also addressed are: European avionics, general aviation avionics, crew station technology, space systems, sensor signal processing, software verification and quality assurance, data link, data bus, embedded processors and operating systems, communication/navigation/identification systems, artificial intelligence and expert systems, application-specific integrated circuits, and 32-bit microprocessors. (C.D.)
SF- AIAA
DE- <MAJOR> *AEROSPACE SYSTEMS; *ASTRIONICS; *AVIONICS; *CONFERENCES; *DIGITAL SYSTEMS
DE- AIRBORNE/SPACEBORNE COMPUTERS; AIRCRAFT EQUIPMENT; APPLICATION SPECIFIC INTEGRATED CIRCUITS; ARTIFICIAL INTELLIGENCE; DATA LINKS; ELECTRONIC EQUIPMENT TESTS; EXPERT SYSTEMS; FAULT TOLERANCE; PILOT PERFORMANCE; SIGNAL PROCESSING; SPACECRAFT ELECTRONIC EQUIPMENT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01782616
AN- <AEROSPACE> A89-12407
TI- An integration approach for rotorcraft pilot's associates
AU- DOTY, C. F. (Boeing Helicopters, Philadelphia, PA)
SO- IN: Automation applications for rotorcraft; Proceedings of the National Specialists' Meeting, Atlanta, GA, Apr. 4-6, 1988. Alexandria, VA, American Helicopter Society, 1988, 8 p.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8902
AB- A technology-integration effort has been mounted on behalf of a semiautonomous Rotorcraft Pilot's Associate (RPA) capable of interjecting a clear understanding of a military helicopter's tactical situation between intrusive interruptions and a pilot. Both pilot workload reductions and mission success enhancements are anticipated from RPA incorporation; in particular, an RPA with a core route planner can be designed to merge mission and tactical plans with current navigation data, furnishing a dynamic prioritization of information for the pilot's use. Since modular design and development techniques are employable, extensive redesign of existing automated systems is not required for RPA realization. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *PILOT PERFORMANCE; *ROTORCRAFT AIRCRAFT
DE- MILITARY HELICOPTERS; SYSTEMS INTEGRATION
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01782615
AN- <AEROSPACE> A89-12406
TI- Mission engineering for a pilot's associate
AU- RHOADES, RONALD G. (BDM Corp., Information Sciences Technology Div., Arlington, VA)
SO- IN: Automation applications for rotorcraft; Proceedings of the National Specialists' Meeting, Atlanta, GA, Apr. 4-6, 1988. Alexandria, VA, American Helicopter Society, 1988, 8 p.
PY- 1988
PD- 198800
RF- 6
CN- DAAJ02-87-C-0025
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8902
AB- The DARPA/USAF Pilot's Associate (PA) technology-base and exploratory development program has undertaken the examination of methodologies for man-in-the-loop AI systems capable of enhancing military aircrew performance. The sensor-integration and data-fusion tasks entailed by PA development are currently intractable, and are only simulated for

the purposes of developmental consideration. Aircraft 'exchange ratios' in combat and the associated probability of survival are the two primary metrics that must be positively satisfied by PAs, reflecting the need of modest numbers of highly sophisticated combat aircraft to prevail against large numbers of less sophisticated aggressors. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *MISSION PLANNING; *PILOT PERFORMANCE
DE- MAN MACHINE SYSTEMS; MILITARY HELICOPTERS
SH- 7566 Systems Analysis (1975-)

AN- <DIALOG> 01782613
AN- <AEROSPACE> A89-12404
TI- Speech recognition in advanced rotorcraft - Using speech controls to reduce manual control overload
AU- VIDULICH, MICHAEL A. (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH); BORTOLUSSI, MICHAEL R. (Western Aerospace Laboratories, Inc., Moffett Field, CA)
CS- Aerospace Medical Research Labs., Wright-Patterson AFB, OH.
CS- <CODE> AG749748
SO- IN: Automation applications for rotorcraft; Proceedings of the National Specialists' Meeting, Atlanta, GA, Apr. 4-6, 1988. Alexandria, VA, American Helicopter Society, 1988, 10 p.
PY- 1988
PD- 198800
RF- 14
CN- NCC2-486
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8902
AB- An experiment has been conducted to ascertain the usefulness of helicopter pilot speech controls and their effect on time-sharing performance, under the impetus of multiple-resource theories of attention which predict that time-sharing should be more efficient with mixed manual and speech controls than with all-manual ones. The test simulation involved an advanced, single-pilot scout/attack helicopter. Performance and subjective workload levels obtained supported the claimed utility of speech recognition-based controls; specifically, time-sharing performance was improved while preparing a data-burst transmission of information during helicopter hover. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *ROTORCRAFT AIRCRAFT; *SPEECH RECOGNITION;
*VOICE CONTROL
DE- MILITARY HELICOPTERS; PILOT PERFORMANCE
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01782611
AN- <AEROSPACE> A89-12402
TI- The NOE pilot's associate - A job description
AU- LAPPOS, NICK (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT)
SO- IN: Automation applications for rotorcraft; Proceedings of the National Specialists' Meeting, Atlanta, GA, Apr. 4-6, 1988. Alexandria, VA, American Helicopter Society, 1988, 8 p.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8902
AB- The increasing demands of NOE military helicopter operations entail reduced margins-of-error, reduced knowledge of the overall situation, reduced visual and electrooptical event horizons, and reduced capability for tactical communication and control. Attention is presently given to emerging possibilities for the automation of helicopter crew burdens in NOE operations, and the consequent expansion of capabilities expected. AI techniques are applied to communications and monitoring tasks, subsystem diagnostics and healing, the integration of system controls, and tactical planning and orientation. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE
DE- AIRCRAFT SURVIVABILITY; COMBAT
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01781488
AN- <AEROSPACE> A89-11279
TI- An analysis of noise-induced hearing loss in army helicopter pilots

AU- FITZPATRICK, DANIEL T. (Hawaii, University, Manoa; U.S. Army, Flight Surgeons Office, Schofield Barracks, HI)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 59, Oct. 1988, p. 937-941.
PY- 1988
PD- 198810
RF- 12
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8901
AB- This study was conducted to determine the relative contribution of age, total flight hours, type of aircraft, and the use of hearing protection to hearing loss in U.S. Army aviators. Information from a survey of the aviators in an aviation brigade was combined with audiometric records to create the data file. The final study group, 83 percent of the unit aviators, was evaluated for hearing loss using two criteria: (1) existing U.S. army standards, and (2) four empirical categories of significant threshold shift. Data analysis suggests that hearing loss is primarily a function of noise exposure as measured by total flight hours. Age was found to be a less significant factor; aircraft type had no significant effect. The results indicate that combination hearing protection appears to significantly lower the risk of hearing loss. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *AUDITORY DEFECTS; *MILITARY HELICOPTERS; *NOISE GENERATORS; *PILOT PERFORMANCE
DE- AEROSPACE MEDICINE; ARMED FORCES (UNITED STATES); ROTARY WINGS; STRUCTURAL VIBRATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01780804
AN- <AEROSPACE> A89-10595
TI- Simulation facilities compatibility in design for compatibility in space
AU- MCKINNON, MURDOCH; WHITE, LES (CAE Electronics, Ltd., Montreal, Canada)

SO- IN: Aerospace Behavioral Engineering Technology Conference, 6th, Long Beach, CA, Oct. 5-8, 1987, Proceedings (A89-10576 01-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1988, p. 181-187.
PY- 1988
PD- 198800
RN- SAE PAPER 871716
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8901
AB- This paper considers simulation facilities related to space development, with special attention given to the major design and performance features of the Canada's Aft Crew Station Simulation Facility SIMFAC (which was built to support the development of the Shuttle Remote Manipulator System) and those of EUROSIUM, which is the simulation facility being currently developed to support the European Space Program. Consideration is also given to the simulation facility of the Mobile Servicing System, which will be required to interact with other elements of the Space Station and which will have both autonomous and telerobotic modes. A parallel is drawn between these simulation facilities and the Crew Station Research and Development Facility developed recently as a design and evaluation tool for future helicopter designs, whose workload and task evaluation facilities and the technology used may serve as examples for space simulation design. (I.S.)
SF- AIAA
DE- <MAJOR> *CANADIAN SPACE PROGRAM; *CREW WORKSTATIONS; *SPACE ENVIRONMENT SIMULATION; *SPACE STATIONS
DE- COMPATIBILITY; COMPUTER AIDED DESIGN; DESIGN ANALYSIS; HUMAN FACTORS ENGINEERING; MANIPULATORS; TELEROBOTICS
SH- 7514 Ground Support Systems & Facilities--Space (1975-)

AN- <DIALOG> 01780785
AN- <AEROSPACE> A89-10576
TI- Aerospace Behavioral Engineering Technology Conference, 6th, Long Beach, CA, Oct. 5-8, 1987, Proceedings
SO- Conference sponsored by SAE. Warrendale, PA, Society of Automotive Engineers, Inc. (SAE P-200), 1988, 418 p. For individual items see A89-10577 to A89-10600.
PY- 1988
PD- 198800
RN- SAE P-200

LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8901
AB- The proceedings discuss topics on human behavioral technology, simulation tasks, and flight operations that include work load, crew fitness, voice technology, commercial transport, image quality and electronic display, on-board systems for enhancing pilot situation awareness, advanced displays, cockpit automation, and the capabilities and requirements of the simulation of space operations. Papers are presented on pilot workload prediction, current military/government applications for speech recognition, image quality and visual simulation of color matrix displays, and physiological adaptation in space. Consideration is also given to the effects of video and symbology dynamics on pilot performance, a status report on the FAA low-visibility simulation, Langley Research Center resources and needs for manned space operations simulation, space simulation using computer generated imagery, fly-by-wire sidestick controller evaluation, and the airline pilots' view of interfacing with new technology in the modern flight deck. (I.S.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *CONFERENCES; *HUMAN BEHAVIOR; *MAN-COMPUTER INTERFACE
DE- AIR TRAFFIC CONTROL; AUTOMATION; AVIONICS; COCKPITS; COMMERCIAL AIRCRAFT; DISPLAY DEVICES; FLIGHT CREWS; FLY BY WIRE CONTROL; HELICOPTERS; LIQUID CRYSTALS; PILOTS (PERSONNEL); PSYCHOPHYSIOLOGY; SPACE ENVIRONMENT SIMULATION; SPEECH RECOGNITION; STRESS (PSYCHOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01775995
AN- <AEROSPACE> N88-26345
TI- Aircraft accident report: Joe Foster Excavating, Inc., Bell 206B, N49606, in-flight collision with trees, Alamo, California, August 3, 1986
CS- National Transportation Safety Board, Washington, DC.
CS- <CODE> NN052488
PY- 1988
PD- 198805
PG- 27P.
RN- PB88-910405; NTSB/AAR-88/04
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8820
AB- On August 3, 1986, at 1235 Pacific daylight saving time, a Bell 206B helicopter, N49606, owned and operated by Joe Foster Excavating, Inc., Danville, California, crashed in a wooded area in Alamo, California, while circling a residence. Visual meteorological conditions prevailed at the time. The pilot and passenger, the owner of the helicopter, sustained fatal injuries; the helicopter was destroyed. The National Transportation Safety Board determines that the probable cause of this accident was the pilot's incapacitation resulting from a myocardial event. Contributing to the cause of the accident was the pilot's failure to comply with the provisions of both his medical and pilot certificates and the inadequate procedures used by the Federal Air Surgeon to medically recertify the pilot. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *HELICOPTERS; *MYOCARDIAL INFARCTION; *PILOT PERFORMANCE
DE- CERTIFICATION; METEOROLOGICAL PARAMETERS; PHYSICAL EXAMINATIONS
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01774352
AN- <AEROSPACE> N88-24635
TI- Evaluation of the US Army fitting program for the integrated helmet unit of the integrated helmet and display sighting system
AU- RASH, CLARENCE E.; MARTIN, JOHN S.; GOWER, DANIEL W., JR.; LICINA, JOSEPH R.; BARSON, JOHN V.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1987
PD- 198707
PG- 80P.
RN- AD-A191616; USAARL-87-8
LA- English
GL- United States
CP- United States

DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR8818
AB- In June 1985, the US Army began fielding a new aircraft known as the Advanced Attack Helicopter, the AH-64. Integral to this new aircraft is a monocular helmet-mounted display system, the Integrated Helmet and Display Sighting System (IHADSS). Along with various electronic components, the IHADSS includes a helmet referred to as the Integrated Helmet Unit (IHU). The purpose of the IHU is to provide the aviator with basic impact and noise protection. In addition, it serves as a platform for the display system, composed of a miniature, 1-inch diameter, Cathode Ray Tube (CRT) and an optical relay device, the Helmet Display Unit (HDU). The basic fitting process involves numerous steps including, but not limited to, adjustments to the suspension system, proper location and alignment to the HDU, and final trimming of the helmet visor to accommodate the HDU when in the operating position. The objectives of the fitting procedure are to: a) obtain a comfortable, stable fit of the IHU, which will enable the aviator to achieve the maximum field-of-view provided by the HDU when it is mounted on the helmet and b) achieve boresight, which permits accurate engagement of weapons systems. This report documents the fitting program established at USAARL, its successes and deficiencies, and presents recommendations for designing a fitting program which, will ensure that the man-machine interface, as provided by the helmet, is optimized. (DTIC)
SF- DTIC
DE- <MAJOR> *FITTING; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *IMPACT RESISTANCE; *NOISE REDUCTION
DE- AH-64 HELICOPTER; CATHODE RAY TUBES; EYE PROTECTION; LINE OF SIGHT; MAN MACHINE SYSTEMS; OPTICAL RELAY SYSTEMS; SYSTEMS INTEGRATION; VISORS
SH- <COSATI> 25C Non-Radio Communications
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01766443
AN- <AEROSPACE> N88-16692
TI- Helicopters as test carriers for avionics systems (HETAS)
TI- <ORIGINAL> HETAS: HUBSCHRAUBER ALS ERPROBUNGSTRAEGER FUER AVIONIK-SYSTEME
TI- <SUPPLEMENT> Final Report
AU- BENDER, K.; DANNEBERG, E.; DIERKE, R.; HAEHNLEIN, G.; MANSFELD, G.; TERSTEEGEN, J.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugfuehrung.
CS- <CODE> DO696666
PY- 1985
PD- 198510
PG- 28P.
RN- DFVLR-IB-112-85/18; LVL-8302-I-2; ETN-88-91013
LA- German
GL- Germany
CP- Germany
DT- REPORT
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8809
AB- The HETAS integrated test bed for avionics systems in human engineering, digital control engineering, and sensors is presented. The flight test system, including helicopter test carrier, systems concept, and integrated flight test system, is described. The ground test system, including helicopter simulation, cockpit, and redundant fly-by-wire system are described. (ESA)
DE- <MAJOR> *AIRBORNE EQUIPMENT; *AVIONICS; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE; *HELICOPTERS; *PERFORMANCE TESTS
DE- COCKPITS; CONTROL SYSTEMS DESIGN; FLIGHT TEST VEHICLES; FLIGHT TESTS; FLY BY WIRE CONTROL; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01766402
AN- <AEROSPACE> N88-16651
TI- Status of NASA/Army rotorcraft research and development piloted flight simulation
AU- CONDON, GREGORY W. (National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.); GOSSETT, TERRENCE D. (Army Aviation Systems Command, Moffett Field, Calif.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1988
PD- 198802

NT- In NASA, Washington, NASA/Army Rotorcraft Technology. Volume 3: Systems Integration, Research Aircraft, and Industry p 1119-1153 (SEE N88-16650 09-01)
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR8809
AB- The status of the major NASA/Army capabilities in piloted rotorcraft flight simulation is reviewed. The requirements for research and development piloted simulation are addressed as well as the capabilities and technologies that are currently available or are being developed by NASA and the Army at Ames. The application of revolutionary advances (in visual scene, electronic cockpits, motion, and modelling of interactive mission environments and/or vehicle systems) to the NASA/Army facilities are also addressed. Particular attention is devoted to the major advances made in integrating these individual capabilities into fully integrated simulation environment that were or are being applied to new rotorcraft mission requirements. The specific simulators discussed are the Vertical Motion Simulator and the Crew Station Research and Development Facility. (Author)
DE- <MAJOR> *COCKPIT SIMULATORS; *FLIGHT SIMULATION; *HELICOPTERS; *PILOT PERFORMANCE; *VERTICAL MOTION SIMULATORS
DE- COMPUTER TECHNIQUES; FLIGHT CHARACTERISTICS; FLIGHT PATHS; LIGHT AIRCRAFT; MISSION PLANNING; SYSTEMS INTEGRATION; VISUAL PERCEPTION
SH- <COSATI> 14B Laboratories, Test Facilities, & Test Equipment
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01766383
AN- <AEROSPACE> N88-16632
TI- NASA/Army Rotorcraft Technology. Volume 2: Materials and Structures, Propulsion and Drive Systems, Flight Dynamics and Control, and Acoustics
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1988
PD- 198802
PG- 587P.
NT- Conference held at Moffett Field, Calif., 17-19 Mar. 1987
RN- NASA-CP-2495-VOL-2; NAS 1.55:2495-VOL-2
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A25/MF A06
JA- STAR8809
AB- The Conference Proceedings is a compilation of over 30 technical papers presented which report on the advances in rotorcraft technical knowledge resulting from NASA, Army, and industry research programs over the last 5 to 10 years. Topics addressed in this volume include: materials and structures; propulsion and drive systems; flight dynamics and control; and acoustics. For individual titles, see N88-16633 through N88-16649.
DE- <MAJOR> *AEROACOUSTICS; *AIRCRAFT DESIGN; *CONFERENCES; *CONTROLLABILITY; *ENGINE DESIGN; *FRACTURE MECHANICS; *HELICOPTERS; *ROTOR AERODYNAMICS
DE- COMPOSITE STRUCTURES; CONTROL THEORY; CRASHWORTHINESS; FATIGUE (MATERIALS); GAS TURBINE ENGINES; HUMAN FACTORS ENGINEERING; ICE FORMATION
SH- <COSATI> 1B Aeronautics
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01763845
AN- <AEROSPACE> N88-14087
TI- Aircraft accident report: Grand Canyon Airlines, Inc., and Helitech, Inc., midair collision over Grand Canyon National Park, June 18, 1986
CS- National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
CS- <CODE> NN052488
PY- 1987
PD- 198707
PG- 68P.
RN- PB87-910403; NTSB/AAR-87/03
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR8806

AB- The National Transportation Safety Board determines that the probable cause of the accident was the failure of the flightcrews of both aircraft to see and avoid each other for undetermined reasons. Contributing to the accident was the failure of the Federal Aviation Administration to exercise its oversight responsibility over flight operations in the Grand Canyon airspace and the actions of the National Park Service to influence the selection of routes by the Canyon scenic tour operators. Also contributing to the accident was the modification and configuration of the routes of the rotary wing operators resulting in their intersecting with the routes of Grand Canyon Airlines near Crystal Rapids. (Author)
DE- <MAJOR> *ACCIDENT INVESTIGATION; *ACCIDENTS; *CIVIL AVIATION; *HELICOPTERS; *PILOTS (PERSONNEL)
DE- ARIZONA; GRAND CANYON (AZ); PILOT PERFORMANCE; REGULATIONS
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01762694
AN- <AEROSPACE> N88-12932
TI- CGI delay compensation
AU- MCFARLAND, RICHARD E.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1986
PD- 198601
PG- 30P.
CN- RTOP 505-42-71
RN- NASA-TM-86703; REPT-85168; NAS 1.15:86703
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8804
AB- Computer-generated graphics in real-time helicopter simulation produces objectionable scene-presentation time delays. In the flight simulation laboratory at Ames Research Center, it has been determined that these delays have an adverse influence on pilot performance during aggressive tasks such as nap-of-the-earth (NOE) maneuvers. Using contemporary equipment, computer-generated image (CGI) time delays are an unavoidable consequence of the operations required for scene generation. However, providing that magnitide distortions at higher frequencies are tolerable, delay compensation is possible over a restricted frequency range. This range, assumed to have an upper limit of perhaps 10 or 15 rad/sec, conforms approximately to the bandwidth associated with helicopter handling qualities research. A compensation algorithm is introduced here and evaluated in terms of tradeoffs in frequency responses. The algorithm has a discrete basis and accommodates both a large, constant transport delay interval and a periodic delay interval, as associated with asynchronous operations. (Author)
DE- <MAJOR> *COMPUTER GRAPHICS; *FLIGHT SIMULATION; *INSTRUMENT COMPENSATION; *PILOT PERFORMANCE; *TIME LAG
DE- ALGORITHMS; ERROR ANALYSIS; HELICOPTER PERFORMANCE; MAN MACHINE SYSTEMS
; REAL TIME OPERATION; TASK COMPLEXITY; TRANSFER FUNCTIONS
SH- <COSATI> 9B Fluidics and Fluerics
SH- 7560 Computer Operations & Hardware (1975-)

AN- <DIALOG> 01761421
AN- <AEROSPACE> N88-11655
TI- MBB simulation facilities applied for rotorcraft research
AU- KRAUSEP, PETER; VANGAASBEEK, JAMES; BORCHERT, HORST
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany).
CS- <CODE> MT618891
PY- 1987
PD- 198706
NT- In AGARD, Rotorcraft Design for Operations 17 p (SEE N88-11649 03-05)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR8803
AB- The increasing pilot workload and environmental conditions of modern military helicopters necessitate detailed assessment of cockpit designs with regard to controls and displays. The optimization must be performed at the initialization of the concept to insure a harmonic design with minimum pilot workload. The status of the MBB Munich flight simulation facility is examined closely in light of these challenging requirements. Projections of the future development of the simulation center components are depicted, as well as priorities. (Author)
DE- <MAJOR> *AIRCRAFT DESIGN; *COCKPITS; *DISPLAY DEVICES; *FLIGHT

CHARACTERISTICS; *FLIGHT SIMULATORS; *MILITARY HELICOPTERS; *RESEARCH
FACILITIES
DE- CONTROLLERS; HUMAN FACTORS ENGINEERING; OPTIMIZATION; SPECIFICATIONS;
WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01759627
AN- <AEROSPACE> A88-55338
TI- Simulation facilities for aerospace design
AU- MCKINNON, MURDOCH; WHITE, LESLIE; LIPPAY, ANDREW (CAE Electronics, Ltd., Saint Laurent, Canada)
SO- IAF, International Astronautical Congress, 39th, Bangalore, India, Oct. 8-15, 1988. 8 p.
PY- 1988
PD- 198810
RN- IAF PAPER 88-090
LA- English
GL- Canada
CP- International Organization
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8824
AB- Examples of aerospace simulation facilities are presented, focusing on the use of computer and software technology. The blade element rotor model for helicopter simulation, the U.S. Army's Crew Station Research and Development Facility, and the Manipulator Development and Simulation Facility of the Canadian Mobile Servicing System are examined. The requirements of simulating manned space flights are discussed, including interface standardization and compatibility. The use of a simulator for total program support is considered. (R.B.)
SF- AIAA
DE- <MAJOR> *COMPUTERIZED SIMULATION; *MAN-COMPUTER INTERFACE; *SPACE
ENVIRONMENT SIMULATION; *SPACE STATIONS; *TRAINING SIMULATORS
DE- HUMAN FACTORS ENGINEERING; MISSION PLANNING; PERFORMANCE PREDICTION;
ROBOTICS; SYSTEMS INTEGRATION; TELEOPERATORS
SH- 7514 Ground Support Systems & Facilities--Space (1975-)

AN- <DIALOG> 01757956
AN- <AEROSPACE> A88-53667
TI- The effect of perspective displays on altitude and stability control in simulated rotary wing flight
AU- O'DONNELL, K. A. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); JOHNSON, W. W.; BENNETT, C. T. (NASA, Ames Research Center, Moffett Field, CA)
CS- Army Aviation Research and Development Command, Moffett Field, CA.
CS- <CODE> AZ143936
SO- IN: AIAA, Flight Simulation Technologies Conference, Atlanta, GA, Sept. 7-9, 1988, Technical Papers (A88-53626 23-09). Washington, DC, American Institute of Aeronautics and Astronautics, 1988, p. 325-331.
PY- 1988
PD- 198800
RF- 7
RN- AIAA PAPER 88-4634
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8823
AB- The effect of perspective displays on flight performance is investigated using two simulation experiments. In the first, a perspective grid display was superimposed on computer-generated terrain and subjects attempted to maintain their initial attitude in a simulated hover using terrain and/or one of four grid patterns. Horizontal lines produced the best attitude control performance. In the second experiment, a square grid was studied in combination with various visual display configurations and grid attachment conditions. It was found that performance with the panel-mounted display was significantly worse than with the out-the-window or helmet-mounted displays. The results suggested that the partial grid attachment condition improved hovering performance with the panel-mounted display. (K.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *ALTITUDE CONTROL; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *VISUAL PERCEPTION
DE- COCKPITS; COORDINATES; DISPLAY DEVICES; THREE DIMENSIONAL MODELS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01757948

AN- <AEROSPACE> A88-53659
TI- Determination of helicopter simulator time delay and its effects on air vehicle development
AU- WOLTKAMP, JOHN; RAMACHANDRAN, S.; BRANSON, ROGER (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AIAA, Flight Simulation Technologies Conference, Atlanta, GA, Sept. 7-9, 1988, Technical Papers (A88-53626 23-09). Washington, DC, American Institute of Aeronautics and Astronautics, 1988, p. 255-263.
PY- 1988
PD- 198800
RF- 34
RN- AIAA PAPER 88-4620
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8823
AB- The system architecture, techniques of measuring throughput delays, and results of a study to determine simulator hardware time delay are discussed. An average total system delay of about 87 milliseconds is found. An analysis of pilot performance did not reveal any significant changes due to increased simulator delays, but did show that the pilot control activity increased in the low-speed high-gain tasks. Although with increased time delay the Cooper-Harper rating increased (indicating degradation in perceived handling qualities), for the type of helicopter simulated, there was no definite time delay at which the ratings changed abruptly. (R.R.)
SF- AIAA
DE- <MAJOR> *COMPUTERIZED SIMULATION; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *TIME LAG; *TRAINING SIMULATORS
DE- BLOCK DIAGRAMS; MCDONNELL DOUGLAS AIRCRAFT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01756242
AN- <AEROSPACE> A88-51953
TI- Prediction and measurement of human pilot dynamic characteristics
AU- HESS, RONALD A. (California, University, Davis); REEDY, JAMES T.
CS- California Univ., Davis.
CS- <CODE> CC907079
SO- AIAA, AHS, and ASEE, Aircraft Design, Systems and Operations Meeting, Atlanta, GA, Sept. 7-9, 1988. 12 p.
PY- 1988
PD- 198809
RF- 7
CN- NCC2-241
RN- AIAA PAPER 88-4441
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8822
AB- An analytical and experimental study of human pilot control strategies in a manned rotorcraft simulation is described. The task simulated involves a low-speed, constant-altitude maneuvering task in which a head-down display is utilized to allow the pilot to track a moving hover point. The efficacy of the display law driving an 'acceleration symbol' is determined and the manner in which the prediction and measurement of pilot/vehicle dynamics can be made part of man/machine system evaluations is demonstrated. (Author)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *DYNAMIC CHARACTERISTICS; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *ROTARY WING AIRCRAFT
DE- AIRCRAFT MANEUVERS; FLIGHT CONTROL; TRANSFER FUNCTIONS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01756081
AN- <AEROSPACE> A88-51792
TI- Qualification and fleet introduction of the AH-1T flight loads and usage monitor
AU- SCHAEFER, CARL G., JR. (U.S. Navy, Naval Air Systems Command, Washington, DC)
SO- IN: Rotary wing test technology; Proceedings of the National Specialists' Meeting, Bridgeport, CT, Mar. 15, 16, 1988 (A88-51786 22-05). Alexandria, VA, American Helicopter Society, 1988, p. II-14 to II-19.
PY- 1988
PD- 198800
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA8822
AB- A survey has been conducted to collect a sizable database for the evaluation of the current attack helicopter usage spectrum. The survey includes the design and installation of an instrumentation system that monitors flight environmental loads and the operational mission usage of eight fleet Marine AH-1T (TOW) attack helicopters. The technical and operational evaluation of a flight data recorder for the AH-1T helicopter is described. This flight test effort is discussed together with some of the problems encountered, and the introduction of the system into the fleet. (K.K.)
SF- AIAA
DE- <MAJOR> *DYNAMIC STRUCTURAL ANALYSIS; *FATIGUE LIFE; *FLIGHT TESTS; *LOAD DISTRIBUTION (FORCES); *MILITARY HELICOPTERS
DE- AIRCRAFT MAINTENANCE; AIRCRAFT STRUCTURES; EXPERIMENT DESIGN; FLIGHT RECORDERS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01755789
AN- <AEROSPACE> A88-51500
TI- Design strategies for the development of a model helicopter rotor impedance test facility
AU- BIELAWA, RICHARD L. (Rensselaer Polytechnic Institute, Troy, NY); HSUEH, KENG D. (New York, State University, Plattsburgh)
SO- Vertica (ISSN 0360-5450), vol. 12, no. 1-2, 1988, p. 109-128.
PY- 1988
PD- 198800
RF- 19
SN- 0360-5450
CN- DAAG29-82-K-0093; DAAL03-86-G-0118
LA- English
GL- United States
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8822
AB- A model helicopter rotor impedance test facility is currently under construction which embodies novel design approaches in order to facilitate positive control of rotor hub fixity as well as the measurement of aeromechanical impedance. Attention is presently given to the results of analyses and their implementations, as well as the identification of the requisite data-processing algorithms and the selection of component hardware. The configuration of the apparatus encompasses a support pylon and vertical and lateral isolation systems, rotor hub instrumentation, data preprocessor and postprocessor systems, and a host computer. (O.C.)
SF- AIAA
DE- <MAJOR> *COMPUTER AIDED DESIGN; *HELICOPTER DESIGN; *IMPEDANCE MEASUREMENT; *MECHANICAL IMPEDANCE; *ROTARY WINGS; *TEST FACILITIES
DE- ALGORITHMS; DATA PROCESSING; ROTOR BODY INTERACTIONS; STRUCTURAL VIBRATION
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01755758
AN- <AEROSPACE> A88-51469
TI- An application of video as navigation system test instrumentation
AU- GIBBINGS, DAVID (Westland Helicopters, Ltd., Yeovil, England)
SO- IN: Society of Flight Test Engineers, Annual Symposium, 18th, Amsterdam, Netherlands, Sept. 28-Oct. 2, 1987, Proceedings (A88-51450 22-05). Lancaster, CA, Society of Flight Test Engineers, 1987, p. 21-1 to 21-5.
PY- 1987
PD- 198700
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8822
AB- A video system suitable for recording aircraft position operating over land in visual contact with the ground which is applicable to most low-speed aircraft and helicopters is proposed. The system uses a miniature video camera directed vertically downwards, and the installation includes a gyro-stabilized vertical datum, digital presentation of the instrumentation timebase, a video recorder, and an audio channel to record intercom. The components of the system and the work carried out to demonstrate achievable accuracy are discussed. The analysis and interpretation process is covered and some of the lessons learned from the existing demonstrator are included. An engineered version capable of easy installation is proposed, and a number of secondary applications for the system are discussed. (C.D.)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *AIRCRAFT EQUIPMENT; *FLIGHT TESTS;

*NAVIGATION INSTRUMENTS; *VIDEO EQUIPMENT
DE- CAMERAS; DOPPLER EFFECT; MONITORS; RADIO ALTIMETERS; VISUAL CONTROL
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01755739
AN- <AEROSPACE> A88-51450
TI- Society of Flight Test Engineers, Annual Symposium, 18th, Amsterdam, Netherlands, Sept. 28-Oct. 2, 1987, Proceedings
SO- Symposium organized by the Netherlands Association of Aeronautical Engineers; Sponsored by the Society of Flight Test Engineers. Lancaster, CA, Society of Flight Test Engineers, 1987, 372 p. For individual items see A88-51451 to A88-51486.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8822
AB- Various papers on flight testing are presented. Among the subjects considered are: new techniques in flight testing, update on rotorcraft icing technology, computational fluid dynamics in flight test, identification of aerodynamic coefficients by means of measured flight loads, identification of the DLC-flap system of the research aircraft ATTAS, modeling V/STOL takeoff performance, data acquisition system for the Fokker 100 test aircraft, airborne data monitoring system, image processing as a tool in flight test evaluation, application of video as navigation system test instrumentation. Also discussed are: electrooptical flight deflection measurement system, flight test of the Advanced Electromechanical Actuation System, electromagnetic compatibility and the flight test engineer, UDF flight test program, NATO E-3A production acceptance testing, certification flight tests of the Conair/Fokker F-27 Firefighter, Fokker-50 and Fokker-100 flight test program, U.S. Air Force Flight Test Center, inertial measurement of airfield performance, instrumentation for ULM and hang-glider flight tests, the Aeritalia solution for flight test data acquisition and processing, terrain-following subsystem testing and development of maneuver loads spectrum for F-7 aircraft. (C.D.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT TEST INSTRUMENTS; *FLIGHT TESTS; *SYSTEM IDENTIFICATION; *TECHNOLOGY ASSESSMENT
DE- AERODYNAMIC COEFFICIENTS; AIRBORNE EQUIPMENT; AIRCRAFT CONFIGURATIONS; AIRCRAFT MANEUVERS; AIRCRAFT STABILITY; AVIONICS; HELICOPTERS; MATHEMATICAL MODELS; MILITARY AIRCRAFT; NAVIGATION INSTRUMENTS; PROPULSION SYSTEM PERFORMANCE; ROTORCRAFT AIRCRAFT; TRANSPORT AIRCRAFT; TURBOJET ENGINES; TURBOPROP AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01755291
AN- <AEROSPACE> A88-51002
TI- Computational human factors in human-machine engineering - The Army-NASA aircrew/aircraft integration (A3I) program
AU- HARTZELL, E. JAMES (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); LAKOWSKE, STEPHEN (Sterling Software, Palo Alto, CA)
CS- Army Aviation Systems Command, Moffett Field, CA.
CS- <CODE> AZ153632
SO- IN: NAECON 88; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 23-27, 1988. Volume 3 (A88-50926 22-01). New York, Institute of Electrical and Electronics Engineers, 1988, p. 819-822.
PY- 1988
PD- 198800
RF- 5
CN- NAS2-11555
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8822
AB- The A3I program is a joint US Army-NASA exploratory program to develop a rational predictive methodology for helicopter cockpit system design, including mission requirements and training-system implications, that integrates human factors engineering with other vehicle system design disciplines at an early stage in the development process. The program will produce a prototye human factors/computer-aided engineering (HF/CAE) workstation suite for use by design professionals. This interactive environment will include computational and expert systems for the analysis and estimation of the impact of cockpit design and mission specification on system performance by considering the performance consequences from the human component of the system, especially as an integral part of the overall system operation, and

from the very beginning of the design process. The central issues of pilot workload, performance, and training needs, and appropriate uses of automation are interrelated to affect all integrated design considerations in future man-machine systems. The goal is to aid designers in understanding these complex interactions and in optimally matching human capabilities with advanced cockpit systems. (I.E.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DECISION MAKING; *FLIGHT CREWS; *HELICOPTER DESIGN;
*HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- MAN-COMPUTER INTERFACE; SYSTEMS INTEGRATION; WORKSTATIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01750734
AN- <AEROSPACE> A88-46445
TI- Simulation of an advanced scout attack helicopter for crew station studies
AU- LYPACZEWSKI, P. A. (CAE Electronics, Ltd., Montreal, Canada); JONES, A. D. (NASA, Ames Research Center, Moffett Field, CA); VOORHEES, J. W. (U.S. Army, Aviation Systems Command, Moffett Field, CA)
CS- CAE Electronics Ltd., Montreal (Quebec).
CS- <CODE> CA686947
SO- IN: The acquisition and use of flight simulation technology in aviation training; Proceedings of the International Conference, London, England, Apr. 27-29, 1987. Volume 2 (A88-46427 19-09). London, Royal Aeronautical Society, 1987, p. 391-399.
PY- 1987
PD- 198700
LA- English
GL- Canada
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8819
AB- The system complexity and high workload of the next generation of light scout/attack helicopters is being evaluated in the Crew Station Research and Development Program. This program has been established to study the issues of battle captain performance for one-man versus two-man crews when confronted by a hostile environment. The crew station experiments are described along with the facility elements and simulation. (B.J.)
SF- AIAA
DE- <MAJOR> *ATTACK AIRCRAFT; *FLIGHT CREWS; *FLIGHT SIMULATION; *MILITARY
HELICOPTERS; *PILOT PERFORMANCE
DE- AIR DEFENSE; AIRCRAFT NOISE; AVIATION PSYCHOLOGY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01750723
AN- <AEROSPACE> A88-46434
TI- FAA perspective on simulation progress and plans for advancement
AU- BOOTHE, EDWARD M. (FAA, Washington, DC)
SO- IN: The acquisition and use of flight simulation technology in aviation training; Proceedings of the International Conference, London, England, Apr. 27-29, 1987. Volume 2 (A88-46427 19-09). London, Royal Aeronautical Society, 1987, p. 187-201.
PY- 1987
PD- 198700
RF- 6
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8819
AB- The current status of FAA plans for simulation progress is reviewed with emphasis on an examination of the FAA Advanced Simulation Plan of 1980. Particular attention is given to criteria for advanced training devices and helicopter simulators. (B.J.)
SF- AIAA
DE- <MAJOR> *AIRLINE OPERATIONS; *FLIGHT SIMULATION; *PILOT TRAINING
DE- COST EFFECTIVENESS; HELICOPTERS; PILOT PERFORMANCE; POLICIES
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01750554
AN- <AEROSPACE> A88-46264
TI- Human factors of helicopter vibration. III - Assessment of vibration exposure
AU- GRIFFIN, MICHAEL J. (Southampton, University, England)
SO- IN: Helicopter vibration and its reduction; Proceedings of the Symposium, London, England, Nov. 16, 1987 (A88-46260 19-05). London, Royal Aeronautical Society, 1987, p. 50-69.
PY- 1987

PD- 198700
RF- 23
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8819
AB- This paper illustrates a method of assessing helicopter vibration with respect to human response. Representative vibration spectra in the fore-and-aft, lateral, and vertical directions on the pilot's seat, at the seat back, and on the floor are shown. Methods of quantifying the vibration in these nine axes with respect to comfort, health, and performance are defined. It is shown that the vibration varies in magnitude during a flight, and varies between aircraft of the same type. The effect of the seat on the transmission of vibration to the pilot is quantified. Methods of reducing the effects of helicopter vibration are considered. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *ROTARY WINGS;
*STRUCTURAL VIBRATION
DE- COMFORT; FLOORS; SEATS; VIBRATION DAMPING; VIBRATION PERCEPTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01750552
AN- <AEROSPACE> A88-46262
TI- Human factors of helicopter vibration. I - The physiological effects of vibration
AU- BARNES, G. R. (RAF, Institute of Aviation Medicine, Farnborough, England)
SO- IN: Helicopter vibration and its reduction; Proceedings of the Symposium, London, England, Nov. 16, 1987 (A88-46260 19-05). London, Royal Aeronautical Society, 1987, p. 20-30.
PY- 1987
PD- 198700
RF- 13
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8819
AB- The primary adverse effect of helicopter vibration on crew physiology is the induced movement of the head and shoulder girdle. Due to their differing viscoelastic properties, these respond to different frequency components of the vibration; in addition, they are underdamped and therefore perform exaggerated movements at their resonant frequencies. Visual performance is especially affected by vibration, because the head movements induced may result in considerable relative motion between eyes and visual displays. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *HUMAN FACTORS ENGINEERING; *PHYSIOLOGICAL EFFECTS; *VIBRATION PERCEPTION; *VIBRATORY LOADS
DE- BIODYNAMICS; EYE MOVEMENTS; HEAD (ANATOMY)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01750550
AN- <AEROSPACE> A88-46260
TI- Helicopter vibration and its reduction; Proceedings of the Symposium, London, England, Nov. 16, 1987
SO- Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1987, 154 p. For individual items see A88-46261 to A88-46270.
PY- 1987
PD- 198700
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA8819
AB- The present conference discusses the origin of helicopter vibration and its control methods, the physiological effects of helicopter vibration, effective automatic speech recognition methods in a helicopter vibration environment, and the assessment of helicopter vibration exposure in operators. Also discussed are civil helicopter operations; helicopter vibration control in the UK's fleet air arm; efficient rotor track and balance diagnostics; RAF vibration control methods; UK Army experience with the Lynx helicopter's head absorber; and helicopter vibration minimization through blade design, higher harmonic pitch, and active structural response control methods. (O.C.)
SF- AIAA
DE- <MAJOR> *AEROELASTICITY; *HELICOPTER CONTROL; *STRUCTURAL VIBRATION;
*VIBRATION DAMPING

DE- ACTIVE CONTROL; AIRSPEED; CIVIL AVIATION; HUMAN FACTORS ENGINEERING;
MILITARY HELICOPTERS; PHYSIOLOGICAL EFFECTS; ROTARY WINGS; SPEECH RECOGNITION; TEST FACILITIES; VIBRATION ISOLATORS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01749649
AN- <AEROSPACE> A88-45359
TI- HLA B27 positive helicopter pilot with reactive arthritis responsive to sulfasalazine
AU- BOHNKER, BRUCE K.; JOCHUM, JAMES J.; SIEFERT, ANN M.; KELLY, JUDITH L. (U.S. Navy, Branch Medical Clinic, Mayport, FL)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 59, July 1988, p. 653, 654.
PY- 1988
PD- 198807
RF- 8
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8818
AB- An aviator with prolonged right sided low back pain is described. The diagnostic workup is presented leading to diagnosis of HLA B27 positive reactive sacroiliitis. Trial of sulfasalazine leads to resolution of his pain. The spondylarthropathies are briefly reviewed. Implications on his aeromedical status are discussed. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *ARTHRITIS; *BACK INJURIES; *FLIGHT FITNESS
DE- CASE HISTORIES; HELICOPTERS; INTESTINES; PILOT PERFORMANCE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01747298
AN- <AEROSPACE> A88-43007
TI- Root causes of helicopter pilot error accidents
AU- ADAMS, RICHARD J. (Advanced Aviation Concepts, Inc., Robbinsville, NJ)
SO- IN: International Symposium on Aviation Psychology, 4th, Columbus, OH, Apr. 27-30, 1987, Proceedings (A88-42927 17-53). Columbus, OH, Ohio State University, 1987, p. 761-767.
PY- 1987
PD- 198700
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- Historically, a very high percentage of helicopter accidents are related to 'pilot error'. An examination of the underlying root causes of these accidents was performed. Helicopter pilots were interviewed throughout the U.S. regarding their perception of the hazards associated with a wide range of operations. This information was compared to accident data and reports from NTSB, the FAA, the U.S. Army and Canada. (Author)
SF- AIAA
DE- <MAJOR> *ACCIDENT INVESTIGATION; *AIRCRAFT ACCIDENTS; *HELICOPTERS;
*PILOT ERROR; *PILOT PERFORMANCE
DE- AVIATION PSYCHOLOGY; FLIGHT ALTITUDE; FLIGHT HAZARDS; FLIGHT TRAINING;
STRESS (PHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01747292
AN- <AEROSPACE> A88-43001
TI- A comparison of one- and two-person crew performance in a supervisory control task
AU- MILLER, R. ALLEN; JAGACINSKI, RICHARD J.; PLAMONDON, BRIAN D.; LYTTON, LYNN E.; KIRLIK, ALEX C. (Ohio State University, Columbus)
CS- Ohio State Univ., Columbus.
CS- <CODE> OM593208
SO- IN: International Symposium on Aviation Psychology, 4th, Columbus, OH, Apr. 27-30, 1987, Proceedings (A88-42927 17-53). Columbus, OH, Ohio State University, 1987, p. 705-711.
PY- 1987
PD- 198700
CN- NAG2-195
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA8817
AB- One- and two-person crews performed a simulated supervisory control task in which they had to directly control a scout helicopter and indirectly control four friendly helicopters in a hostile environment. One-person crews relied on an autopilot more than two-person crews in order to deal with multiple task demands. However, two-person crews were superior in terms of overall performance, and on particular subtasks such as searching for cargo and enemy craft and destroying enemy craft after they were located. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS;
*PILOT PERFORMANCE
DE- AUTOMATIC PILOTS; DISPLAY DEVICES; MILITARY HELICOPTERS; TASK COMPLEXITY; TRACKING PROBLEM
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01747284
AN- <AEROSPACE> A88-42993
TI- Inflight evaluation of pilot workload measures for rotorcraft research
AU- SHIVELY, ROBERT J. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA); BORTOLUSSI, MICHAEL R. (Western Aerospace Laboratories, Inc., Moffett Field, CA); BATTISTE, VERNOL; HART, SANDRA G. (NASA, Ames Research Center, Moffett Field, CA); PEPITONE, DAVID D. (San Jose State University, CA); MATSUMOTO, JOY HAMERMAN
CS- Army Aviation Research and Development Command, Moffett Field, CA.
CS- <CODE> AZ143936
SO- IN: International Symposium on Aviation Psychology, 4th, Columbus, OH, Apr. 27-30, 1987, Proceedings (A88-42927 17-53). Columbus, OH, Ohio State University, 1987, p. 637-643.
PY- 1987
PD- 198700
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- The effectiveness of heart-rate monitoring and the NASA TLX workload rating scale (Hart et al., 1985) in measuring helicopter-pilot workloads is investigated experimentally. Four NASA test pilots flew two 2-h missions each in an SH-3G helicopter, following scenarios with takeoff, hover, cross-country, and landing tasks; pilot performance on the tasks undertaken near the landing area was measured by laser tracking. The results are presented in graphs and discussed in detail, and it is found that the TLX ratings clearly distinguish the flight segments and are well correlated with the performance data. The mean heart rate (measured as interbeat interval) is correlated (r = -0.69) with the TLX workload, but only the standard deviation of the interbeat interval is able to distinguish between flight segments; the correlation between standard deviation and TLX ratings is negative but not significant. (T.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *PILOT PERFORMANCE; *ROTORCRAFT AIRCRAFT;
*WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT TESTS; HEART RATE; HELICOPTER DESIGN; TASKS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01747218
AN- <AEROSPACE> A88-42927
TI- International Symposium on Aviation Psychology, 4th, Columbus, OH, Apr. 27-30, 1987, Proceedings
AU- JENSEN, RICHARD S., ED. (Ohio State University, Columbus)
SO- Symposium sponsored by the Ohio State University and Association of Aviation Psychologists. Columbus, OH, Ohio State University, 1987, 808 p. For individual items see A88-42928 to A88-43007.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8817
AB- Topics discussed include engineering in the areas of cockpit design, voice technology, expert systems, simulation, and ATC automation; the psychology of perception, judgment, cockpit resource management, and communication in aviation; selection and training; the physiological effects of stress, fatigue, and drugs and alcohol; workload assessment; performance assessment; and accident investigation. Papers are presented on a tactical aircaft cockpit study, the application of voice technology in space vehicles, expert systems for risk assessment, and the use of the ILLIMAC simulator in research at the University of Illinois. Attention is also given to the judgment of speed with computer-generated motion displays, training for imminent emergencies,

the formation process of airline flight crews, the relative impact of selection and training on optimal crew performance, and instruction for military air intercept control. Additional papers are on attention in aviation, the spontaneous eye blink in workload assessment, the inadequacy of root mean square error as a performance measure, and the root causes of helicopter pilot error accidents. (I.S.)
SF- AIAA
DE- <MAJOR> *AVIATION PSYCHOLOGY; *CONFERENCES
DE- AIRCRAFT ACCIDENT INVESTIGATION; AIRCRAFT COMMUNICATION; COCKPITS;
EXPERT SYSTEMS; PILOT PERFORMANCE; PILOT TRAINING; VOICE COMMUNICATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01747215
AN- <AEROSPACE> A88-42924
TI- Antidotes for runaway helicopter insurance rates
AU- POWELL, GEORGE M. (Bell Helicopter Textron, Inc., Fort Worth, TX)
SO- IN: Vertical flight training needs and solutions; Proceedings of the AHS National Specialists' Meeting, Arlington, TX, Sept. 17, 18, 1987 (A88-42913 17-53). Alexandria, VA, American Helicopter Society, Inc., 1987, p. 97-111.
PY- 1987
PD- 198700
RF- 18
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- A study concerning the problem of high helicopter insurance rates, based on interviews with aircraft manufacturers, insurers, legislators, risk managers, operators, lawyers, trade associations, the FAA, and the public is presented. Various influences on insurance costs are discussed, finding that those involved in every aspect of the helicopter industry are responsible for high rates. It is suggested that more training to reduce the human factor in accidents would help reduce rates. The Helicopter Association International hull/liability insurance program and the possibility for tort liability reform legislation are also examined. (R.B.)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *INSURANCE (CONTRACTS); *OPERATING COSTS; *PILOT
ERROR
DE- COST ANALYSIS; DECISION MAKING; FLIGHT SAFETY; FLIGHT TRAINING; LEGAL
LIABILITY
SH- 7583 Economics & Cost Analysis (1975-)

AN- <DIALOG> 01747214
AN- <AEROSPACE> A88-42923
TI- 'Film at eleven' - Safety and the TV news helicopter
AU- ERION, BRUCE F. (WXIA-TV, Atlanta, GA); GALANIS, LEO (KWTV, Oklahoma City, OK)
SO- IN: Vertical flight training needs and solutions; Proceedings of the AHS National Specialists' Meeting, Arlington, TX, Sept. 17, 18, 1987 (A88-42913 17-53). Alexandria, VA, American Helicopter Society, Inc., 1987, p. 91-94.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- The operation, equipment, maintenance, and training aspects of TV news helicopters are discussed, focusing on safety concerns. Important safety measures include a pilot who understands the needs of the newsroom operation, a full-time aerial photographer who understands the aircraft and can act as a crew chief, and communication between news helicopter operators performing the same mission. Equipment which increase the safety of the aircraft include a second VHF radio, specially designed camera windows, navigational radios, high skid gear, maintenance-free broadcast equipment, hydraulic door openers, sun visors, and wedge windows. The importance of annual training to ensure safe flying is also examined. (R.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *FLIGHT SAFETY; *HELICOPTERS; *NEWS MEDIA;
*TELEVISION EQUIPMENT
DE- AIRCRAFT MAINTENANCE; AIRCRAFT PERFORMANCE; AIRCRAFT PILOTS; PILOT
PERFORMANCE; PSYCHOLOGICAL FACTORS

SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01747209
AN- <AEROSPACE> A88-42918
TI- An airline perspective for helicopters
AU- BROWN, J. A. (American Airlines, Inc., Fort Worth, TX)
SO- IN: Vertical flight training needs and solutions; Proceedings of the AHS National Specialists' Meeting, Arlington, TX, Sept. 17, 18, 1987 (A88-42913 17-53). Alexandria, VA, American Helicopter Society, Inc., 1987, p. 41-45.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- The use of a standardized training program for commercial helicopter pilots is proposed. The proposed plan would centralize training to standardize and control its quality, modernize training techniques, and make more extensive use of flight simulators. It is suggested that commercial manufacturers and operators should collectively establish a mutually supported training program patterned after ground school and flight simulator training used by commercial airlines which would be affordable to all operators and would provide training for helicopter ground support personnel. It is felt that the cost of such a program would be offset by the resulting reduction in human factor accidents and product liability costs. (R.B.)
SF- AIAA
DE- <MAJOR> *AIRLINE OPERATIONS; *FLIGHT TRAINING; *HELICOPTERS; *PILOT PERFORMANCE; *PILOT TRAINING
DE- COMMERCIAL AIRCRAFT; COMPUTER ASSISTED INSTRUCTION; PILOT ERROR
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01747208
AN- <AEROSPACE> A88-42917
TI- FAA roles and outlook for safety
AU- SHAPLEY, JOHN J. (FAA, Fort Worth, TX)
SO- IN: Vertical flight training needs and solutions; Proceedings of the AHS National Specialists' Meeting, Arlington, TX, Sept. 17, 18, 1987 (A88-42913 17-53). Alexandria, VA, American Helicopter Society, Inc., 1987, p. 35-38.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8817
AB- Rotorcraft certification and research and development conducted by the FAA are discussed. Certification rules and aspects of minimum safety standards and the development of power-lift standards for tilt-rotor aircraft are examined. Accident investigations, pilot workload scenarios, and workload requirements exceeding capabilities of the crew are incorporated into the certification process. Specific workload scenarios are presented, discussing their use in the development of certification requirements. (R.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *HELICOPTERS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT RELIABILITY; HELICOPTER PERFORMANCE; PILOT ERROR; PILOT PERFORMANCE
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01746089
AN- <AEROSPACE> A88-41798
TI- Dynamics of the controlled motion of a helicopter
TI- <ORIGINAL> Dinamika upravliaemogo dvizheniia vertoleta
TI- <EXTENSION> Russian book
AU- KOLOKOLOV, SERGEI NIKOLAEVICH; KONOVALOV, ANATOLII PETROVICH; KURATOV, VLADIMIR ANTONOVICH
SO- Moscow, Izdatel'stvo Mashinostroenie, 1987, 144 p. In Russian.
PY- 1987
PD- 198700
RF- 39
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- BOOK
DT- TRANSLATION
JA- IAA8817

AB- Current methods for studying the dynamics of the controlled motion of helicopters are reviewed. In particular, attention is given to mathematical models of helicopter motion, helicopter balancing, qualitative evaluation of the stability and controllability of helicopters, and identification of models of helicopter motion from flight test data. The discussion also covers the dynamics of a closed-loop piloting system, controllability optimization, and parametric studies of the stability and controllability of helicopters. (V.L.)
SF- AIAA
DE- <MAJOR> *DYNAMIC CONTROL; *FLIGHT CONTROL; *HELICOPTER CONTROL
DE- CONTROLLABILITY; DATA PROCESSING; DYNAMIC STABILITY; FLIGHT OPTIMIZATION; FLIGHT TESTS; MAN MACHINE SYSTEMS; MATHEMATICAL MODELS; PILOT PERFORMANCE; STATISTICAL ANALYSIS; TRANSFER FUNCTIONS; UNSTEADY AERODYNAMICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01744843
AN- <AEROSPACE> A88-40552
TI- Rotorcraft research at NASA
AU- BURKS, JOHN S. (NASA, Washington, DC)
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
SO- Vertiflite (ISSN 0042-4455), vol. 34, May-June 1988, p. 12-17.
PY- 1988
PD- 198806
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8816
AB- An overview of NASA research in rotorcraft technology is presented. Ten percent of the NASA aeronautics program is made up of rotorcraft research. The aeronautics program conducts research in five areas: aerodynamics, propulsion, materials and structures, information sciences and human factors, and flight systems. The key objectives of NASA research are major reduction in external noise and aircraft vibration, reduction of pilot workload for night, adverse weather and NOE flying, increasing power and reducing fuel consumption in small engines, and identifying and exploiting vehicle characteristics and concepts for triple current speed and improved maneuverability and agility. NASA and Army resources are combined to pursue research at three major centers. The Ames research center conducts research in the physics of transition and turbulent flows, using a new improved wind tunnel and the NAS system. At the Langley Research Center, work is done in noise and vibration reduction, finding lighter and more durable composite structures, and aeroelasticity for tilt motors and X-wing configurations. At the NASA Lewis Research Center, researchers are working on improving helicopter propulsion systems. (R.B.)
SF- AIAA
DE- <MAJOR> *AERODYNAMICS; *NASA PROGRAMS; *RESEARCH AND DEVELOPMENT; *ROTORCRAFT AIRCRAFT; *TEST FACILITIES
DE- FLIGHT SIMULATORS; HELICOPTER ENGINES; TILT ROTOR AIRCRAFT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01744839
AN- <AEROSPACE> A88-40548
TI- Aerospace progress and research - The fortieth anniversary of ONERA
TI- <ORIGINAL> Recherches et progres aerospatiaux - Le quarantieme anniversaire de l'ONERA
AU- CARPENTIER, JEAN (ONERA, Chatillon-sous-Bagneux, France)
SO- Academie des Sciences (Paris), Comptes Rendus, Serie Generale, La Vie des Sciences (ISSN 0762-0969), vol. 4, Sept.-Oct. 1987, p. 405-436. In French.
PY- 1987
PD- 198710
SN- 0762-0969
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8816
AB- The current status of ONERA activities in the domains of research, the application of research data to aeronautical construction projects, and the technical assistance given to manufacturers is reviewed. The numerical simulation of the flow around aircraft and the validation of numerical methods using research wind tunnels is discussed, in addition to the use of industrial wind tunnels for the dvelopment of aircraft, helicopters, and missiles. Propulsion research has centered around the

development of turbines, ramjet engines for tactical missiles and hypersonic vehicles, and solid and liquid propellant rocket engines for missiles and launchers. Other topics considered include aircraft materials development, measurement instrumentation, and future plans. (R.R.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENGINEERING; *AEROSPACE INDUSTRY; *RESEARCH AND DEVELOPMENT
DE- AERODYNAMICS; COMPUTERIZED SIMULATION; FRANCE; HISTORIES; PROPULSION; WIND TUNNEL TESTS
SH- 7599 General (1975-)

AN- <DIALOG> 01744813
AN- <AEROSPACE> A88-40522
TI- Aerospace equipment - Evolution and future problems
TI- <ORIGINAL> Les equipements aerospatiaux - Evolution et problemes d'avenir
AU- HUCHER, MICHEL
SO- Navigation (Paris) (ISSN 0028-1530), vol. 36, April 1988, p. 253-267. In French.
PY- 1988
PD- 198804
SN- 0028-1530
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8816
AB- The status of the French aircraft equipment industry is reviewed, and the navigation segment is analyzed, with emphasis on civil aviation applications. Data show the relative importance of the French industry in helicopter and business aircraft manufacturing with respect to the world market. Radionavigation equipment is considered, and the technology involved in the Navstar/GPS system is described. Inertial guidance systems for autonomous aircraft navigation are also discussed, with particular attention given to the A320 Air Data and Inertial Reference System. (R.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *AIRCRAFT EQUIPMENT; *CIVIL AVIATION; *EUROPEAN AIRBUS; *TECHNOLOGICAL FORECASTING
DE- ECONOMIC ANALYSIS; GLOBAL POSITIONING SYSTEM; HUMAN FACTORS ENGINEERING ; RADIO NAVIGATION
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01741509
AN- <AEROSPACE> A88-37218
TI- Results of a precision hover simulation on the one-to-one motion Large Amplitude Research Simulator
AU- HYNES, MARSHALL S. (U.S. Navy, Naval Air Development Center, Warminster, PA)
SO- IN: International Powered Lift Conference and Exposition, Santa Clara, CA, Dec. 7-10, 1987, Proceedings (A88-37176 15-01). Warrendale, PA, Society of Automotive Engineers, Inc., 1988, p. 519-530.
PY- 1988
PD- 198800
RF- 7
RN- SAE PAPER 872356
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8815
AB- A piloted simulation was conducted to: evaluate attitude response bandwidth as a predictor of V/STOL hover flying qualities, validate a unique convolution integral simulation technique (CONVO), and qualitatively assess the one-to-one motion characteristics of the Grumman Large Amplitude Research Simulator (LARS). Handling qualities ratings demonstrated good correlation with attitude response bandwidth for both attitude command and rate command response types, however, a minimum damping requirement is necessary to supplement the bandwidth requirement for attitude command responses. Formal validation of the CONVO technique was not possible due to inaccurate modeling of the Grumman V/STOL Design 698, however, CONVO fidelity for the bandwidth investigation was satisfactory. Comparisons of pilot evaluations of the Design 698 on LARS and the NASA Ames VMS show LARS evaluations to be much worse due to high controller sensitivity. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *HOVERING; *V/STOL AIRCRAFT
DE- ATTITUDE CONTROL; CONVOLUTION INTEGRALS; MATHEMATICAL MODELS; PILOT

PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01741003
AN- <AEROSPACE> A88-36712
TI- Preview control pilot model for near-earth maneuvering helicopter flight
AU- HESS, R. A. (California, University, Davis); CHAN, K. K.
SO- (Guidance, Navigation and Control Conference, Williamsburg, VA, Aug. 18-20, 1986, Technical Papers, p. 875-885) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 11, Mar.-Apr. 1988, p. 146-152. Previously cited in issue 23, p. 3481, Accession no. A86-47498.
PY- 1988
PD- 198804
RF- 14
SN- 0731-5090
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE; *VISUAL FIELDS
DE- FEEDBACK CONTROL; FLIGHT SIMULATION; FLIGHT TESTS; TIME RESPONSE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01739788
AN- <AEROSPACE> A88-35497
TI- Practical workload assessment in the development process
AU- SHAFER, JOHN B. (IBM, Federal Systems Div., Owego, NY)
SO- IN: Human Factors Society, Annual Meeting, 31st, New York, NY, Oct. 19-23, 1987, Proceedings. Volume 2 (A88-35401 14-54). Santa Monica, CA, Human Factors Society, 1987, p. 1408-1410.
PY- 1987
PD- 198700
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
AB- This paper discusses a practical concept of work load measure, which makes it possible to assess this otherwise nonquantitative concept in terms of work-load units. In this practical approach, work load is considered as the number of activities modified by the level of difficulty, with the physical, mental, visual, vocal, or auditory activities counted and manipulated as things to do for a certain task. It is suggested that the level of difficulty is to be referred to the precision of a manual task, the confusion of a mental task, the ambiguity of a visual task, the verbal precision of a vocal task, or a low signal-to-noise ratio of an auditory task, and is to be rated by an approach suggested by McCracken an Aldrich (1983). The applications of the practical work-load concept by human-factor specialists to the development of an advanced helicopter is discussed. (I.S.)
SF- AIAA
DE- <MAJOR> *DESIGN ANALYSIS; *HUMAN FACTORS ENGINEERING; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- ASSESSMENTS; OPERATORS (PERSONNEL)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01739784
AN- <AEROSPACE> A88-35493
TI- Cockpit automation concept development for the NUH-60 (STAR) aircraft
AU- RILEY, DANIEL D.; STRINGER, PAUL G. (Essex Corp., Warminster, PA)
SO- IN: Human Factors Society, Annual Meeting, 31st, New York, NY, Oct. 19-23, 1987, Proceedings. Volume 2 (A88-35401 14-54). Santa Monica, CA, Human Factors Society, 1987, p. 1383-1387.
PY- 1987
PD- 198700
RF- 6
CN- N62269-83-D-0115
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
AB- A study was performed to derive an automation and avionics integration design concept for the NUH-60 Systems Testbed for Avionics Research

(STAR) aircraft. The STAR, a one-of-a-kind reconfiguration of the UH-60 Black Hawk helicopter, is being developed by the U.S. Army Avionics Research and Development Activity to provide a flight demonstrator and research vehicle for state-of-the-art cockpit technology. The work was directed toward determining cockpit design preferences associated with single-pilot performance of the Army scout and utility missions. Emphasis was placed on high work load phases of the missions during which eyes-out-of-the-cockpit and hands-on-controls performance capabilities would be most crucial. A number of cockpit-based design alternatives in the areas of communication, navigation, aircraft survivability equipment operations, subsystem status monitoring, and aircraft performance computation and prediction were systematically derived and proposed. (Author)
SF- AIAA
DE- <MAJOR> *AUTOMATION; *AVIONICS; *COCKPITS; *H-60 HELICOPTER; *HUMAN
FACTORS ENGINEERING; *RESEARCH AIRCRAFT
DE- MILITARY TECHNOLOGY; TECHNOLOGY ASSESSMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01739703
AN- <AEROSPACE> A88-35412
TI- Simulator design features for helicopter shipboard landings
AU- SHEPPARD, DANIEL J.; JONES, SHERRIE A. (Essex Corp., Orlando, FL); MADDEN, JOYCE (U.S. Navy, Naval Training Systems Center, Orlando, FL)
SO- IN: Human Factors Society, Annual Meeting, 31st, New York, NY, Oct. 19-23, 1987, Proceedings. Volume 1 (A88-35401 14-54). Santa Monica, CA, Human Factors Society, 1987, p. 233-237.
PY- 1987
PD- 198700
CN- N61339-85-D-0026
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
AB- The Vertical Takeoff and Landing Simulator (VTOL) at the Naval Training Systems Center's (NTSC) Visual Technology Research Simulator (VTRS) was used to study the effects of simulator design features on pilot performance in helicopter shipboard landings. The research was designed to evaluate the effects of current design features on the SH-60B Operational Flight Trainer (OFT) used to train helicopter shipboard landing and four proposed simulator design modifications. These were: (1) scene detail (SH-60B OFT scene versus an upgraded VTRS scene), (2) field-of-view (VTRS wide versus a smaller SH-60B OFT field-of-view), (3) dynamic seat cueing (on versus off), and (4) dynamic inflow (standard rotor model available in existing trainers versus an updated rotor model). These factors were tested across two levels of seastate. On the basis of the factors studied in the experiment, the wider field-of-view, the more detailed scene and the updated rotor model are recommended for use. The dynamic seat cueing evaluated in his study is not recommended at this time. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *FLIGHT SIMULATORS; *HELICOPTER PERFORMANCE;
*LANDING SIMULATION; *SHIPS; *VERTICAL LANDING
DE- DESIGN ANALYSIS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE; SEA
STATES; TRAINING SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01739662
AN- <AEROSPACE> A88-35371
TI- Pilot oriented aids for helicopter automatic nap-of-the-earth flight
AU- PEKELSMA, NICHOLAS J.; DENTON, RICHARD V. (TAU Corp., Los Gatos, CA)
SO- IN: Rotorcraft flight controls and avionics; Proceedings of the National Specialists' Meeting, Cherry Hill, NJ, Oct. 13-15, 1987 (A88-35366 14-01). Alexandria, VA, American Helicopter Society, 1987, 5 p.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
AB- An account is given of recently developed tools for the real-time computer generation of both far-field and near-field military helicopter trajectories in nap-of-the-earth (NOE) flight. An evaluation of accumulated experience has established that significant efforts will be required to arrive at a suitable balance of trajectory computations and display technologies with such acceptable handling qualities that a pilot will be comfortable with any automatic NOE computation; attention is given to the case of significant changes in a displayed trajectory.

It is noted that such significant trajectory changes can, nevertheless, be rigorously correct from the standpoint of mathematical optimization. (O.C.)
SF- AIAA
DE- <MAJOR> *AUTONOMOUS NAVIGATION; *HUMAN FACTORS ENGINEERING; *NAP-OF-THE-EARTH NAVIGATION; *NAVIGATION AIDS
DE- FLIR DETECTORS; GLOBAL POSITIONING SYSTEM; INERTIAL NAVIGATION; MAN-COMPUTER INTERFACE; MILITARY HELICOPTERS; OPTICAL RADAR
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01739661
AN- <AEROSPACE> A88-35370
TI- Application of frequency and time domain cost functionals to active vibration control of an OH-6 helicopter in forward flight
AU- SCHRAGE, D. P.; NYGREN, K. P.; WASIKOWSKI, M. E. (Georgia Institute of Technology, Atlanta)
SO- IN: Rotorcraft flight controls and avionics; Proceedings of the National Specialists' Meeting, Cherry Hill, NJ, Oct. 13-15, 1987 (A88-35366 14-01). Alexandria, VA, American Helicopter Society, 1987, 8 p. Army-sponsored research.
PY- 1987
PD- 198700
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8814
AB- Helicopter rotor vibration problems are presently addressed by means of active feedback control techniques. These have been demonstrated on a free flight-trimmed, coupled rotor-body OH-6 model simulation in forward flight with the dynamic systems coupler, or 'DYSCO', program. Optimal regulator algorithms are formulated in both the frequency and time domain, using the higher harmonic and individual blade control, respectively. The various control schemes are compared, and their effectiveness is discussed with a view to implementational recommendations. (O.C.)
SF- AIAA
DE- <MAJOR> *ACTIVE CONTROL; *FEEDBACK CONTROL; *OH-6 HELICOPTER; *TIME SERIES ANALYSIS; *VIBRATION DAMPING
DE- FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING; KALMAN FILTERS; OPTIMAL CONTROL; ROTOR BODY INTERACTIONS; UNSTEADY AERODYNAMICS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01736974
AN- <AEROSPACE> A88-32683
TI- IKBS as a pilot aid
TI- <EXTENSION> Intelligent Knowledge Based Systems
AU- ELLIS, BRIAN (Royal Aircraft Establishment, Farnborough, England)
SO- IN: Recent advances in cockpit aids for military operations; Proceedings of the Symposium, London, England, Mar. 31, 1987 (A88-32676 12-01). London, Royal Aeronautical Society, 1987, p. 89-95.
PY- 1987
PD- 198700
RF- 5
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8812
AB- Intelligent knowledge-based systems (IKBSs) are presently considered as purveyors of advice and assistance to military aircrews irrespective of external conditions that might overload human operators. Their functions become more critical as aircraft designers respond to pressures for the reduction of flight crew sizes. IKBS will be valuable in airborne military operations entailing such specialized knowledge as that of ASW and ECM signals evaluation. IKBSs must excell in signal processing, information correlation from disparate sources, and contextual awareness. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *COCKPITS; *FLIGHT MANAGEMENT SYSTEMS; *INTELLIGENCE; *KNOWLEDGE; *MILITARY AIRCRAFT
DE- HELICOPTERS; JET AIRCRAFT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01732044
AN- <AEROSPACE> A88-27752
TI- Technological leaps occurring in the aeronautical and space fields
TI- <ORIGINAL> Sauts technologiques en cours dans les domaines aeronautique et espace

AU- PELEGRIN, MARC J. (ONERA, Centre d'Etudes et de Recherches de Toulouse, France)
SO- IN: Automatic systems in aeronautics; National Colloquium, Paris, France, Mar.17-19, 1986, Proceedings (A88-27751 63-10). Toulouse, Cepadues-Editions, 1986, p. 9-58. In French.
PY- 1986
PD- 198600
RF- 9
LA- French
GL- France
CP- France
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8810
AB- Recent advances in automation in the aeronautical and space fields are reviewed. Test results concerning the electrical transmission of signals for automated flight systems have been obtained during flight testing of the Concord and the A300. The Generalized Active Command system is designed to increase stability and maneuverability and to suppress buffeting and flutter effects. Other topics discussed include military aeronautical applications, the multicyclic control of helicopter blades, and the man-machine interface. Problems encountered during signal transmission, multisensor measurement, and signal processing are reviewed, in addition to problems involved with system flexibility. Advances in AI are also considered. (R.R.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *CONTROL SYSTEMS DESIGN; *FLIGHT SAFETY; *FLY BY WIRE CONTROL; *MAN MACHINE SYSTEMS
DE- ARTIFICIAL INTELLIGENCE; CONCORDE AIRCRAFT; HELICOPTER CONTROL; HUMAN FACTORS ENGINEERING; STABILITY AUGMENTATION
SH- 7563 Cybernetics (1975-)

AN- <DIALOG> 01728793
AN- <AEROSPACE> A88-24501
TI- Into the wind
TI- <EXTENSION> tilt rotor aircraft design
AU- CHASE, VICTOR D.
SO- Air and Space (ISSN 0886-2257), vol. 2, Feb.-Mar. 1988, p. 58-67.
PY- 1988
PD- 198803
SN- 0886-2257
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8808
AB- A development status evaluation is presented for the variety of wind tunnel sizes, operating regimes, and types that are routinely employed at NASA's Langley and Ames aerodynamics research facilities. The wind tunnels are of continuous or intermittent flow, subsonic, transonic, supersonic or hypersonic, high-temperature or cryogenic, and employ a variety of instrumentation and flow visualization devices in conjunction with digital test data gathering and analysis resources. The creativity and the discoveries that have distinguished the career of aerodynamicist R. T. Whitcomb in conjunction with NASA wind tunnel work are noted. (O.C.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC CONFIGURATIONS; *TILT ROTOR AIRCRAFT; *TILT ROTOR RESEARCH AIRCRAFT PROGRAM; *WIND TUNNEL TESTS
DE- COMPUTER GRAPHICS; FLOW VISUALIZATION; NASA PROGRAMS; SCHLIEREN PHOTOGRAPHY
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01727088
AN- <AEROSPACE> A88-22796
TI- Rotorcraft vibration criteria - A new perspective
AU- CREWS, SAM T. (U.S. Army, Aviation Systems Command, Saint Louis, MO)
SO- IN: AHS, Annual Forum, 43rd, Saint Louis, MO, May 18-20, 1987, Proceedings. Volume 2 (A88-22726 07-01). Alexandria, VA, American Helicopter Society, 1987, p. 991-998.
PY- 1987
PD- 198700
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8807
AB- Experience gained in recent rotorcraft development and production

contracts has proven the need for improved rotorcraft development standards for vibration. A new Aeronautical Design Standard for vibration was subsequently developed by AVSCOM. The important criteria is described and justification for that criteria is included herein. Also recommended research for further improvement in that criteria is presented. (Author)
SF- AIAA
DE- <MAJOR> *MILITARY HELICOPTERS; *ROTORCRAFT AIRCRAFT; *VIBRATION; *VIBRATION MEASUREMENT
DE- FUNCTIONAL DESIGN SPECIFICATIONS; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING; ROTARY WINGS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01727069
AN- <AEROSPACE> A88-22777
TI- An advanced digital flight control concept for single pilot, attack helicopter operations
AU- PARLIER, CHARLES A. (McDonnell Douglas Helicopter Co., Mesa, AZ)
SO- IN: AHS, Annual Forum, 43rd, Saint Louis, MO, May 18-20, 1987, Proceedings. Volume 2 (A88-22726 07-01). Alexandria, VA, American Helicopter Society, 1987, p. 697-704.
PY- 1987
PD- 198700
RF- 14
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8807
AB- This paper examines the fundamental requirements (and the rationale behind the requirements) for the Advanced Digital Flight Control System for the prototype Apache, YAH-64 AV05 (77-23258). Consideration is given to issues touching on the pilot, the crewstation, the cockpit control configuration, the flight control system requirements concept, the basic control modes, the special control modes, and envelope control. Preliminary results indicate that the concept is viable and superior to previous control systems in some flight regimes. (B.J.)
SF- AIAA
DE- <MAJOR> *ATTACK AIRCRAFT; *DIGITAL COMMAND SYSTEMS; *FLIGHT CONTROL; *MILITARY HELICOPTERS; *NUMERICAL CONTROL
DE- AIRCRAFT DESIGN; AIRCRAFT PILOTS; CONTROL SYSTEMS DESIGN; HELICOPTER PERFORMANCE; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01727067
AN- <AEROSPACE> A88-22775
TI- Classification of response-types for single-pilot NOE helicopter combat tasks
AU- MITCHELL, DAVID G.; HOH, ROGER H. (Systems Technology, Inc., Hawthorne, CA); ATENCIO, ADOLPH, JR. (NASA, Ames Research Center; U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
SO- IN: AHS, Annual Forum, 43rd, Saint Louis, MO, May 18-20, 1987, Proceedings. Volume 2 (A88-22726 07-01). Alexandria, VA, American Helicopter Society, 1987, p. 663-675.
PY- 1987
PD- 198700
RF- 12
CN- NAS2-11304
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8807
AB- Two piloted simulations have recently been conducted to evaluate both workload and handling qualities requirements for operation of a helicopter by a single pilot in a nap-of-the-earth combat environment. An advanced cockpit, including a moving-map display and an interactive touchpad screen, provided aircraft mission, status, and position information to the pilot. The results of the simulations are reviewed, and the impact of these results on the development of a revised helicopter handling qualities specification is discussed. Rate command is preferred over attitude command in pitch and roll, and attitude hold over groundspeed hold, for low-speed precision pointing tasks. Position hold is necessary for Level 1 handling qualities in hover when the pilot is required to perform secondary tasks. Addition of a second crew member improves pilot ratings. (Author)
SF- AIAA
DE- <MAJOR> *COMBAT; *FLIGHT SIMULATION; *MILITARY HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE

DE- ATTITUDE CONTROL; CONTROL SIMULATION; HOVERING; INTERACTIVE CONTROL;
POINTING CONTROL SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01714448
AN- <AEROSPACE> A88-10156
TI- Low cost windowless cockpit research vehicle
AU- AILSLIEGER, ROSS E.; PALMER, DAVID T. (Boeing Military Airplane Co., Wichita, KS)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 5th, Long Beach, CA, Oct. 13-16, 1986, Proceedings (A88-10152 01-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1986, p. 45-49.
PY- 1986
PD- 198600
RN- SAE PAPER 861755
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8801
AB- A commercial extension boom type forklift was modified for operation from a remote crew station. Two interchangeable cockpits were fabricated: (1) a generic helicopter cockpit with large windows and (2) a windowless cockpit with three television scenes projected on a panoramic display for outside vision. The vehicle is operated by a side-stick controller and a 'collective' lever. The goal was to develop a low-cost means to conduct research into windowless aircraft operations. The vehicle tests have begun and will be expanded as the cockpit electronics are developed. (Author)
SF- AIAA
DE- <MAJOR> *COCKPITS; *LOW COST; *MILITARY AIRCRAFT; *RESEARCH VEHICLES
DE- AIRCRAFT DESIGN; AVIONICS; PILOT PERFORMANCE; PROTECTION; RESEARCH AND
DEVELOPMENT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01714446
AN- <AEROSPACE> A88-10154
TI- Versatile simulation testbed for rotorcraft speech I/O system design
AU- SIMPSON, CAROL A. (Psycho-Linguistic Research Associates, Menlo Park, CA)
CS- Psycho-Linguistic Research Associates, Menlo Park, CA.
CS- <CODE> P6249806
SO- IN: Aerospace Behavioral Engineering Technology Conference, 5th, Long Beach, CA, Oct. 13-16, 1986, Proceedings (A88-10152 01-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1986, p. 33-37.
USAF-supported research.
PY- 1986
PD- 198600
CN- NAS2-12425
RN- SAE PAPER 861661
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8801
AB- A versatile simulation testbed for the design of a rotorcraft speech I/O system is described in detail. The testbed will be used to evaluate alternative implementations of synthesized speech displays and speech recognition controls for the next generation of Army helicopters including the LHX. The message delivery logic is discussed as well as the message structure, the speech recognizer command structure and features, feedback from the recognizer, and random access to controls via speech command. (K.K.)
SF- AIAA
DE- <MAJOR> *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *SPEECH RECOGNITION;
*SYSTEMS ENGINEERING; *SYSTEMS SIMULATION
DE- INPUT; LIGHT HELICOPTERS; OUTPUT; ROTARY WING AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01714444
AN- <AEROSPACE> A88-10152
TI- Aerospace Behavioral Engineering Technology Conference, 5th, Long Beach, CA, Oct. 13-16, 1986, Proceedings
SO- Conference sponsored by SAE. Warrendale, PA, Society of Automotive Engineers, Inc. (SAE P-184), 1986, 318 p. For individual items see A88-10153 to A88-10174.
PY- 1986
PD- 198600
RN- SAE P-184

LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8801
AB- The conference presents papers on fitness for duty, rotorcraft as innovative technology for future systems, Space Station and aircraft windows, air transport, intuitive situation displays, workload, fly by wire transport aircraft, human attributes and aircrew effectiveness, simulation technology, and color for electronic displays. Topics include the development of three-dimensional audio signals, Space Station viewing requirements, an integrated display for vertical situation awareness in commercial transport aircraft, the advantages of a primary flight display, and evaluating the subjective workload of directional orientation tasks with varying display formats. Consideration is also given to airline requirements on a fly-by-wire aircraft, the relationship between basic attributes test scores and learning to fly a VTOL simulator, flight simulator visual systems, and national and international measurement techniques for color determination. (K.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *CONFERENCES; *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE; *MAN MACHINE SYSTEMS
DE- AIRCRAFT DESIGN; AIRCRAFT SAFETY; AUDITORY SIGNALS; DISPLAY DEVICES; FITNESS; FLIGHT PATHS; FLY BY WIRE CONTROL; PILOT PERFORMANCE; PSYCHOLOGICAL FACTORS; ROTORCRAFT AIRCRAFT; SPACECRAFT DESIGN; TASK COMPLEXITY; TRANSPORT AIRCRAFT; WINDOWS (APERTURES); WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01713569
AN- <AEROSPACE> N87-29515
TI- Information management in the Army battlefield helicopter
AU- GIBSON, C. P.; WILLIAMS, D.
CS- Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
CS- <CODE> R2785060
PY- 1987
PD- 198702
NT- In AGARD, Information Management and Decision Making in Advanced Airborne Weapon Systems 13 p(SEE N87-29503 24-06)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR8724
AB- Considerable experience in the design of mission management systems has been gained in recent years. Flight trials have shown that careful design of these systems can result in considerable time savings in executing many of the tasks performed by the crew during tactical operations. In addition, flight trials were also conducted to evaluate the potential benefits of a simple tactical situation display presented on a color cathode ray tube. These trials have given valuable insight into the applications and requirements of this type of display. The experience gained was applied to the development of a complete system for installation in a helicopter with a MIL-STD-1553B databus avionics system to enable further flight trials addressing system integration and man machine interface optimization. A flexible ground station was also developed to allow investigation of optimizing methods for premission programming of the system and tactical situation display via a solid state data transfer device. (Author)
DE- <MAJOR> *FLIGHT OPERATIONS; *HELICOPTER PERFORMANCE; *INFORMATION PROCESSING (BIOLOGY); *PILOT PERFORMANCE
DE- COMPUTER PROGRAMMING; CREW PROCEDURES (INFLIGHT); DISPLAY DEVICES; FLIGHT TESTS; MAN MACHINE SYSTEMS; SYSTEMS INTEGRATION
SH- 7582 Documentation & Information Science (1975-)

AN- <DIALOG> 01712585
AN- <AEROSPACE> N87-28530
TI- Modeling of Systems for Aircraft Guidance and Air Traffic Control for Research, Development, and Evaluation
TI- <EXTENSION> conference
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugfuehrung.
CS- <CODE> DO696666
PY- 1986
PD- 198611
PG- 215P.
SN- 0176-7739

NT- Colloquium held in Brunswick, West Germany, 30 Jun. - 1 Jul. 1986
RN- DFVLR-MITT-86-24; ETN-87-90046
LA- MULTIPLE
LA- <NOTE> In GERMAN; ENGLISH summary
LA- <SUMMARY LANGUAGE> ENGLISH
GL- Germany
CP- Germany
DT- COLLOQUIA
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8723
AB- The role of models as tools for research and development is presented. The modeling of the dynamic anticipatory control as a decisive element of predetermined helicopter control systems; the modeling of radio navigation systems near airports; and the modeling of the fault situation in navigation systems are treated. The simulation of strapdown systems for error analysis and for the support of the integration of novel systems; and models for the description of air traffic holding procedures and air traffic control scenarios are examined. A model approach for the man machine system pilot-aircraft is described. Models and evaluation procedure for the ground based approach planning system COMPAS are given. For individual titles, see N87-28531 through N87-28540.
(ESA)
DE- <MAJOR> *AIR TRAFFIC CONTROL; *AIRCRAFT GUIDANCE; *CONFERENCES; *MATHEMATICAL MODELS; *RESEARCH AND DEVELOPMENT; *SYSTEMS SIMULATION
DE- AIRCRAFT CONTROL; APPROACH CONTROL; FLIGHT CONTROL; HELICOPTER CONTROL; HOLDING; PILOT PERFORMANCE; POSITION ERRORS; RADIO NAVIGATION; STRAPDOWN INERTIAL GUIDANCE
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01710912
AN- <AEROSPACE> N87-26838
TI- Avionics systems for future civil helicopters
TI- <ORIGINAL> AVIONIKSYSTEME FUER KUENFTIGE ZIVILHUBSCHRAUBER
AU- INGELSPERGER, ANTON
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany). Unternehmensgruppe Hubschrauber und Flugzeuge.
CS- <CODE> MT620643
PY- 1986
PD- 198600
NT- In its Research and Development. Technical-Scientific Publications 1986 p 167-174 (SEE N87-26826 20-99)
NT- Presented at the 4th BMFT-Statusseminar, Munich, West Germany, 28-30 Apr. 1986
RN- MBB-UD-473/86
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity
JA- STAR8720
AB- Civil helicopter cockpit instrumentation using color displays, and the testing of color displays are explained. The central control unit principles are discussed. The main fields in cockpit instrumentation and central control unit which need further development for use in future helicopters are discussed. The use of development simulators, signal standardization and bus system, and software for display systems are presented. (ESA)
DE- <MAJOR> *AVIONICS; *HELICOPTERS; *PRODUCT DEVELOPMENT
DE- COCKPITS; CONTROL SYSTEMS DESIGN; DISPLAY DEVICES; SIMULATORS; SOFTWARE ENGINEERING; STANDARDIZATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01709810
AN- <AEROSPACE> N87-25731
TI- The effects of asynchronous visual delays on simulator flight performance and the development of simulator sickness symptomatology
TI- <SUPPLEMENT> Final Report, 25 Apr. - 26 Dec. 1986
AU- ULIANO, K. C.; LAMBERT, E. Y.; KENNEDY, R. S.; SHEPPARD, D. J.
CS- Essex Corp., Orlando, FL.
CS- <CODE> E4014347
PY- 1986
PD- 198612
PG- 71P.
CN- N61339-85-D-0026
RN- AD-A180196; NAVTRASYSCEN-86-D-0026-1
LA- English
GL- United States
CP- United States

DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A04/MF A01
JA- STAR8719
AB- This research effort involved an experiment investigating the effect of asynchronous visual delays on simulator flight performance and the development of simulator sickness symptomatology. The SH-60B Vertical Takeoff and Land (VTOL) Simulator, part of the Navy's Visual Technology Research Simulator (VTRS) program was used to investigate this issue. Twenty-five experienced pilots flew three 40- or 60-minute sessions with two simulator tasks (air taxi and slalom) under each of the lag conditions. Pilots flew one session per day for three days with the lag condition changing each day. Objective and self-report indices were collected and, while results showed no difference between lag conditions, paper-and pencil illness ratings reflected a high initial incidence of illness (46% on Day 1) followed by rapid adaptation upon subsequent exposure. Simulator performance, however, was differentially affected by lag with the longest lag producing the worst performance. Finally, relationships between sickness indices, flight performance data, and other variables are presented and discussed (DTIC)
SF- DTIC
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT CHARACTERISTICS; *FLIGHT SIMULATION;
*FLIGHT TESTS; *HELICOPTER PERFORMANCE; *INVESTIGATION; *MOTION SICKNESS; *PILOT PERFORMANCE; *SYMPTOMOLOGY; *VISUAL FLIGHT
DE- ADAPTATION; DELAY; SYNCHRONISM; VERTICAL TAKEOFF AIRCRAFT
SH- <COSATI> 6J Industrial (Occupational) Medicine
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01708983
AN- <AEROSPACE> N87-24880
TI- Aeronautical decision making for instrument pilots
TI- <SUPPLEMENT> Final Report
AU- JENSEN, RICHARD S.; ANDRION, JANEEN; LAWTON, RUSSELL S.
CS- Aircraft Owners and Pilots Association, Frederick, MD.
CS- <CODE> AL294706
PY- 1987
PD- 198705
PG- 91P.
CN- DTFA01-80-C-10080
RN- DOT/FAA/PM-86/43
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A05/MF A01
JA- STAR8718
AB- Aviation accident data indicate that the majority of aircraft mishaps are due to judgement error. This training manual is part of a project to develop materials and techniques to help improve pilot decision making. Training programs using prototype versions of these materials have demonstrated substantial reductions in pilot error rates ranging from approximately 10 to 50% fewer mistakes. This manual is designed to explain the risks associated with instrument flying activities, the underlying behavioral causes of typical accidents, and the effects of stress on pilot decision making. It provides a means for the individual pilot to develop an Attitude Profile through a self-assessment inventory and provides detailed explanations of preflight and in-flight stress management techniques. The assumption is that the pilots will develop a positive attitude toward safety and the ability to effectively manage stress while recognizing and avoiding unnecessary risk. The manual is one of a series on Aeronautical Decision Making prepared for the following pilot audiences: (1) Student and Private; (2) Commercial; (3) Instrument; (4) Instructor; (5) Helicopter; and (6) Multi-Crew. (Author)
DE- <MAJOR> *DECISION MAKING; *EDUCATION; *HUMAN FACTORS ENGINEERING;
*INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE; *PILOT TRAINING
DE- AIRCRAFT SAFETY; JUDGMENTS; PILOT ERROR
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01708501
AN- <AEROSPACE> N87-24391
TI- Research and Technology
TI- <SUPPLEMENT> Annual Report, 1986
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1987
PD- 198704
PG- 184P.
RN- NASA-TM-89411; A-87031; NAS 1.15:89411
LA- English
GL- United States
CP- United States

DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A09/MF A02
JA- STAR8717
AB- Selected achievements at the Ames-Moffett and Ames-Dryden sites of the Ames Research Center are illustrated. The challenging work that was accomplished in the past year is presented for the following areas: engineering and technical services, aerospace systems, flight operations and research, aerophysics, and space research. (B.G.)
SF- NASA CASI
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *HUMAN FACTORS ENGINEERING; *RESEARCH AND DEVELOPMENT; *RESEARCH FACILITIES; *ROTOR AERODYNAMICS; *SYSTEMS ENGINEERING
DE- ACTIVE CONTROL; COMPUTATIONAL FLUID DYNAMICS; DATA MANAGEMENT; EXPERT SYSTEMS; NOISE REDUCTION; SPACELAB PAYLOADS; TILT ROTOR AIRCRAFT
SH- <COSATI> 5D History, Law, & Political Science
SH- 7599 General (1975-)

AN- <DIALOG> 01702688
AN- <AEROSPACE> N87-18548
TI- Readiness and retention. Pilot flight experience and aircraft mishaps
TI- <SUPPLEMENT> Final Report, 1977 - 1985
AU- BOROWSKY, MICHAEL S.
CS- Naval Safety Center, Norfolk, VA.
CS- <CODE> NT252649
PY- 1986
PD- 198606
PG- 19P.
RN- AD-A173911
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8711
AB- Budget constraints which yield reductions in flight hours per pilot imply an eventual shifting of the distribution of flight hours. Analyses show that the rate of pilot error mishaps tends to decrease as pilots' flight experience increase. These data suggest, therefore, that as the experience levels of naval aviators decline, the mishap rate will increase. The experience levels of Training Command/Fleet Readiness Squadron instructor pilots would also tend to decrease, thereby contributing both directly and indirectly to an increased mishap rate. The total effect will, of course, also depend upon aggregate flight hour reductions as well as pilot retention rates. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *ARMED FORCES (UNITED STATES) ; *ERROR ANALYSIS; *FEDERAL BUDGETS; *MAINTAINABILITY; *PILOT PERFORMANCE
DE- AIRCRAFT EQUIPMENT; ATTACK AIRCRAFT; FIGHTER AIRCRAFT; HELICOPTERS
SH- <COSATI> 1B Aeronautics
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01701861
AN- <AEROSPACE> N87-17715
TI- The application of quadratic optimal cooperative control synthesis to a CH-47 helicopter
AU- TOWNSEND, BARBARA K.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1986
PD- 198609
PG- 23P.
CN- RTOP 505-61-51
RN- NASA-TM-88353; A-86388; NAS 1.15:88353
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8710
AB- A control-system design method, Quadratic Optimal Cooperative Control Synthesis (CCS), is applied to the design of a Stability and Control Augmentation Systems (SCAS). The CCS design method is different from other design methods in that it does not require detailed a priori design criteria, but instead relies on an explicit optimal pilot-model to create desired performance. The design model, which was developed previously for fixed-wing aircraft, is simplified and modified for

application to a Boeing Vertol CH-47 helicopter. Two SCAS designs are developed using the CCS design methodology. The resulting CCS designs are then compared with designs obtained using classical/frequency-domain methods and Linear Quadratic Regulator (LQR) theory in a piloted fixed-base simulation. Results indicate that the CCS method, with slight modifications, can be used to produce controller designs which compare favorably with the frequency-domain approach. (Author)
DE- <MAJOR> *AIRCRAFT CONTROL; *CONTROL SYSTEMS DESIGN; *LINEAR QUADRATIC
REGULATOR; *OPTIMAL CONTROL; *PILOT PERFORMANCE; *STABILITY AUGMENTATION
DE- CH-47 HELICOPTER; CONTROLLABILITY; FEEDBACK CONTROL; MATHEMATICAL
MODELS; MATRICES (MATHEMATICS)
SH- <COSATI> 1C Aircraft
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01698131
AN- <AEROSPACE> N87-13960
TI- Seat isolation system
AU- VANVLIET, M.; MCKINNON, M.; KRUK, R. V.
CS- CAE Electronics Ltd., Saint Laurent (Quebec).
CS- <CODE> CA691925
PY- 1986
PD- 198606
NT- In AGARD Backache and Back Discomfort 12 p (SEE N87-13932 05-52)
LA- English
GL- Canada
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A03
JA- STAR8705
AB- Sustained low-frequency vibrations in helicopters, combined with poor posture imposed by control configuration, can affect the health and performance of aircrew. The attenuation of vibration is recognized as a critical problem in the design of future helicopters, and new (sidearm) control configurations under development may permit better posture. Conventional approaches isolate a pilot with a seat suspension which attenuates the dominant (vertical) axis of vibration. Such seats are typically passive, relying on a system of springs and dampers to attenuate the most critical combinations of expected frequency and g level. The bulk of such seats often precludes retrofitting them to existing air vehicles. Active shock/vibration isolation seats which offer advantages in terms of attenuation and frequency response have been proposed but no successful system has been developed to date. Some flight simulators employ g-seats to simulate g-forces acting on the pilot in high-performance aircraft. The expertise gained in developing, testing, and manufacturing the g-seat provides an ideal basis for developing an active antivibration seat. The frequency range of the g-seat includes the critical band of damaging and fatiguing vibrations in the vertical axis. Laboratory trials have demonstrated that the seat can attenuate the vibration to which the pilot is exposed. Concurrently, development of a displacement multi-axis hand controller for helicopter application is under way. Successful flight tests have been conducted with this unit configured as a side arm controller, permitting pilot to maintain an upright posture. This paper describes an approach and methodology for development of an active antivibration seat within the context of an integrated cockpit seat/control system. The intent is to achieve a high level of crew safety and comfort in concert with improved control performance. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *HELICOPTERS; *HUMAN FACTORS ENGINEERING;
*SEATS; *VIBRATION DAMPING; *VIBRATION ISOLATORS
DE- AEROSPACE TECHNOLOGY TRANSFER; CONTROL SYSTEMS DESIGN; CUSHIONS; MOTION
SIMULATORS; VIBRATION EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01698130
AN- <AEROSPACE> N87-13959
TI- Back pain in gazelle aircrew
AU- BRAITHWAITE, M.
CS- Royal Air Force, Netheravon (England).
CS- <CODE> R1358085
PY- 1986
PD- 198606
NT- In AGARD Backache and Back Discomfort 8 p (SEE N87-13932 05-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A03
JA- STAR8705

AB- The prevalence of backache among helicopter aircrew has long been known to be unacceptably high. The introduction of the Gazelle helicopter to UK service has resulted in an apparent increase in this prevalence. This paper is based on a questionnaire issued to Gazelle aircrew serving in Germany during 1981. The aim was to produce numerical evidence of the prevalence of backache in Gazelle aircrew, to delineate the factors responsible in the aircraft and to make recommendations for re-design. The major findings of the survey are that 82% of aircrew complained of Gazelle related backache, the taller pilots being worst affected. Flights lasting longer than are one hour gave rise to backache in 70% of the subjects. The seat design features considered responsible were the design of the seat cushion, inadequate lumbar support, routing of the shoulder harness and the angle of seat rake. Since the completion of this survey, a trial of a new Gazelle seat has been carried out. The new design includes an improved seat cushion, inflatable lumbar support, and increased height of the harness take off point from the inertia reel. The results of the initial trial are conclusive in their support for the new seat. These improvements have been incorporated into the design of the Gazelle armoured seat currently under development. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *AIRCRAFT PILOTS; *BACK INJURIES; *FLIGHT CREWS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PAIN; *SEATS; *SITTING POSITION
DE- CUSHIONS; LUMBAR REGION; SEAT BELTS; SURVEYS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01698129
AN- <AEROSPACE> N87-13958
TI- Backache in aircrew
AU- READER, D. G.
CS- Royal Air Force Inst. of Aviation Medicine, North Luffenham (England).
CS- <CODE> R1483410
PY- 1986
PD- 198606
NT- In AGARD Backache and Back Discomfort 6 p (SEE N87-13932 05-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A03
JA- STAR8705

AB- Aircrew have long complained of backache. The backache is seldom severe, but frequently interferes with flying performance and is very distracting. A survey was conducted among UK aircrew in 1971 which showed that aircrew suffer from backache twice more frequently than groundcrew, pilots suffer more than other aircrew members and that ejection seats caused more backache than other types of seats. The survey also showed that half the aircrew never suffered from backache on the ground. The incidence of backache was high, 13% of pilots suffered on every flight, 22% suffered once a week while 45% suffered once a month. The backache is caused by the sitting position and design of the seat, which leads to loss of the lumbar curve. When the lumbar curve is restored by means of a curved rigid pad applied to the back, 50% of aircrew report that the backache is greatly improved and in 32% of cases completely resolved. A scheme has been underway for some years in the UK to provide lumbar pads for aircrew complaining of backache. The pads are simple and cheap to produce and are easy to use. However, the major disadvantage is that they require a mold for the individual's lumbar curve and then they cannot be used by other aircrew. Aircraft seat designs both for ejection seats and helicopter crew seats now incorporate lumbar support curves to prevent both loss of the lumbar curve and the subsequent backache in aircrews. The incidence of backache in aircraft incorporating these new designs is considerably lower. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *AIRCRAFT PILOTS; *BACK INJURIES; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *LUMBAR REGION; *PAIN; *SEATS; *SITTING POSITION
DE- CAUSES; ETIOLOGY; HELICOPTERS; PREVENTION; SURVEYS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01698125
AN- <AEROSPACE> N87-13954
TI- Muscle fatigue in static and vibrational seating environments
AU- POPE, M. H.; WILDER, D. G.; DONNERMEYER, D. D.
CS- Vermont Univ., Burlington. Dept. of Orthopaedics and Rehabilitation.
CS- <CODE> VN418152
PY- 1986
PD- 198606
NT- In AGARD Backache and Back Discomfort 10 p (SEE N87-13932 05-52)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A03
JA- STAR8705
AB- In order to perform an objective assessment of muscle fatigue in a UH-1-H cockpit seating environment, instrumentation was developed to sense and use as an outcome measure the shift in the center frequency of the electromyographic (EMG) spectrum of the dorsal lumbar musculature. Subjective assessment of fatigue was accomplished by means of a visual analog scale indicating discomfort as a function of duration of exposure to the seated environment. Twenty subjects (10 male and 10 female) were exposed to the same seating environment (in terms of both static posture and vibration exposure) as that experienced by the UH-1-H helicopter pilot. The vibration environment of a UH-1-H helicopter was recorded and reproduced using a servohydraulic vibration simulator. Each exposure lasted two hours. Marginally significant fatigue, as measured by the center frequency shift method, occurred only as a result of the sustained static posture. In contrast, all exposures to this seating environment, in both static and vibration modes, produced significant subjective discomfort in both buttocks and lower back. Thus, the predominant cause of back discomfort and fatigue in this instance appears to be the UH-1-H specific seated posture rather than the UH-1-H specific vibrational environment. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *BACK INJURIES; *LUMBAR REGION; *MUSCULAR FATIGUE; *PAIN; *SITTING POSITION; *UH-1 HELICOPTER; *VIBRATION EFFECTS
DE- COCKPITS; ELECTROMYOGRAPHY; EXPOSURE; FEMALES; MALES; SEATS; SEX FACTOR

AN- <DIALOG> 01697618
AN- <AEROSPACE> N87-13445
TI- Helicopter flight control research: A demanding application of piloted simulation
AU- BUCKINGHAM, S. L.
CS- Royal Aircraft Establishment, Farnborough (England).
CS- <CODE> R2785060
PY- 1986
PD- 198601
PG- 40P.
NT- Presented at the Royal Aeronautical Society International Conference on Flight Simulation of Helicopters - Status and Prospects, London, England, Apr. 1985
RN- RAE-TM-FS(B)-595; BR99585; ETN-86-98376; AD-A169550
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8705
AB- Piloted simulation research in helicopter handling qualities is reviewed. Studies addressed the application of advanced control systems to enhance agility in Nap-of-the-Earth (NOE) flight. Handling qualities research places particular demands on many components of the simulator, including software environment and computing, cockpit design, and simulator operation. The requirements in terms of provision of adequate visual and motion cues are especially severe for agile NOE flight. An advanced flight simulator is described. (ESA)
SF- ESA
DE- <MAJOR> *CONTROL SIMULATION; *FLIGHT CONTROL; *FLIGHT SIMULATION; *HELICOPTER CONTROL
DE- CONTROL THEORY; FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING; NAP-OF-THE-EARTH NAVIGATION; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01697322
AN- <AEROSPACE> N87-13148
TI- Anthropometric handicaps in the construction of a helicopter cockpit
TI- <ORIGINAL> ANTHROPOMETRISCHE VORGABEN FUER DIE KONSTRUKTION EINES HUBSCHRAUBER-COCKPITS
TI- <EXTENSION> seats
AU- KROH, G.
CS- Institute of Aviation Medicine, Manching (Germany).
CS- <CODE> IK614235
PY- 1985
PD- 198500
NT- In DGLR Proceedings of a Symposium on the Evaluation of Man-Machine Systems: Methods and Problems p 10-24 (SEE N87-13146 04-54)
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A03
JA- STAR8704

AB- Helicopter pilots were used to test the dummy cockpit of a helicopter now under dwevelopment in order to develop a data base for the seating and the steering organs. Seated tests showed that the postures assumed by the pilots during flights generally did not agree with those envisioned in the construction specifications. This was due to the relatively large discrepancy in arm length between the 5th and the 99th percentile. To prevent their arms from getting tired, the pilots pushed the seat back farther than expected by the designer. Suggestions are also briefly made for the location of the stick and pedals. (ESA)
SF- ESA
DE- <MAJOR> *ANTHROPOMETRY; *COCKPITS; *HELICOPTER DESIGN; *SEATS
DE- COMFORT; CONTROL EQUIPMENT; HUMAN FACTORS ENGINEERING; OPTIMIZATION;
SITTING POSITION; TEST PILOTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01697320
AN- <AEROSPACE> N87-13146
TI- Proceedings of a Symposium on the Evaluation of Man-Machine Systems: Methods and Problems
TI- <ORIGINAL> BEWERTUNG VON MENSCH-MASCHINE-SYSTEMEN. METHODEN UND
PROBLEMATIK
CS- Deutsche Gesellschaft fuer Luft- und Raumfahrt, Bonn (Germany).
CS- <CODE> DP399183
PY- 1985
PD- 198500
PG- 277P.
NT- Symposium held in Cologne, West Germany, 14-15 Nov. 1985
RN- DGLR-85-04; ISBN-3-922010-30-X; ETN-86-98080
LA- MULTIPLE
LA- <NOTE> Partly in GERMAN and ENGLISH
GL- Germany
CP- Germany
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A13/MF A03
JA- STAR8704
AB- Anthropometric handicaps in helicopter cockpits; an obstacle-warning radar for helicopters; the workload and stress of a cockpit crew; and the simulation of human service reliability in the manual control of aircraft were studied. The system-ergonomic workload in highly automated process control tasks; and psychological workload during task-related activities were analyzed. A research method to determine the quality of task mastering by navigators in ship guidance; and the vibrations of the spinal column were tested. Human factors engineering in nuclear power plant control; and the ergonomic requirements for the design of control rooms were investigated. The possibilities of the eye-mark investigation as an anthropotechnical method to study man machine systems; measures, basic conceptions and inquiry techniques for the evaluation of man machine systems were studied. The empirical determination of the acceptable user surface in automated air conditioning systems was investigated. For individual titles see N87-13147 through N87-13165.
(ESA)
DE- <MAJOR> *ANTHROPOMETRY; *CONFERENCES; *HUMAN FACTORS ENGINEERING; *MAN
MACHINE SYSTEMS
DE- AIR CONDITIONING EQUIPMENT; COCKPITS; HELICOPTER DESIGN; NAVIGATION;
NUCLEAR POWER PLANTS; OPERATORS (PERSONNEL); PROCESS CONTROL (INDUSTRY)
; VIBRATION TESTS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01696506
AN- <AEROSPACE> N87-12327
TI- Introduction to helicopter noise
TI- <ORIGINAL> INTRODUCTION AU BRUIT DES HELICOPTERES
AU- HAERTIG, J.
CS- Institut Franco-Allemand de Recherches, Saint-Louis (France).
CS- <CODE> IH382936
PY- 1984
PD- 198402
PG- 25P.
RN- ISL-NB-401/84; ETN-86-98405
LA- French
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8703
AB- Literature on the intensity and characteristics of the external noise produced by helicopters was reviewed. Several types of noise are described and illustrated by measurements and calculations. (ESA)

SF- ESA
DE- <MAJOR> *AIRCRAFT NOISE; *HELICOPTERS; *NOISE MEASUREMENT
DE- AERODYNAMIC NOISE; BIBLIOGRAPHIES; HUMAN FACTORS ENGINEERING
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 01696347
AN- <AEROSPACE> N87-12167
TI- A helicopter flight evaluation of kinesthetic-tactual displays
TI- <SUPPLEMENT> Interim Report
AU- POSTON, A. M.; DUNN, R. S.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1986
PD- 198603
PG- 20P.
RN- AD-A168302; HEL-TN-3-86
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR8703
AB- The kinesthetic-tactual (KT) display concept employs moveable elements incorporated in a pilot's flight control handgrips. A series of laboratory and simulator studies conducted since 1976 has shown that this touch-based display approach can substitute for visual displays or augment them in useful ways. This report describes the first helicopter flight evaluation and demonstration of KT displays. Flight performance data were collected to compare the conventional visual display condition to KT conditions. Performance results as well as pilot opinion comments are discussed along with conclusions and implications for further KT system development. This is an interim report because in-depth analysis of the flight data is still underway. The most promising potential benefits in mission applications of KT displays are for conditions where visual task demands are high; for example, helicopter terrain flight requiring continuous visual attention outside the cockpit, and where use of conventional visual displays is complicated by night vision devices. (DTIC)
SF- DTIC
DE- <MAJOR> *ATTENTION; *COCKPIT SIMULATORS; *DISPLAY DEVICES; *FLIGHT CONTROL; *FLIGHT SIMULATION; *FLIGHT TESTS; *HELICOPTERS; *PILOT PERFORMANCE
DE- EVALUATION; NIGHT VISION; PERFORMANCE TESTS; TERRAIN
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01695966
AN- <AEROSPACE> N87-11783
TI- Evaluation of a visual system in its support of simulated helicopter flight
TI- <SUPPLEMENT> Final Report, Sep. 1985 - Feb. 1986
AU- SPEARS, W. D.; CORLEY, W. E.
CS- Science Applications, Inc., Orlando, FL.
CS- <CODE> SD698068
PY- 1986
PD- 198602
PG- 113P.
NT- Prepared in cooperation with Seville Training Systems Corp.
CN- N61339-82-D-0006
RN- AD-A168829; TR-86-06
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A06/MF A02
JA- STAR8703
AB- The Visual System Component Development Program (VSCDP) was developed by GE under contract with PM TRADE and installed at Williams AFB in spring 1985. Its purpose was to expand the state-of-the-art in visual systems by providing the capability to support nap-of-the-earth (NOE) flight simulation, which requires a high density of visual cues to allow pilots to accurately judge vertical and horizontal distances. The GE system was tested with the computer generated imagery projected in the dome with a radius of 12 feet. The Field of View (FOV) was 140 degrees horizontal by 60 degrees vertical with an enhanced Area of Interest (AOI) of 26 degrees horizontal by 20 degrees vertical inserted in the middle. The imagery centered in pilot's attention regardless of where he was looking in the dome; however, the eye tracker was not functioning for these tests. Nine experienced helicopter pilots participated as subjects. Two kinds of flight mission plans were used: a familiarization flight and a tactical maneuvers flight. The results of the experiment showed that the GE system can support all aspects of helicopter flight simulation. However, problems were found that indicate further work is needed. These included trouble with perceived

sizes and distances in the visual scene, and a high incidence of simulator sickness, probably due to processing of motion cues. (DTIC)
SF- DTIC
DE- <MAJOR> *COMPUTER GRAPHICS; *FLIGHT SIMULATION; *PILOT PERFORMANCE;
*VISUAL FLIGHT; *VISUAL PERCEPTION
DE- CUES; EYE MOVEMENTS; HELICOPTER PERFORMANCE; HORIZONTAL FLIGHT; LINE OF
SIGHT; NAP-OF-THE-EARTH NAVIGATION; TRACKING (POSITION); VERTICAL ORIENTATION
SH- <COSATI> 5H Man-machine Relations
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01694265
AN- <AEROSPACE> N87-10064
TI- Summary of artificial and natural icing tests conducted on US Army aircraft from 1974 to 1985
TI- <SUPPLEMENT> Final Report
AU- CHAMBERS, H. W.; ADAMS, J. Y.
CS- Army Aviation Systems Command, Saint Louis, MO.
CS- <CODE> AZ155219
PY- 1986
PD- 198607
PG- 223P.
CN- DTFA03-80-A-00199
RN- FAA/CT-85/26; TR-85-F-11
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A10/MF A03
JA- STAR8701
AB- The U.S. Army Aviation Systems Command conducts airworthiness qualification testing on aircraft under artificial and natural icing conditions. A JCH-47C helicopter with a Helicopter Icing Spray System (HISS) installed is used for generating a simulated natural icing environment. The artificial icing tests are followed by natural icing tests to assure a wide variety of flight conditions are tested and to verify artificial icing test results. Also discussed is the use of deice and anti-ice systems; the impact of ice accretion and shedding characteristics, performance considerations, stability and control, and vibration characteristics; and the cloud parameters measurement equipment and test aircraft instrumentation used for documenting test data. The test methodology and requirements used for qualifying aircraft for flight into icing conditions, instrumentation, and special equipment are summarized, and the details for tests conducted are contained in the references. The report documents in part 14 years of U.S. Army experience in conducting inflight aircraft icing tests and is provided to the FAA under interagency agreement in the preparation of manuals and other documents relative to the certification of civil aircraft as appropriate. (Author)
DE- <MAJOR> *AIRCRAFT RELIABILITY; *AIRCRAFT SAFETY; *CERTIFICATION; *ICE FORMATION; *ICE PREVENTION; *MILITARY TECHNOLOGY
DE- DEFROSTING; DEICING; FLIGHT TESTS; HELICOPTERS; MOISTURE CONTENT; PERFORMANCE TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01693947
AN- <AEROSPACE> N86-33004
TI- A model for the human's use of visual field cues in nap-of-the-Earth flight
TI- <SUPPLEMENT> Abstract Only
AU- HESS, R. A.; CHAN, K.
CS- California Univ., Davis. Dept. of Mechanical Engineering.
CS- <CODE> CC907079
PY- 1986
PD- 198605
NT- In NASA. Ames Research Center, 21st Annual Conference on Manual Control 1 p (SEE N86-32976 24-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A01/MF A04
JA- STAR8624
AB- A simple model is developed which describes the manner in which the human pilot may use visual field cues in controlling a vehicle in nap-of-the earth flight. The model is based upon the feedforward of information obtained from streamer patterns in the visual field to the inner-most loop of a multi-loop pilot/vehicle model. In this framework, the model is a logical extension of pursuit and preview models of the human operator which have appeared in the literature. Simulation and flight test data involving low-level helicopter flight tasks are applied to model development and validation. (Author)

DE- <MAJOR> *AIRCRAFT CONTROL; *MATHEMATICAL MODELS; *NAP-OF-THE-EARTH
NAVIGATION; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- CUES; FEEDFORWARD CONTROL; FLIGHT SIMULATION; FLIGHT TESTS; OPERATOR
PERFORMANCE; TASK COMPLEXITY
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01693936
AN- <AEROSPACE> N86-32993
TI- Anthropometric considerations for a 4-axis side-arm flight controller
AU- DEBELLIS, W. B.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1986
PD- 198605
NT- In NASA. Ames Research Center, 21st Annual Conference on Manual Control
14 p (SEE N86-32976 24-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR8624
AB- A data base on multiaxis side-arm flight controls was generated. The rapid advances in fly-by-light technology, automatic stability systems, and onboard computers have combined to create flexible flight control systems which could reduce the workload imposed on the operator by complex new equipment. This side-arm flight controller combines four controls into one unit and should simplify the pilot's task. However, the use of a multiaxis side-arm flight controller without complete cockpit integration may tend to increase the pilot's workload. (Author)
DE- <MAJOR> *ANTHROPOMETRY; *CONTROL SYSTEMS DESIGN; *FLIGHT CONTROL;
*HELICOPTER CONTROL; *PILOT PERFORMANCE
DE- CONTROLLERS; DATA BASES; FIBER OPTICS; HELICOPTER DESIGN; HUMAN FACTORS
ENGINEERING; MAN MACHINE SYSTEMS; SYSTEMS INTEGRATION; WORKLOADS
(PSYCHOPHYSIOLOGY)
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01693935
AN- <AEROSPACE> N86-32992
TI- Flight test of a displacement sidearm controller
AU- LIPPAY, A. L.; KRUK, R.; KING, M.; MORGAN, M. (National Aeronautical Establishment, Ottawa (Ontario).)
CS- CAE Electronics Ltd., Saint Laurent (Quebec).
CS- <CODE> CA691925
PY- 1986
PD- 198605
NT- In NASA. Ames Research Center 21st Annual Conference on Manual Control
23 p (SEE N86-32976 24-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR8624
AB- A six-axis displacement-stick sidearm controller was developed to enable single-handed control of remote manipulator operations in space. With a working model available, piloted evaluation became possible in a fly-by-computer variable-stability research aircraft, originally a Bell 205 helicopter. The original mechanization was limited to three rotational axes and a linear one, analogous to the collective stick. A newly designed short stickgrip was mounted and the spring force pattern adjusted to suit the helicopter flight control environment. A standard set of test maneuvers was flown by four experimental pilots with conventional helicopter flight controls and with sidearm controllers equipped with two different handgrips. Existing data from flight tests with an isometric-stick controller were added to complete the comparison. The displacement controller consistently achieved a rating of 3.0 to 3.5 on the Cooper-Harper scale, on par with the conventional controls. The same basic controller design was tested in spacecraft and remote manipulator simulations with very promising results. In each application operator/system integration was rapid and positive. The results demonstrate feasibility and support the design philosphy of using deflection as well as force to generate proprioceptive feedback. (Author)
DE- <MAJOR> *CONTROL STICKS; *CONTROL SYSTEMS DESIGN; *FLIGHT CONTROL;

*FLIGHT TESTS; *MANUAL CONTROL; *MENTAL PERFORMANCE; *PILOT PERFORMANCE

DE- AIRBORNE/SPACEBORNE COMPUTERS; DISPLACEMENT; HUMAN FACTORS ENGINEERING;
LEARNING; MAN MACHINE SYSTEMS; REMOTE MANIPULATOR SYSTEM; SYSTEMS
INTEGRATION
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01687792
AN- <AEROSPACE> N86-26810
TI- Aeromedical lessons learned with night vision devices
AU- PRICE, D. R.; MCLEAN, W. E.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1985
PD- 198512
NT- In AGARD Visual Protection and Enhancement 10 p (SEE N86-26802 17-52)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8617
AB- A review of night vision devices used in the military helicopter flight environment is presented, along with aeromedical lessons learned. Discussion revolves around experience with three U.S. Army aviation systems: the currently used second-generation night vision goggle (NVG), or AN/PVS-5; the soon-to-be-fielded AN/AVS-6 third-generation NVG; and the AH-64 Apache thermal sensor and imaging system. Performance characteristics are presented, and primary emphasis is on aeromedical research related to pilot interface with the systems to include visual acuity, contrast sensitivity, depth discrimination, dark adaptation, crew fatigue, and adaptational problems. (Author)
DE- <MAJOR> *CONTRAST; *IMAGING TECHNIQUES; *NIGHT VISION; *VISUAL ACUITY
DE- DARK ADAPTATION; FLIGHT FATIGUE; GOGGLES; HUMAN FACTORS ENGINEERING;
SPACE PERCEPTION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01687788
AN- <AEROSPACE> N86-26806
TI- Evaluation of helicopter helmet-mounted display mock-up
AU- SANTUCCI, G.; VALOT, C.
CS- Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).
CS- <CODE> CK538079
PY- 1985
PD- 198512
NT- In AGARD Visual Protection and Enhancement 14 p (SEE N86-26802 17-52)
LA- English
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8617
AB- A psychophysiological investigation was conducted on a mockup to evaluate a helmet mounted FLIR display. This experiment included laboratory and inflight testing. Laboratory testing included angular visual acuity, contour perception and stereoscopic acuity. Electrooculography was used to test binocular behavior under monocular stimulation (interocular synergy, binocular rivalry, optokinetic nystagmus). Results showed decreased angular and stereoscopic acuity, and provided a better understanding of eye activity components in this situation. Inflight testing: stressful perception was evidenced during low level helicopter flight, which can be either an overestimation of distances and altitude by active pilots, or an underestimation of these parameters by passive pilots. An illusory sensation was observed under certain binocular uses of helmet mounted displays. It concerns contour vision. Hypotheses are formulated for these various sensory changes. (Author)
DE- <MAJOR> *FLIGHT TESTS; *FLIR DETECTORS; *HELICOPTER CONTROL; *HELMET
MOUNTED DISPLAYS; *PILOT PERFORMANCE; *PSYCHOPHYSIOLOGY
DE- ELECTRO-OPTICS; OCULOMOTOR NERVES; PERCEPTUAL ERRORS; STEREOSCOPIC
VISION; VISUAL ACUITY; VISUAL PERCEPTION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01687787

AN- <AEROSPACE> N86-26805
TI- Operational experiences with night vision goggles in helicopter low-level flight at night
AU- HAIDN, H.
CS- German Army Aviation School, Bueckeburg (Germany).
CS- <CODE> GX622045
PY- 1985
PD- 198512
NT- In AGARD Visual Protection and Enhancement 8p (SEE N86-26802 17-52)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8617
AB- The operational marginal conditions are described with regard to the threat analysis in the Central European theater. This is supplemented by a presentation of the technological and physical aspects of the available visual sensors, such as helmet mounted night vision goggles, low light level television, and forward looking infrared and their employment as pilotage aids within the helicopter cockpit. Also, a description is given of the work capabilities and limitations inherent with the employment of electro-optical vision aids. This involves a comparison of the visual capabilities of the unaided eye during low level flight with Moon illumination at night, conditions during reduced light levels, and viewing the same scene with electro-optical sensors. The requirement for glare protection within the cockpit is discussed and different solutions are represented. An exceptional and difficult problem to solve is currently presented by positive position fixing under the given circumstances. Aids and procedures to improve navigation were devised and are now successfully in use. Finally, the results of interviews with helicopter pilots, who have long term experience with the use of helmet mounted night vision goggles are discussed. (Author)
DE- <MAJOR> *GOGGLES; *HELICOPTER CONTROL; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION; *VISUAL AIDS
DE- ELECTRO-OPTICS; FLIR DETECTORS; GLARE; HELMET MOUNTED DISPLAYS; NAVIGATION AIDS; PILOT PERFORMANCE; TELEVISION CAMERAS; VISUAL PERCEPTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01685224
AN- <AEROSPACE> N86-24200
TI- Antiemetic drugs and pilot performance
TI- <SUPPLEMENT> Interim Report, Feb. 1983 - Feb. 1984
AU- TAYLOR, H. L.; DELLINGER, J. A.; WELLER, M. H.; RICHARDSON, B. C.; HYMAN, F. C.
CS- Illinois Univ., Urbana-Champaign. Inst. of Aviation.
CS- <CODE> IB655059
PY- 1985
PD- 198511
PG- 44P.
NT- Prepared in cooperation with Michigan Univ., Ann Arbor
CN- F33615-83-K-0612
RN- AD-A162109; USAFSAM-TR-84-52
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8614
AB- This study evaluated the effects on human performance of three antiemetic drugs. The effects on pilot performance in a flight simulator were determined using the commonly prescribed dosages, standardized for a 70 kg person, of thiethylperazine (10 mg), promethazine hydrochloride (25 mg) cimetidine (300 mg), and a placebo control. Two tasks, a two-dimensional tracking task which part of an instrument landing system (ILS) approach and the Sternberg choice reaction time task, were used to generate pilot performance data. A Latin square design was used to balance treatment order effects, and each subject received each treatment condition. Log root mean square (RMS) deviation values, computed from the simulator flight data (altitude straight and level, altitude turning, localizer (lateral) tracking, glideslope (vertical tracking) were used in a multivariate analysis of variance to test the main effects. An approximate F-test, based on Wilk's criterion, resulted in F(12,87) =2.47, (P0.0008) for the treatment main effect (drug). Univariate analyses resulted in a significant drug main effect on two primary task variables--altitude straight and level and localizer tracking. Contrasts between the three antiemetic drugs and the placebo were used to test the hypothesis of no significant difference between treatment pairs. The contrasts between promethazine hydrochloride and the control were significant for altitude straight and level and for glideslope tracking. The other contrasts were not significant except for the control-thiethylperazine contrast for the localizer tracking variable. (DTIC)

SF- DTIC
DE- <MAJOR> *ANTIEMETICS AND ANTINAUSEANTS; *DOSAGE; *MULTIVARIATE STATISTICAL ANALYSIS; *PILOT PERFORMANCE
DE- DRUGS; FLIGHT SIMULATORS; GLIDE PATHS; HYPOTHESES; INSTRUMENT LANDING SYSTEMS; TRACKING (POSITION); VERTICAL FLIGHT
SH- <COSATI> 6O Pharmacology
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01684623
AN- <AEROSPACE> N86-23591
TI- The US Army's LHX (light helicopter family) program
TI- <SUPPLEMENT> Final Report, 1983 - 1984
AU- HARRIS, W. L.; BLAIR, J.; DECKER, G. F.; MCDANIEL, R. L.
CS- Army Science Board, Washington, DC.
CS- <CODE> A2244653
PY- 1984
PD- 198412
PG- 50P.
RN- AD-A161949
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8614
AB- Observations, analysis, conclusions and recommendations of the AHSG on selected critical issues related to the Army's LHX aircraft program are described. The basis of LHX, LHX program management, technology risk assessment, speed, and one versus two-man flight crew are discussed in the initial sections of this report. These issues constitute the more fundamental aspects of the Army's LHX program which were reviewed by the AHSG. Primary and secondary conclusions and recommendations are presented. Finally, a discussion of specific technologies and Army aviation programs is given in the appendices to this report. The discussion of each of these technologies and programs includes the AHSG's recommendations and conclusions on the same. A set of attachments follows the appendices. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRFRAMES; *COMPOSITE STRUCTURES; *FLIGHT CREWS; *HELICOPTERS; *INTEGRATED CIRCUITS; *LIGHT HELICOPTERS; *ROTARY WING AIRCRAFT; *TILT ROTOR AIRCRAFT; *WEIGHT (MASS)
DE- ASSEMBLING; MANAGEMENT; RISK
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01681007
AN- <AEROSPACE> N86-19903
TI- An analysis of visual tasks in helicopter shipboard landing
TI- <SUPPLEMENT> Final Technical Report, Sep. 1981 - Apr. 1985
AU- BERBAUM, K. S.; KENNEDY, R. S.
CS- Essex Corp., Orlando, FL.
CS- <CODE> E4014347
PY- 1985
PD- 198511
PG- 62P.
CN- N61339-81-C-0105
RN- AD-A161101; EOTR-85-7
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8610
AB- The purpose of this research effort was to identify visual research issues concerning helicopter landings, particularly the hover phase, for future study in the Visual Technology Research Simulator (VTRS) program. Identification of salient visual issues is a step toward surfacing equipment features that can be modified and studied. As we discussed the task with pilots, reviewed NATOPS manuals, and simulations witnessed, it became apparent that the visual task may differ depending upon whether: experienced or inexperienced pilots are flying; a simulator or an aircraft is flown; the environment is day or night; the pilot sought to acquire or maintain a skill level. As a way of limiting this broad project, it was elected to review intensively a scenario involving a highly experienced operator flying dusk/night approaches in a simulator. The Naval aviator selected was prompted by another aviator more familiar with the objective who dictated verbal protocols of his visual and control activities during several landings. These protocols were sorted into 10 phases in order to correspond to increasing distances in the landing task and the visual information

processing within each stage was described. Therefore, the stages are delimited in terms of range or altitude from the ship. We believe the most useful outcome of this analysis will be a list of visual cue augmentations that may be implemented and studied over the various stages of landing. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT LANDING; *HELICOPTERS; *HOVERING; *PILOT PERFORMANCE;
*VISUAL TASKS
DE- ABILITIES; AUGMENTATION; CUES; FLIGHT SIMULATION; FLIGHT SIMULATORS;
INFORMATION PROCESSING (BIOLOGY); SHIPS; VERTICAL TAKEOFF AIRCRAFT;
VISION; VISUAL AIDS
SH- <COSATI> 5H Man-machine Relations
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01675358
AN- <AEROSPACE> N86-14172
TI- Use of remote optical measurements in agriculture
TI- <SUPPLEMENT> Abstract Only
AU- BELCHANSKIY, G. I.; KONDRATYEV, K. Y.; KOZODEROV, V. V.; SAZONOV, N. V. ; TOPCHIYEV, A. G.; FEDCHENKO, P. P.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1985
PD- 198509
NT- In its USSR Rept.: Space (JPRS-USP-85-005) p 109-110 (SEE N86-14111 04-88)
NT- Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 5, Sep. - Oct. 1984 p 8-24
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08
JA- STAR8604
AB- In 1983 a number of organizations and institutes began joint work on use of remote measurement data obtained from aircraft and helicopters and ground data in the interests of agriculture. The program includes analysis of the factors influencing spectral reflectivity of soils and vegetation, development of methods for interaction between optical radiation and the soil-vegetation system, use of airborne spectrometric instrumentation for evaluating the chlorophyll content in plant leaves and determining the contamination of vegetation, surface studies of selected standard sectors of agricultural fields, regression analysis of data from surface photometric measurements and the parameters of the phytobiometric state of vegetation, organization of a data bank of spectral standards or keys and analysis of the possibilities of allowance for the distorting influence of the atmosphere. The fundamental theoretical premises for solution of these problems and some of the work done on solution of these problems are examined. (Author)
DE- <MAJOR> *AERIAL RECONNAISSANCE; *PHOTOMETRY; *SOILS; *VEGETATION
DE- AGRICULTURE; ECOLOGY; PLANTS (BOTANY); SOIL SCIENCE; SPECTROMETERS;
VEGETATION GROWTH
SH- 7543 Earth Resources (1975-)

AN- <DIALOG> 01665969
AN- <AEROSPACE> A87-49156
TI- AIAA Flight Simulation Technologies Conference, Monterey, CA, Aug. 17-19, 1987, Technical Papers
SO- Conference sponsored by AIAA. New York, American Institute of Aeronautics and Astronautics, 1987, 167 p. For individual items see A87-49157 to A87-49176.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8721
AB- Papers are presented on such topics as simulation in ADA, multiaircraft simulation, part-task simulation techniques, the effect of time delay and simulation mode on closed-loop pilot-vehicle performance, temporal fidelity in aircraft simulation visual systems, and the response of airline pilots to flight simulator motion. Consideration is also given to the flight simulation of multiple aircraft and helicopters using a single high-performance computer; the development of a real-time blade element aeroelastic rotor motion; simulation in support of advanced cockpit performance; and a flight simulator evaluation of the approach path parameters for MLS curved aproaches. (B.J.)
SF- AIAA

DE- <MAJOR> *CONFERENCES; *FLIGHT SIMULATION
DE- ADA (PROGRAMMING LANGUAGE); FLIGHT SIMULATORS; MOTION SIMULATION; PILOT
PERFORMANCE; TIME LAG
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01665721
AN- <AEROSPACE> A87-48908
TI- The coming-of-age of the public transport helicopter
AU- DENT, JOHN (Civil Aviation Authority, London, England)
SO- European Rotorcraft Forum, 11th, London, England, Sept. 10-13, 1985, Paper. 12 p.
PY- 1985
PD- 198509
LA- English
GL- United Kingdom
CP- International Organization
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8721
AB- Research being done to improve public transport helicopter safety is reviewed. Ditching performance, helicopter health monitoring, crashworthiness, human factors in accidents, safety monitoring, and operational aspects of safety are discussed. Future trends in the area of public helicopter transport are briefly addressed. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *HELICOPTERS; *PASSENGER AIRCRAFT; *TRANSPORT
AIRCRAFT
DE- AIRCRAFT ACCIDENTS; AIRCRAFT MAINTENANCE; CRASHWORTHINESS; DITCHING;
PILOT PERFORMANCE
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01661068
AN- <AEROSPACE> A87-44255
TI- Rotorcraft research - A national effort (The 1986 Alexander Nikolsky Honorary Lectureship)
AU- WARD, JOHN F. (ORI, Inc., Aeronautics and Space Technology Div., Rockville, MD)
CS- Operations Research, Inc., Rockville, MD.
CS- <CODE> OW815683
SO- (AHS, Annual National Forum, 42nd, Washington, DC, June 1986) American Helicopter Society, Journal (ISSN 0002-8711), vol. 32, April 1987, p. 3-20. Research supported by the American Helicopter Society, ORI, Inc., U.S. Army, and NASA.
PY- 1987
PD- 198704
RF- 11
SN- 0002-8711
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- The present history of rotary-wing and VTOL aircraft development initiatives in the U.S. notes that most such R&D efforts have tended to be 'threat-driven'; the threat has in recent years passed from one of a primarily military character to one of global civilian market growth competition. Recommendations are made concerning remaining research requirements in rotorcraft fluid dynamics, structural mechanics, and human factors engineering. Next-generation configurations to be intensively developed encompass tilt-rotors, advancing blade concept helicopters, convertible X-wings, and folding-blade tilt-rotors. (O.C.)

SF- AIAA
DE- <MAJOR> *RESEARCH AND DEVELOPMENT; *ROTORCRAFT AIRCRAFT; *VERTICAL
TAKEOFF AIRCRAFT
DE- FLUID DYNAMICS; HELICOPTER DESIGN; HISTORIES; HUMAN FACTORS ENGINEERING
; STRUCTURAL DESIGN; TILT ROTOR RESEARCH AIRCRAFT PROGRAM
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01660886
AN- <AEROSPACE> A87-44073
TI- Roadside tree attenuation measurements at UHF for land mobile satellite systems
AU- GOLDHIRSH, JULIUS (Johns Hopkins University, Laurel, MD); VOGEL, WOLFHARD J. (Texas, University, Austin)
CS- Johns Hopkins Univ., Laurel, MD.
CS- <CODE> JS767253
SO- IEEE Transactions on Antennas and Propagation (ISSN 0018-926X), vol. AP-35, May 1987, p. 589-596.

PY- 1987
PD- 198705
RF- 13
SN- 0018-926X
CN- N00024-85-C-5301; JPL-956520
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- Tree attenuation results at 870 MHz are described for experiments conducted in October 1985 and March 1986 in Central Maryland. These experiments employed a helicopter as a source platform and a van with receiver and data acquisition instrumentation. Tree attenuation results were obtained for the cases in which the van was stationary and in motion. The experiments were performed for the purpose of providing the designers of planned land mobile satellite systems with important elements in the determination of link parameter requirements; namely, the expected fading statistics due to roadside trees for both mobile and stationary vehicles. Single tree attenuation results gave worst case median fades as high as 15 dB although roadside tree values were noted to produce fades in excess of 20 dB for small percentages of time. The cumulative fade distributions and their relative contributions as a function of path elevation angle, right side versus left side driving, and different road types are derived from the field measurements. Upon comparing the attenuations from bare deciduous trees (March 1986) with those due to trees in full foliage (October 1985), the increase in dB attenuations were, in general, less than 25 percent for the dynamic cases, and less than 40 percent for the worst case static configuration. This result demonstrates that the dominant fading is caused by the wooded tree branches as opposed to the leaves on these branches. The tail end of the observed fade distributions was observed to follow lognormal distributions with respect to dB attenuation. (Author)
SF- AIAA
DE- <MAJOR> *LAND MOBILE SATELLITE SERVICE; *SIGNAL FADING; *TREES (PLANTS)
; *WAVE ATTENUATION
DE- AUTUMN; SIGNAL TRANSMISSION; SPRING (SEASON); SURFACE VEHICLES; ULTRAHIGH FREQUENCIES
SH- 8732 Communications & Radar (1987-)

AN- <DIALOG> 01660250
AN- <AEROSPACE> A87-43437
TI- A promising low speed air data system for helicopters
AU- MANDLE, J. (Crouzet, S.A., Division Aerospatiale, Valence, France)
SO- DGLR, European Rotorcraft Forum, 12th, Garmisch-Partenkirchen, West Germany, Sept. 22-25, 1986, Paper. 21 p.
PY- 1986
PD- 198609
LA- English
GL- France
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- The principle of operation, instrumentation, and performance of CLASS, a set of algorithms and hardware developed for the French defense department to calculate the (low) bidirectional airspeed of a helicopter using data from conventional pneumatic sensors, are discussed and illustrated with diagrams, drawings, and graphs. Calibration is performed using the truck-mounted anemometer scheme proposed by Mandle and Weiss. In flight tests performed at Bretigny during 1984, the CLASS equipment was shown to give accurate results in stabilized flights (standard deviation below 3 kts) and transient maneuvers. (T.K.)
SF- AIAA
DE- <MAJOR> *AIR DATA SYSTEMS; *AVIONICS; *HELICOPTERS; *LOW SPEED
DE- AIRBORNE/SPACEBORNE COMPUTERS; AIRCRAFT MANEUVERS; AIRSPEED; CALIBRATING; FLIGHT TESTS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01660246
AN- <AEROSPACE> A87-43433
TI- Observations of pilot control strategy in low level helicopter flying tasks
AU- PADFIELD, G. D.; CHARLTON, M. T.; HOUSTON, S. S. (Royal Aircraft Establishment, Bedford, England); PAUSDER, H.-J.; HUMMES, D. (DFVLR, Institut fuer Flugmechanik, Brunswick, West Germany)
SO- DGLR, European Rotorcraft Forum, 12th, Garmisch-Partenkirchen, West Germany, Sept. 22-25, 1986, Paper. 27 p.
PY- 1986
PD- 198609
RF- 17
LA- English

GL- United Kingdom
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- A series of task-oriented flight test techniques has been developed for flying qualities research with highly augmented helicopters. These techniques encompass task definition, flight testing, debriefing, and task analysis. The 'circle' maneuver has been introduced as a task for the exploration of pilot control strategy and hence of flying qualities associated with precise flight path control at high bank angles. Tests have been conducted with instrumented Puma and BO-105 aircraft involving low level tracking of ground-marked courses. The results presented are derived from the correlation of pilot opinion with the results of analyses of both performance and pilot control activity. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *FLIGHT TESTS; *HELICOPTER CONTROL; *PILOT PERFORMANCE
DE- FLIGHT PATHS; PILOT ERROR; POWER SPECTRA; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01660218
AN- <AEROSPACE> A87-43405
TI- Simulator evaluations of inceptors for ACT helicopters
AU- MASSEY, C. P. (Westland Helicopters, Ltd., Yeovil, England)
SO- DGLR, European Rotorcraft Forum, 12th, Garmisch-Partenkirchen, West Germany, Sept. 22-25, 1986, Paper. 18 p.
PY- 1986
PD- 198609
RF- 6
LA- English
GL- United Kingdom
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- Two 3-axis inceptors have been used in ground simulation trials at RAE Bedford during which approximately seventy hours of trials were flown by four primary evaluation pilots. Both inceptors were used as 2-axis as well as 3-axis controllers and systematic evaluations of inceptor forces and control signal shaping were performed. Objective measurements of performance and workload were taken and the pilots were asked to rate various aspects of their task performance as well as rating the system in use. Statistical analysis of these results has shown the benefits of control signal shaping and that the 2-axis configuration has performance advantages but no subjective preference compared with the 3-axis configuration. Guidance towards preferred feel forces has also been gained. The trials procedure has proved successful in producing results in which a high degree of confidence can be placed. (Author)
SF- AIAA
DE- <MAJOR> *ACTIVE CONTROL; *CONTROL EQUIPMENT; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *PILOT PERFORMANCE
DE- FLIGHT SIMULATORS; MILITARY HELICOPTERS; SIGNAL PROCESSING; STATISTICAL ANALYSIS; THREE AXIS STABILIZATION; TRAINING EVALUATION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01660217
AN- <AEROSPACE> A87-43404
TI- EH101 cockpit design
AU- BARTON, G.; REVELL, J.; WEBSTER, G. (Westland Helicopters, Ltd., Yeovil, England)
SO- DGLR, European Rotorcraft Forum, 12th, Garmisch-Partenkirchen, West Germany, Sept. 22-25, 1986, Paper. 18 p.
PY- 1986
PD- 198609
LA- English
GL- United Kingdom
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8719
AB- This paper describes the work undertaken on the EH101 'all CRT' cockpit design from initial conception through to system design, detailed format development and proposed certification programme covering the approach to the many topical issues such as power systems formats, integrity, reversion, software certification and the problems of three engine instrumentation. Described are the trade-off studies on weight, screen size, configuration and flexibility. The resulting selected system is described, including architecture, interfaces and modes of operation including reversion. The work undertaken on format

development particularly the power system displays with the problems of instrumentation for three engines, torque margin and hover formats is covered. The proposed certification programme is described before finally drawing conclusions from the work undertaken to date and discussing possible future enhancements to the EH101 Cockpit Electronics Display System. (Author)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *HELICOPTER DESIGN; *SYSTEMS INTEGRATION
DE- AVIONICS; BLOCK DIAGRAMS; CATHODE RAY TUBES; CERTIFICATION; MTBF; SCREENS; STRUCTURAL WEIGHT; TRADEOFFS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01658151
AN- <AEROSPACE> A87-41338
TI- The measurement of radar cross section
AU- MACKENZIE, J. D.; DYER, K. P. (Thorn-EMI Electronics, Ltd., Computer Systems Div., Wells, England); WARD, K. D. (Royal Signals and Radar Establishment, Malvern, England)
SO- IN: Military microwaves '86; Proceedings of the Conference, Brighton, England, June 24-26, 1986 (A87-41276 18-32). Tunbridge Wells, England, Microwave Exhibitions and Publishers, Ltd., 1986, p. 493-500. Research supported by the Ministry of Defence (Procurement Executive).
PY- 1986
PD- 198600
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8718
AB- A radar system has been developed to cover many of the requirements for the evaluation of target characteristics in the I-band (9-10 GHz). The system is transportable, rapidly deployable, and produces instantaneous full-illumination plots of target radar cross section (RCS). Although cooperative targets are preferred, targets of opportunity can be examined and high-resolution profiles and RCS obtained; sea clutter can also be investigated, and results of various types of wave structures can be shown. A block diagram of the system is presented, and its electronics, instrumentation, and main components are described in detail. (V.L.)
SF- AIAA
DE- <MAJOR> *CLUTTER; *RADAR CROSS SECTIONS; *RADAR TARGETS; *SIGNATURE ANALYSIS
DE- CASSEGRAIN ANTENNAS; HELICOPTERS; RADAR TRACKING; RADAR TRANSMITTERS; SHIPS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01657716
AN- <AEROSPACE> A87-40903
TI- Clothing surface area as related to body volume and clothing microenvironment volume
AU- KAKITSUBA, NAOSHI; MICHNA, HENRY; MEKJAVIC, IGOR B. (Simon Fraser University, Burnaby, Canada)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, May 1987, p. 411-416. Research supported by the British Columbia Science Council.
PY- 1987
PD- 198705
RF- 16
SN- 0095-6562
LA- English
GL- Canada
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8717
AB- The ratio of clothing surface area to body surface area, f(cl), is generally accepted as a function of clothing insulation. To predict the value of f(cl), the clothing fit of four helicopter pilot suits (Goretex, cotton ventile, Nomex/Insulite, and Nomex) was evaluated by means of measuring a newly introduced factor, termed 'radiation area factor', which is defined as the ratio of the effective radiation area to the body surface area, Ar/A(D). The values of the Ar/A(D) were derived, evaluating the A(r) from the pictures of subjects wearing either of the four suits or street clothing. On the basis of the results, a new approach is proposed for predicting the f(cl) as a function of the body volume and the clothing microenvironment volume. (I.S.)
SF- AIAA
DE- <MAJOR> *AREA; *BODY VOLUME (BIOLOGY); *CLOTHING; *FLIGHT CLOTHING
DE- HUMAN FACTORS ENGINEERING; RADIATIVE HEAT TRANSFER; THERMAL INSULATION

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01654582
AN- <AEROSPACE> A87-37769
TI- Night vision issues in 23 AF
AU- HAMMER, DAVID L. (USAF, Scott AFB, IL)
SO- SAFE Journal, vol. 17, Spring 1987, p. 10-12.
PY- 1987
PD- 198700
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8716
AB- Night vision difficulties encountered by 23 AF are examined. The types of aircraft and missions flown by 23 AF, and their visual standard requirements are described. The need for optometrists, opthamologists, and physiologist to consider the mission requirements of 23 AF when addressing night vision problems is discussed. (I.F.)
SF- AIAA
DE- <MAJOR> *MILITARY OPERATIONS; *NIGHT VISION; *PILOT PERFORMANCE; *VISUAL AIDS
DE- ARMED FORCES (UNITED STATES); FIXED WINGS; FLIGHT CONDITIONS; GOGGLES; ROTARY WING AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01654536
AN- <AEROSPACE> A87-37723
TI- Simulator sickness - A problem for Army aviation
AU- CROWLEY, JOHN S. (U.S. Army, Hanau Army Airfield, Hanau, West Germany)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, April 1987, p. 355-357.
PY- 1987
PD- 198704
RF- 8
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8716
AB- 'Simulator sickness' describes a symptom complex frequently reported by pilots during or after flight simulator training. There were 112 helicopter pilots at a U.S. Army AH-1 Cobra Flight Weapons Simulator (FWS) who completed a symptom-oriented subjective questionnaire. Of these, 40 percent reported symptoms of dysequilibrium; pilots developing simulator sickness had significantly more total and AH-1 flight time. Adaptation to the syndrome occurred with increasing FWS experience. The history and aeromedical significance of simulator sickness are briefly reviewed, and a case report presented. A mandatory grounding policy in use locally is described. Potential treatment strategies are briefly discussed. (Author)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT SIMULATION; *MOTION SICKNESS; *PILOT PERFORMANCE
DE- CASE HISTORIES; SIGNS AND SYMPTOMS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01654529
AN- <AEROSPACE> A87-37716
TI- Flight trial of a helmet-mounted display image stabilisation system
AU- WELLS, M. J.; GRIFFIN, M. J. (Southampton, University, England)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, April 1987, p. 319-322.
PY- 1987
PD- 198704
RF- 11
SN- 0095-6562
LA- English
GL- United Kingdom
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8716
AB- An image stabilization system for improving reading performance with a helmet-mounted display (HMD) during whole-body vibration was tested at night in a helicopter. Six subjects read arrays of 50 numerals as quickly and as accurately as possible while flying in three different flight conditions. The mean reading time for each array while stationary on the ground was approximately 21 s, and the mean reading error was 0.4 percent without stabilization. In-flight mean reading

time increased to approximately 40 s, and reading error was 18 percent without the stabilization system. Stabilizing the image significantly reduced the mean in-flight reading time to approximately 25 s with a 4 percent reading error. Data from the flight trial support the results of previous experiments, which suggest that HMD reading performance with vibration and night viewing conditions may be inferior to performance with daylight conditions. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *HELMET MOUNTED DISPLAYS; *IMAGE ENHANCEMENT;
*PERFORMANCE TESTS; *PILOT PERFORMANCE; *SYSTEMS STABILITY
DE- DYNAMIC STABILITY; NIGHT VISION; VIBRATION EFFECTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01654528
AN- <AEROSPACE> A87-37715
TI- Low back pain in the AH-1 Cobra helicopter
AU- FROOM, PAUL; HANEGBI, RAN; RIBAK, JOSEPH; GROSS, MOSHE (Israel Air Force, Aeromedical Centre, Tel Hashomer, Israel)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, April 1987, p. 315-318.
PY- 1987
PD- 198704
RF- 9
SN- 0095-6562
LA- English
GL- Israel
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8716
AB- The effect of posture on the prevalence and intensity of low back pain was investigated in eighteen AH-1 Cobra helicopter pilots who flew alternate missions of equal duration in both the gunner and the pilot positions. In the gunner's position (front seat), the AH-1 pilot maintains a vertical sitting position, whereas in the pilot's seat (rear), the pilot leans forward and to the left in order to operate the controls. Compared to the gunner's position, a flight in the pilot's position resulted in an increased incidence of pain (72.2 versus 55.6 percent), quicker onset of pain, and greater pain intensity. (I.S.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *BACK INJURIES; *PAIN; *PILOT PERFORMANCE;
*POSTURE
DE- ETIOLOGY; MILITARY HELICOPTERS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01652488
AN- <AEROSPACE> A87-35675
TI- Test flying the Cyclo-Crane 'proof-of-concept' experimental model N240AL
AU- MORRIS, J. J. (Aerolift, Inc., Tillamook, OR)
SO- Vertiflite (ISSN 0042-4455), vol. 33, Mar.-Apr. 1987, p. 40-50.
PY- 1987
PD- 198704
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8715
AB- The Cyclo-Crane hybrid aircraft concept and recent flight test results of the proof-of-concept model are presented. The structure is designed so that the net aerostatic lift of the helium in the aerostat is equal to the sum of all structural weight and 50 percent of the design slingload weight. The balance of lift for the design slingload weight and thrust for control and transition is created by the aerodynamic lift of the external airfoils. The test aircraft has an overall length of 178 feet, aerostat diameter and length of 68 feet and 136 feet respectively, and lift capacity of 4000 pounds. The pilot has a set of helicopter type controls which allow him to pitch and yaw the aircraft and translate along each of the three axes. When the aircraft is in a hover mode, the wings are positioned parallel to the shaft on which the centerbody rotates, providing lift via cyclic control, enabling the Cyclo-Crane to ascend and descend vertically and move laterally. Among the topics covered are: requisite instrumentation, preparation for tests, control feel, operation in winds, and operational safety. The first operational Cyclo-Crane is to have a 35- to 45-ton payload capacity. (D.H.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *CRANES; *FLIGHT TESTS; *HEAVY LIFT
AIRSHIPS
DE- AIRCRAFT INSTRUMENTS; AIRCRAFT SAFETY; FLIGHT CONTROL; HELIUM; HORIZONTAL FLIGHT; HOVERING

SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01652484
AN- <AEROSPACE> A87-35671
TI- Rotorcraft integration for improved mission cost effectiveness
AU- SCOUGHTON, CRAIG (Allied-Bendix Aerospace, Flight Systems Div., Teterboro, NJ)
SO- Vertiflite (ISSN 0042-4455), vol. 33, Mar.-Apr. 1987, p. 12-16.
PY- 1987
PD- 198704
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8715
AB- The integration of electronic systems on board modern military helicopters - to reduce the clutter and complexity of the proliferating black boxes commonly used to provide flight control, wide spectrum communications, precise navigation, threat protection, weapons guidance, cockpit instrumentation, obstacle/threat detection, and aircraft subsystem monitoring is examined. Basic system functions are noted that can be managed by integrated systems: the mission computer, remote terminal unit, display processor, crew station data entry, and crew station displays. System integration technologies currently under development include very-high-speed integrated circuitry, common modules, and the high-speed data bus. Examples of the more integrated approach are the advanced crew stations for the Boeing Model 360, the Air Force HH-60, the Army AHIP, and the joint service V-22. (D.H.)
SF- AIAA
DE- <MAJOR> *COST EFFECTIVENESS; *ROTORCRAFT AIRCRAFT; *SYSTEMS INTEGRATION

DE- AIRBORNE/SPACEBORNE COMPUTERS; AVIONICS; CREW WORKSTATIONS; MILITARY HELICOPTERS; SYSTEMS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01652232
AN- <AEROSPACE> A87-35419
TI- Visual acuity, corrective lenses, and accidents in helicopter pilots
AU- FROOM, PAUL; RIBAK, JOSEPH; BURGER, ABRAHAM; GROSS, MOSHE (Israel Air Force, Aeromedical Center, Ramat Gan)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, March 1987, p. 252, 253.
PY- 1987
PD- 198703
RF- 8
SN- 0095-6562
LA- English
GL- Israel
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8715
AB- The visual acuity of 38 helicopter pilots experiencing serious air accidents was compared to that of a control group of 72 pilots matched for age, aircraft, and hours of flight. Decrease in visual acuity was divided into two groups: (1) minor decreases in vision up to 20/25 (not requiring corrective lenses); and (2) visual acuity of 20/30 or less with correction to 20/20. Minor decreases in visual acuity were found in 23.7 percent of those in the accident group compared to 25.0 percent in the control group. There were more pilots in the control group who needed corrective lenses (12.5 percent versus 2.8 percent, p less than 0.07). It is concluded that helicopter pilots with corrective lenses or minor uncorrected decreases in visual acuity are not at increased risk for serious air accidents. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *EYEPIECES; *LENSES; *PILOT PERFORMANCE; *VISUAL ACUITY
DE- AEROSPACE MEDICINE; HELICOPTER PERFORMANCE; OPHTHALMOLOGY; PILOT ERROR
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01650206
AN- <AEROSPACE> A87-33393
TI- Back pains of helicopter pilots in 1985 - Results of a multipart study
TI- <ORIGINAL> Rachialgies des pilotes d'helicopteres en 1985 - Resultats d'une enquete pluricentrique
AU- METGES, P. J.; FLAGEAT, J.; MOUCHON, Y. (Hopital d'Instruction des Armees Begin, Saint-Mande, France)
SO- Medecine Aeronautique et Spatiale, vol. 25, 4th Quarter, 1986, p.

310-315. In French.
PY- 1986
PD- 198600
RF- 24
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- A study, consisting of a questionnaire, a clinical examination, and an X-ray examination, of 232 helicopter pilots and 175 nonpilot flight personnel is performed to investigate the phenomenon of back pain. For the pilots, chronic back pain, particularly in the lumbar region, occurred most frequently, with fewer incidents of acute back pain and complications such as cervicobrachial neuralgia. Back pain appeared to be common to both groups, and its source is thought to be musculoligamentary. The onset of lumbar region pain is found to occur much later in terms of accumulated flight time than in the past, presumably due to better designed seats and technological improvements damping aircraft vibration. (R.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT STRESS (BIOLOGY); *HELICOPTERS; *LUMBAR REGION; *PAIN
DE- HELMETS; HUMAN FACTORS ENGINEERING; SEATS; VIBRATION EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01649874
AN- <AEROSPACE> A87-33061
TI- Effects of stimulus characteristics and task demands on pilots' perception of dichotic messages
AU- WENZEL, ELIZABETH M. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: Human Factors Society, Annual Meeting, 30th, Dayton, OH, Sept. 29-Oct. 3, 1986, Proceedings. Volume 2 (A87-33001 13-54). Santa Monica, CA, Human Factors Society, 1986, p. 1177-1181.
PY- 1986
PD- 198600
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- The experiment is an initial investigation of pilot performance when auditory advisory messages are presented dichotically, either with or without a concurrent pursuit task requiring visual/motor dexterity. The dependent measures were percent correct and correct reaction times for manual responses to the auditory messages. Two stimulus variables which show facilitory effects in traditional dichotic-listening paradigms, differences in pitch and semantic content of the messages, were examined to determine their effectiveness during the functional simulation of helicopter pursuit. In an effort to accumulate points for the advisory messages for accuracy alone or for both accuracy and reaction times which were faster than their opponent's. In general, the combined effects of the stimulus and task variables are additive. When interactions do occur they suggest that an increase in task demands can sometimes mitigate, but usually does not remove, any processing advantages accrued from stimulus characteristics. The implications of these results for cockpit displays are discussed. (Author)
SF- AIAA
DE- <MAJOR> *AUDITORY PERCEPTION; *AUDITORY STIMULI; *PILOT PERFORMANCE
DE- AUDITORY SIGNALS; DICHOTOMIES; HELICOPTERS; TASK COMPLEXITY; VOICE COMMUNICATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01649860
AN- <AEROSPACE> A87-33047
TI- Development and evaluation of a proportional displacement sidearm controller for helicopters
AU- KRUK, R. V.; RUNNINGS, D. W.; KING, M.; LIPPAY, A. L.; MCKINNON, G. M. (CAE Electronics, Montreal, Canada)
SO- IN: Human Factors Society, Annual Meeting, 30th, Dayton, OH, Sept. 29-Oct. 3, 1986, Proceedings. Volume 2 (A87-33001 13-54). Santa Monica, CA, Human Factors Society, 1986, p. 865-869.
PY- 1986
PD- 198600
RF- 11
LA- English
GL- Canada
CP- United States

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- Associated with the development of fly-by-wire control systems for use in helicopters has been the prospect of replacing all of the current manual flight controls in the cockpit with a single sidearm controller. For the most part, the technology available for this concept has consisted of variations of force sensing sidearm controllers. The human proprioceptive system, hower, does not perform optimally in force discrimination and stable maintenance of force outputs. One consequence of this is that operator feedback with respect to direction and magnitude of control input with force sensing manual control systems is relatively poor. An alternative approach applying proportional displacement sensing rather than force sensing was developed and evaluated via laboratory studies and flight tests in a research helicopter. The results to date indicate that pilot workload and performance with a displacement sensing controller are equivalent to conventional controls and superior to a force sensing controller across a wide spectrum of flight conditions and maneuvers. All four control functions (i.e., roll, pitch, yaw, and collective) were on one hand in both the force and displacement sensing configurations. A sidearm controller utilizing displacement sensing rather than force sensing retains most of the advantages of the latter (e.g., simplicity, compactness) while offering superior compatibility with human operator sensorimotor characteristics. (Author)
SF- AIAA
DE- <MAJOR> *FLY BY WIRE CONTROL; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS
; *PILOT PERFORMANCE; *PROPORTIONAL CONTROL
DE- COCKPITS; DISPLACEMENT MEASUREMENT; PROPRIOCEPTION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01649847
AN- <AEROSPACE> A87-33034
TI- A methodology for predicting crew workload in new weapon systems
AU- ALDRICH, THEODORE B.; SZABO, SANDRA M. (Anacapa Sciences, Inc., Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 30th, Dayton, OH, Sept. 29-Oct. 3, 1986, Proceedings. Volume 1 (A87-33001 13-54). Santa Monica, CA, Human Factors Society, 1986, p. 633-637.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- The Army currently is evaluating the feasibility of single-crewmember operation of a multipurpose, lightweight helicopter, designated the LHX. To determine if a single operator can perform the LHX scout and attack missions, 29 mission segments were analyzed for excessive workload. The mission segments were divided into performance elements (tasks) and were positioned on mission segment timelines. For each performance element, the man-machine interface was identified and estimates of the visual, auditory, cognitive, and psychomotor components of workload were assigned. The mission/task/workload data were used to build one- and two-crewmember computer models designed to predict total workload and to identify overloads in each mission segment. Two baseline analyses were conducted to predict workload under low-automation conditions for one- and two-crewmember LHX configurations. In addition, iterative analyses were conducted to predict the reduction in workload associated with each of 26 individual automation options and 16 combinations of options. The methodology provides a systematic means of predicting human operator workload in advance of system design. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *LIGHT HELICOPTERS; *MAN MACHINE
SYSTEMS; *PILOT PERFORMANCE; *WEAPON SYSTEMS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT CONTROL; HUMAN FACTORS ENGINEERING; LIGHT HELICOPTERS; TASK
COMPLEXITY; WARFARE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01649846
AN- <AEROSPACE> A87-33033
TI- Empirical workload and communications analysis of scout helicopter exercises
AU- SHAFER, JOHN B. (IBM Corp., Federal Systems Div., Bethesda, MD); SHAFFER, MARGARET T.; KUTCHE, GEORGE B.
SO- IN: Human Factors Society, Annual Meeting, 30th, Dayton, OH, Sept. 29-Oct. 3, 1986, Proceedings. Volume 1 (A87-33001 13-54). Santa Monica, CA, Human Factors Society, 1986, p. 628-632.
PY- 1986

PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- The objective was to find independent real-world data to validate results of paper-and-pencil analyses predicting workload savings by automating functions in an advanced scout-attack helicopter. Videotapes existed that had captured cockpit activities during force-on-force exercises. The videotapes were analyzed to determine the relative workload contribution of communications and crew station activities for the pilot and copilot observer. The findings indicated search activity was the single most time consuming mission-related function other than flying the aircraft. Further, data entry required a crewmember's undivided attention; therefore automated communications should consider the implications of manual data entry which may increase rather than decrease workload. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *P-531 HELICOPTER; *PILOT PERFORMANCE; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DATA RECORDING; HUMAN FACTORS ENGINEERING; NAVIGATION; SEARCHING; TARGET RECOGNITION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01648507
AN- <AEROSPACE> A87-31694
TI- Noise, vibration and changes in wakefulness during helicopter flight
AU- LANDSTROM, ULF; LOFSTEDT, PER (National Board of Occupational Safety and Health, Umea, Sweden)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, Feb. 1987, p. 109-118. Research supported by the National Board of Occupational Safety and Health of Sweden.
PY- 1987
PD- 198702
RF- 27
SN- 0095-6562
LA- English
GL- Sweden
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8713
AB- The investigation was carried out in cooperation with the helicopter school AF 1 in Boden. Measurements were made in two different types of helicopter, Hkp 3 and Hkp 6. Three different parameters were recorded during the flights: noise, vibrations, and wakefulness. Noise and vibration exposures were mainly correlated to the main rotor energy and frequency. Both types of exposure were dominated by lower frequencies, below 10 Hz. Analyses of wakefulness during long-distance flights, about 4 h, and short-distance flights, less than 2 h, were based on EEG and EKG recordings. As expected the level of wakefulness was influenced by the stress upon the pilots. Take-offs and landings, as well as unexpected events during the flight, were correlated to an increased level of wakefulness. In some cases flying was correlated to a gradual increase of weariness. The correlation between weariness, types of flying, and the external environmental factors of noise and vibration, is also discussed. (Author)
SF- AIAA
DE- <MAJOR> *ENGINE NOISE; *FLIGHT CONDITIONS; *HELICOPTER ENGINES; *PILOT PERFORMANCE; *VIBRATION EFFECTS; *WAKEFULNESS
DE- ELECTROCARDIOGRAPHY; ELECTROENCEPHALOGRAPHY; FLIGHT FATIGUE; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY); TIME DEPENDENCE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01648300
AN- <AEROSPACE> A87-31487
TI- The digital map as a tactical situation display
AU- SHUPE, NORMAN K.; BERNABE, BARBARA (U.S. Army, Avionics Research and Development Activity, Fort Monmouth, NJ)
SO- IN: Digital Avionics Systems Conference, 7th, Fort Worth, TX, Oct. 13-16, 1986, Proceedings (A87-31451 13-01). New York, Institute of Electrical and Electronics Engineers, Inc., 1986, p. 275-288.
PY- 1986
PD- 198600
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA8713
AB- A topographic map as a graphic basis for presenting tactical information is consistent with the human information processing capacity required for rapid situation assessment. The primary barrier to developing a topographically based situation display has been merging the tactical image and the topographic image on a single display surface. A digital map integrated with a modern symbol generator and airborne processing power can overcome this barrier. The airborne processor can be exploited to interpret alphanumeric tactical data and transform it to a graphic representation, while the symbol generator can inset the resulting tactical image over the topographic image. A consequence of the available flexibility of this technology is an increase in the numbers and complexity of tactical data to be managed. Thus, the ultimate utility of the resulting display depends on an efficient operator interface to facilitate interaction with data. The present paper describes the integration of a digital topographic map as a tactical data display on an OH58-D aircraft. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COMPUTER AIDED MAPPING; *DIGITAL NAVIGATION; *DISPLAY DEVICES; *IMAGE PROCESSING
DE- HUMAN FACTORS ENGINEERING; MILITARY HELICOPTERS; NAP-OF-THE-EARTH NAVIGATION; SYMBOLIC PROGRAMMING; TACTICS; TERRAIN ANALYSIS; TOPOGRAPHY
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01648264
AN- <AEROSPACE> A87-31451
TI- Digital Avionics Systems Conference, 7th, Fort Worth, TX, Oct. 13-16, 1986, Proceedings
SO- Conference sponsored by IEEE and AIAA. New York, Institute of Electrical and Electronics Engineers, Inc., 1986, 831 p. For individual items see A87-31452 to A87-31549.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8713
AB- Various papers on digital avionics systems are presented. The general topics addressed include: software management; standard modular avionics, communication, navigation, and identification; space systems technology; rotorcraft avionics; advanced control/display technology for crew systems; software development and evaluation tools; data buses in subsystem interconnections; digital map techniques; commercial transportation avionics/collision avoidance systems; and human factors in crew systems. Also considered are: software verification and quality assurance; sensor signal and data processing; design for testability in system concept; fiber optics; Ada; fault tolerance and reconfigurability in system concept; digital flight controls; data link system applications; artificial intelligence and expert systems; advanced digital integrated circuits technology, design, and testability; integrated flight/propulsion control; and general aviation avionics. (C.D.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *CONFERENCES; *DIGITAL ELECTRONICS
DE- ADA (PROGRAMMING LANGUAGE); AUTOMATION; COMPUTER AIDED DESIGN; COMPUTER SYSTEMS PROGRAMS; DEMAND ASSIGNMENT MULTIPLE ACCESS; DISPLAY DEVICES; EMBEDDED COMPUTER SYSTEMS; EXPERT SYSTEMS; EXTRAVEHICULAR ACTIVITY; HIGH LEVEL LANGUAGES; MANAGEMENT INFORMATION SYSTEMS; MILITARY TECHNOLOGY; MULTIPROCESSING (COMPUTERS); PRODUCTIVITY; RADIO RECEIVERS; REAL TIME OPERATION; SIGNAL PROCESSING; VERY LARGE SCALE INTEGRATION
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01647913
AN- <AEROSPACE> A87-31100
TI- Application of low-power, high-rate PCM telemetry in a helicopter instrumentation system
AU- THOMAS, MITCHEL E.; DIAMOND, JOHN K. (NASA, Langley Research Center, Hampton, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
SO- ISA, International Instrumentation Symposium, 33rd, Las Vegas, NV, May 3-8, 1987, Paper. 16 p.
PY- 1987
PD- 198705
LA- English
GL- United States
CP- United States

DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8712
AB- The use of low-power, high-rate pulse code modulation (PCM) in a helicopter instrumentation system is examined. A Helicopter Instrumentation and Recording System (HIARS) was developed to obtain main rotor blade measurements and fuselage performance measurements. The HIARS consists of a low-power PCM telemeter, a digital PCM system, an optical rotor position sensor, and a PCM decommutation unit; the components and functions of these subsystems are described. Flight tests were conducted to evaluate the ability of the HIARS to measure aircraft parameters. The test data reveal that the PCM telemetry is applicable to helicopter instrumentation systems. (I.F.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *HELICOPTER DESIGN; *NOISE MEASUREMENT;
*P.A.C.M. TELEMETRY; *PERFORMANCE TESTS; *PULSE CODE MODULATION
DE- FUSELAGES; IN-FLIGHT MONITORING; ROTARY WINGS; SYSTEMS ENGINEERING
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01647314
AN- <AEROSPACE> A87-30501
TI- Avco-Pratt - Getting its LHX engine field-ready
AU- HARVEY, DAVID
SO- Rotor and Wing International (ISSN 0191-6408), vol. 21, Feb. 1987, p. 26, 28, 56.
PY- 1987
PD- 198702
SN- 0191-6408
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8712
AB- An account is given of two manufacturers' joint development and manufacturing of the U.S. Army LHX helicopter competition-oriented T-800-APW-800 turboshaft engine. The primary performance goals of this engine's development have been (1) high power/weight ratio; (2) high fuel economy; (3) a fast response rate to throttle settings, in keeping with required LHX agility; and (4) exceptional service life. The engine is of two-spool configuration, with a three-stage variable geometry compressor having two axial stages and a centrifugal one. Attention is given to development efforts aimed at the 'soldier proofing' of engine maintenance requirements. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *ENGINE DESIGN; *HELICOPTER ENGINES;
*LIGHT HELICOPTERS; *MILITARY AIRCRAFT; *PRODUCT DEVELOPMENT
DE- GOVERNMENT PROCUREMENT; HUMAN FACTORS ENGINEERING; OPERATIONAL PROBLEMS
; PROCUREMENT POLICY
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01645313
AN- <AEROSPACE> A87-28500
TI- Psychophysiological and neurological aspects of flight-personnel fatigue
TI- <ORIGINAL> Psikhofiziologicheskie i nevrologicheskie aspekty problemy utomleniia letnogo sostava
AU- EGOROV, V. A.; KOMANDENKO, N. I.
SO- Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Sept. 1986, p. 44, 45. In Russian.
PY- 1986
PD- 198609
RF- 8
SN- 0026-9050
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8711
AB- Subjective and objective fatigue symptoms caused by polymorphic functional disturbances in the nervous system, the analyzers, and other organs and systems is discussed, together with the sequence of appearance of these symptoms. Emphasis is placed on the diagnosis of early symptoms of the fatigue syndrome, such as the asthenia syndrome (characterized by headaches, increased irritability, sleep disturbances, low tolerance to physical and mental loads, and increased perspiration), oral automatism, elevated thresholds of tactile sensitivity, and elevated or lowered ligamental and periostal reflexes. Poor coordination, equilibrium disturbance, and vegetative polyneuritis (especially in helicopter pilots) also appear early. Early recognition of these symptoms is important in prophylaxis and treatment of fatigued

personnel and, in the long run, in increasing their life expectancy. (
I.S.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *AVIATION PSYCHOLOGY; *FATIGUE (BIOLOGY);
*NEUROLOGY; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- PHYSIOLOGICAL EFFECTS; PSYCHOLOGICAL FACTORS; SIGNS AND SYMPTOMS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01641840
AN- <AEROSPACE> A87-25027
TI- The development of advanced technology blades for tilt-rotor aircraft
AU- ALEXANDER, HAROLD R. (Boeing Vertol Co., Philadelphia, PA); MAISEL, MARTIN D. (NASA, Ames Research Center; U.S. Army, Aeromechanics Laboratory, Moffett Field, CA); GIULIANETTI, DEMO J. (NASA, Ames Research Center, Moffett Field, CA)
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> BR870123
SO- (European Rotorcraft Forum, 11th, London, England, Sept. 10-13, 1985) Vertica (ISSN 0360-5450), vol. 10, no. 3-4, 1986, p. 315-339.
PY- 1986
PD- 198600
RF- 7
SN- 0360-5450
LA- English
GL- United States
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8709
AB- The paper discusses the development and ground testing of blades for the XV-15 tilt-rotor demonstrator aircraft. This work was performed under contract NAS2-11250 with NASA Ames Research Center. These blades, known as the Advanced Technology Blades (ATB), replace the rectangular, steel blades which were part of the XV-15 original design. The materials used in the primary structure of the ATB are fiberglass and high strain graphite epoxy laminates. This facilitates the use of 43 deg of nonlinear twist, a nonuniform tapered planform and thin airfoils required for aerodynamic efficiency. Instrumentation life is extended by encapsulating gages and wiring in the composite structure. Tip shells and cuff fairings are removable to provide access to tip weights and retention hardware; they are also replaceable with alternate research configurations. Extensive laboratory testing has validated predicted strength characteristics. Hover testing has demonstrated performance significantly superior to that predicted by contemporary methodology. Key elements of the test rig used for rotor performance measurement were developed as an ancillary part of the present program. The performance testing included measurement of near- and far-field noise. Induced inflow velocity distributions were also determined and photographs of tip vortex condensation trails were taken. These are providing guidance for modifications to hover peformance codes. (Author
)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *ROTARY WINGS; *TILT ROTOR AIRCRAFT; *XV-15
AIRCRAFT
DE- AIRCRAFT NOISE; GLASS FIBERS; GRAPHITE-EPOXY COMPOSITES; NOISE MEASUREMENT; PLASTIC AIRCRAFT STRUCTURES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01640919
AN- <AEROSPACE> A87-24106
TI- Solid mechanical vibrations. III
TI- <ORIGINAL> Les vibrations mecaniques solidiennes. III
TI- <EXTENSION> pilot exposure
AU- POIRIER, J. L.
SO- Medecine Aeronautique et Spatiale, vol. 25, 3rd Quarter, 1986, p. 229-236. In French.
PY- 1986
PD- 198600
RF- 30
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8709
AB- Vibratory phenomena which can affect the health of humans riding in vehicles are discussed, along with available techniques for ameliorating the effects of vibrations. Attention is given to the perception of the vibrations, the types and magnitudes of harm imparted to humans at different vibrational frequencies, and to the physiological areas which are most subject to damage from vibrational loading. The vibrational hazards of land vehicles, helicopters and aircraft are reviewed, together with the use of active and suspended

seats for reducing the vibrational load on the pilot, noting the increased chances of harmful effects with the length of time for the specific types of vehicles. Adaptive control systems and pilot posture seats are considered as means to lessening pilot exposure to vibration. (M.S.K.)
SF- AIAA
DE- <MAJOR> *BONES; *NERVOUS SYSTEM; *PILOT PERFORMANCE; *TENDONS; *VIBRATION EFFECTS; *VIBRATION ISOLATORS
DE- AVIONICS; HELICOPTERS; POSTURE; PROPHYLAXIS; SEATS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01636227
AN- <AEROSPACE> A87-19414
TI- Instrumentation for RCS measurements of modulation spectra of aircraft blades
AU- FLISS, G. G.; MENSA, D. L. (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA)
SO- IN: National Radar Conference, Los Angeles, CA, March 12, 13, 1986, Proceedings (A87-19401 06-32). New York, Institute of Electrical and Electronics Engineers, Inc., 1986, p. 95-99.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
AB- This paper describes the implementation of an instrumentation system for measuring spectral signatures of rotating aircraft blades. The objective of the system is to measure spectral signatures in terms of their absolute radar cross section. Suitable for measuring stationary vehicles with rotating propulsion and lift systems, the coherent CW heterodyne system is assembled using commercially available instruments and components. The unique feature of the implementation is the ability to measure low Doppler frequencies from structrures which are rotated at very low rates. When coupled with a modern digital signal analyzer, complex modulation spectra of the object signature can be displayed rapidly and accurately. Examples of spectral signatures, obtained from laboratory and field measurements on helicopter rotating assemblies, are presented to demonstrate the capabilities of the system. (Author)
SF- AIAA
DE- <MAJOR> *MEASURING INSTRUMENTS; *RADAR CROSS SECTIONS; *RADAR SIGNATURES; *ROTARY WINGS; *SPECTRAL SIGNATURES
DE- CALIBRATING; PORTABLE EQUIPMENT; SIGNAL PROCESSING; SYSTEM EFFECTIVENESS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01636080
AN- <AEROSPACE> A87-19267
TI- Static test and flight test of the Army/Bell ACAP helicopter
AU- REISDORFER, D. (Bell Helicopter Textron, Fort Worth, TX); MAZZA, L. T. (U.S. Army, Aviation Applied Technology, Directorate, Fort Eustis, VA)
SO- IN: American Helicopter Society, Annual Forum, 42nd, Washington, DC, June 2-4, 1986, Proceedings. Volume 2 (A87-19201 06-01). Alexandria, VA, American Helicopter Society, 1986, p. 865-872.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
AB- The static test of the Army/Bell Advanced Composite Airframe Program (ACAP) Static Test Article has recently been completed and flight testing of the Flight Test Vehicle is now ongoing. This paper discusses the techniques that have been used in testing these two airframes and highlights the special test considerations that have been developed for composite structures during this program. The topics discussed include: (1) methods of accounting for environmental degradation effects on composite materials in static tests; (2) application of static test results as verification of structure for safety of flight; and (3) instrumentation accuracy requirements and difficulties in measuring true strains in nonhomogeneous materials. The paper concludes with philosophies and techniques recommended to be explored for improved test methods in future programs. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *MILITARY HELICOPTERS; *STATIC TESTS
DE- AIRCRAFT SAFETY; AIRFRAMES; BELL AIRCRAFT; COMPOSITE STRUCTURES; ENVIRONMENTAL TESTS; WEIGHT REDUCTION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01636068
AN- <AEROSPACE> A87-19255
TI- Flight evaluation of height response characteristics for the hover bob-up task and comparison with proposed criteria
AU- HINDSON, W. S. (NASA; Stanford University, Joint Institute of Aeronautics and Acoustics, CA); TUCKER, G. E.; LEBACQZ, J. V.; HILBERT, K. B. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: American Helicopter Society, Annual Forum, 42nd, Washington, DC, June 2-4, 1986, Proceedings. Volume 2 (A87-19201 06-01). Alexandria, VA, American Helicopter Society, 1986, p. 685-709.
PY- 1986
PD- 198600
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
AB- The CH-47B variable-stability helicopter was used to evaluate a range of height-response configurations while performing a precision hover bob-up task. The purpose of the study was to assess the validity of results obtained in previous ground-based and in-flight simulations in the context of a precision bob-up task and to provide additional flight data for inclusion in revisions to specifications for helicopter handling qualities. Height response characteristics were implemented using explicit model-following techniques, and the resulting CH-47B dynamics were validated using time-domain and frequency-domain data-analysis methods. The tests complemented the previous investigations by providing detailed pilot comments and ratings, and performance and control-utilization data that relate exclusively to the hover bob-up task. The results are compared with those from previous investigations and with new criteria that have been proposed for handling qualities requirements for helicopters. (Author)
SF- AIAA
DE- <MAJOR> *CH-47 HELICOPTER; *FLIGHT MECHANICS; *FLIGHT TESTS; *HOVERING
DE- AIRCRAFT LANDING; MODEL REFERENCE ADAPTIVE CONTROL; PILOT PERFORMANCE; RESEARCH AIRCRAFT; TIME RESPONSE; VERTICAL MOTION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01636066
AN- <AEROSPACE> A87-19253
TI- An investigation of single-piloted advanced cockpit and control configurations for nap-of-the-earth helicopter combat mission tasks
AU- HAWORTH, L. A.; BIVENS, C. C.; SHIVELY, R. J. (U.S. Army, Aeroflightdynamics Directorate, Moffett Field, CA)
SO- IN: American Helicopter Society, Annual Forum, 42nd, Washington, DC, June 2-4, 1986, Proceedings. Volume 2 (A87-19201 06-01). Alexandria, VA, American Helicopter Society, 1986, p. 657-672.
PY- 1986
PD- 198600
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
SF- AIAA
DE- <MAJOR> *AUTOMATIC CONTROL; *COCKPITS; *HELICOPTER CONTROL; *MILITARY HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION
DE- DISPLAY DEVICES; FLIGHT SIMULATION; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01636065
AN- <AEROSPACE> A87-19252
TI- Pilot use of simulator cues for autorotation landings
AU- DECKER, W. A.; ADAM, C. F.; GERDES, R. M. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: American Helicopter Society, Annual Forum, 42nd, Washington, DC, June 2-4, 1986, Proceedings. Volume 2 (A87-19201 06-01). Alexandria, VA, American Helicopter Society, 1986, p. 635-655.
PY- 1986
PD- 198600
RF- 15
LA- English

GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
AB- A ground-based simulator experiment was conducted to investigate the influence of simulator cue variations on helicopter autorotation landing-task performance. Using the NASA Ames Research Center Vertical Motion Simulator (VMS), variations were made in motion-system performance and selection of either longitudinal or lateral linear acceleration cues. Analysis of landing performance statistics and pilot commentary revealed that task performance changed with degraded motion cues. However, fixed base (no motion) could provide acceptable landing performance if adequate visual cues were present. Lontitudinal linear-acceleration cues assisted one pilot's control of the landing forward speed, while lateral linear-acceleration cues assisted in control of lateral drift or sideslip. Variations were also made in the content and details of visual landing scenes. Pilot commentary collected on the use of three landing scenes stressed the importance of receiving consistent, easily recognized, position, attitude, and speed cues from the visual scene. The importance of subtle aural cues to pilot acceptance of the simulation was also noted. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *HELICOPTERS; *LANDING AIDS; *MAN MACHINE SYSTEMS; *VISUAL STIMULI
DE- AUTOROTATION; COMPUTER VISION; EXPERIMENT DESIGN; PILOT PERFORMANCE; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01635325
AN- <AEROSPACE> A87-18512
TI- Planning for T800-LHT-800 availability, supportability and affordability
AU- BULT, K.; WALLACE, W. L. (Garrett Turbine Engine Co., Phoenix, AZ)
SO- Vertiflite (ISSN 0042-4455), vol. 32, Sept.-Oct. 1986, p. 30-33.
PY- 1986
PD- 198610
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8706
AB- The integration of reliability, availability, and maintainability; integrated logistics support; and manpower and personnel activities in the design and development of the T800-LHT-800 engine is discussed. The basic features of the 1200 shaft horsepower engine developed for military use are described. The two-level maintenance program for the engine, aviation user and depot-level maintenance, are examined. (I.F.)

SF- AIAA
DE- <MAJOR> *ENGINE DESIGN; *GAS TURBINE ENGINES; *HELICOPTER ENGINES; *TURBOSHAFTS
DE- ENGINE MONITORING INSTRUMENTS; HUMAN FACTORS ENGINEERING; MILITARY HELICOPTERS; PRODUCTION PLANNING; VULNERABILITY
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01633638
AN- <AEROSPACE> A87-16825
TI- Development of computer-generated imagery for a low-cost real-time terrain imaging system
AU- FOX, T. A.; CLARK, P. D. (U.S. Army, Human Engineering Laboratory, Aberdeen Proving Ground, MD)
SO- IN: NAECON 1986; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-23, 1986. Volume 3 (A87-16726 05-01). New York, Institute of Electrical and Electronics Engineers, 1986, p. 986-991.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8705
AB- The U.S. Army Human Engineering Laboratory has acquired a computer-generated, real-time terrain imaging system. This system, known as HELICON, is used to produce images of terrain features as they would be seen from the front window of a helicopter. It provides a source of constant visual stimuli while collecting pilot performance data related to the research and development of new Army helicopter

systems. An important feature of this system is low cost, due to the use of off-the-shelf hardware; a VAX 11/780 and an ADAGE 3000 graphics processor. The procedure involved in creating the terrain features are described, and the system are discussed. (Author)
SF- AIAA
DE- <MAJOR> *COMPUTER GRAPHICS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING;
*HUMAN FACTORS LABORATORIES; *IMAGING TECHNIQUES; *TERRAIN ANALYSIS
DE- COORDINATES; LOW COST; PILOT PERFORMANCE; REAL TIME OPERATION; VISUAL
STIMULI
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01633628
AN- <AEROSPACE> A87-16815
TI- A Micro SAINT simulation analyzing operator workload in a future attack helicopter
TI- <EXTENSION> Systems Analysis of Integrated Networks of Tasks
AU- LAUGHERY, R.; DREWS, C.; ARCHER, R. (Micro Analysis and Design, Boulder, CO); KRAMME, K. (Texas Instruments, Inc., Dallas)
SO- IN: NAECON 1986; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-23, 1986. Volume 3 (A87-16726 05-01). New York, Institute of Electrical and Electronics Engineers, 1986, p. 896-903.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8705
AB- Task network modeling using the microcomputer-based, menu-driven Micro SAINT language is presented as for quantitatively predicting operator workload in the earliest stages of avionics design. The sequence of tasks performed, i.e., the task network, by the human operator, helicopter and threats are modeled to a desired level of fidelity. Shared variables are identified to account for interactions among the different network segments. Techniques by which Micro SAINT was implemented to evaluate the operator workload in a future attack helicopter are delineated. (M.S.K.)
SF- AIAA
DE- <MAJOR> *COMPUTERIZED SIMULATION; *COST EFFECTIVENESS; *HELICOPTER
DESIGN; *PILOT PERFORMANCE
DE- AUTOMATION; COCKPITS; FIGHTER AIRCRAFT; PERFORMANCE PREDICTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01633624
AN- <AEROSPACE> A87-16811
TI- Data on the usability of Micro SAINT
TI- <EXTENSION> Systems Analysis of Integrated Networks of Tasks
AU- ARCHER, R.; DREWS, C.; LAUGHERY, R.; DAHL, S. (Micro Analysis and Design, Boulder, CO); HEGGE, F. (U.S. Army, Walter Reed Army Institute of Research, Washington, DC)
SO- IN: NAECON 1986; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-23, 1986. Volume 3 (A87-16726 05-01). New York, Institute of Electrical and Electronics Engineers, 1986, p. 855-858.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8705
AB- The implementation of a microcomputer version of the simulation software tool SAINT (Systems Analysis of Integrated Networks of Tasks) is described. Micro SAINT was developed to assist in simulating human operator activities. The program considers the task network, a catalog of variables and a function library, continuous variable changes, the simulation scenario, and snapshots of an ongoing simulation. The current version is limited to 250 nodes in the task network. The model was used to examine the workload of pilots flying the LHX helicopter, to model an aircrew training system for AH-1S attack helicopter aircrew, and to simulate the performance of the crew of an M60 tank are outlined. (M.S.K.)
SF- AIAA
DE- <MAJOR> *COMPUTER PROGRAMMING; *COMPUTERIZED SIMULATION; *HUMAN FACTORS
ENGINEERING
DE- LIGHT HELICOPTERS; MICROCOMPUTERS; OPERATOR PERFORMANCE; SOFTWARE TOOLS
; TANKS (COMBAT VEHICLES)

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01633618
AN- <AEROSPACE> A87-16805
TI- The effect of helicopter vibration on the accuracy of a voice recognition system
AU- MALKIN, F. J. (U.S. Army, Human Engineering Laboratory, Aberdeen Proving Ground, MD); DENNISON, T. W. (Sperry Corp., Aerospace and Marine Group, Albuquerque, NM)
SO- IN: NAECON 1986; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-23, 1986. Volume 3 (A87-16726 05-01). New York, Institute of Electrical and Electronics Engineers, 1986, p. 813-817.
PY- 1986
PD- 198600
RF- 14
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8705
AB- Several issues remain to be resolved before speech recognition can be considered on a viable technology for helicopters. One of these is changes in the voice that occur as a result of stress, noise, and vibration. This paper reports the results of an investigation to determine the effect of vibration-induced changes in the voice on the accuracy of a speech-recognition system. A series of flight tests were conducted using 12 participants and 8 different flight maneuvers. Data were collected with the participant speaking 50 phonetically balanced words into the speech recognizer while seated in the copilot's seat of a UH-1H helicopter. The results indicate that speech-recognition-system accuracy is not affected by helicopter vibration. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *SPEECH RECOGNITION; *VIBRATION EFFECTS
DE- ACCURACY; BACKGROUND NOISE; FLIGHT TESTS; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY)
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01633617
AN- <AEROSPACE> A87-16804
TI- Speech processing - The Crouzet research and development programme
AU- TARNAUD, P. (Crouzet, S.A., Division Aerospatial, Valence, France)
SO- IN: NAECON 1986; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-23, 1986. Volume 3 (A87-16726 05-01). New York, Institute of Electrical and Electronics Engineers, 1986, p. 803-812.
PY- 1986
PD- 198600
LA- English
GL- France
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8705
AB- This paper discusses the Crouzet R&D program in the speech-processing field. It first describes the flight tests of the isolated-word recognition technique on a PUMA SA 330 helicopter. The test rig, the objectives, and the main results of those trials are discussed. The second part concerns the connected-word development program. Its main phases: applied research, ergonomic and functional research, operational-oriented studies and development of airborne systems are detailed. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *PERFORMANCE TESTS; *RESEARCH AND DEVELOPMENT; *SPEECH RECOGNITION
DE- ALGORITHMS; BACKGROUND NOISE; FLIGHT TESTS; HUMAN FACTORS ENGINEERING; MIRAGE AIRCRAFT; SIGNAL RECEPTION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01631487
AN- <AEROSPACE> A87-14674
TI- Aerial remote sensing in the lower part of the atmospheric surface layer of agricultural fields
TI- <ORIGINAL> Aerodistantsionno-prizemnoe zondirovanie sel'skokhoziaistvennykh polei
TI- <EXTENSION> Russian book
AU- CHUDNOVSKII, A. F.; TIMOFEEV, IU. V.; SHINDEROV, B. L.
SO- Leningrad, Gidrometeoizdat, 1985, 272 p. In Russian.
PY- 1985

PD- 198500
RF- 287
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- BOOK
JA- IAA8703
AB- The work describes techniques for the remote sensing of crop fields from heights not above 100 m using agricultural aircraft (e.g., the AN-2) and helicopters. The feasibility of this approach is substantiated through an examination of principles of atmospheric and soil physics. Appropriate remote-sensing instrumentation is described, and ways to achieve the required measurement precision are examined. Some results obtained with this methodology are presented, with particular attention given to microwave and infrared radiometer measurements of crop fields. (B.J.)
SF- AIAA
DE- <MAJOR> *AERIAL PHOTOGRAPHY; *AGRICULTURAL AIRCRAFT; *CROP IDENTIFICATION; *FARM CROPS; *REMOTE SENSING
DE- AIRBORNE EQUIPMENT; ATMOSPHERIC BOUNDARY LAYER; BIOMASS; BRIGHTNESS; DYNAMIC MODELS; INFRARED RADIOMETERS; INSTRUMENT ERRORS; LEAVES; MICROWAVE RADIOMETERS; SOIL MAPPING; SOIL MOISTURE; SPECTROPHOTOMETRY; THERMAL MAPPING
SH- 8743 Earth Resources & Remote Sensing (1987-)

AN- <DIALOG> 01630818
AN- <AEROSPACE> A87-14005
TI- Avionics systems for future commercial helicopters
SO- BMFT, Statusseminar ueber Luftfahrtforschung und Luftfahrttechnologie, Munich, West Germany, Apr. 28-30, 1986, Paper. 23 p. In German.
PY- 1986
PD- 198604
LA- German
GL- Germany
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8703
AB- The state of the art and future developments in avionics for commercial helicopters are discussed. Present systems of cockpit instrumentation with color displays, systems for testing these displays, and central control systems are described. Future sensors, cockpit instrumentation, and central controls are described, stressing the greater levels of control and information about the entire aircraft that will be concentrated in the cockpit. The use of simulators to test these future technologies before their installation in helicopters is discussed, and signal standrdization, bus systems, and software that will be used in future commercial helicopters are considered. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *COMMERCIAL AIRCRAFT; *HELICOPTER DESIGN
DE- COCKPIT SIMULATORS; CONTROL SYSTEMS DESIGN; DISPLAY DEVICES; HELICOPTER CONTROL; SENSORS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01630491
AN- <AEROSPACE> A87-13678
TI- Full scale crash test of a BK117 helicopter
AU- ONISHI, M.; YOSHIMURA, T. (Kawasaki Heavy Industries, Ltd., Airframe Engineering Section, Gifu, Japan)
SO- IN: National Specialist's Meeting on Crashworthy Design of Rotorcraft, Atlanta, GA, April 7-9, 1986, Proceedings (A87-13662 03-05). Alexandria, VA, American Helicopter Society, 1986, 9 p.
PY- 1986
PD- 198600
RF- 6
LA- English
GL- Japan
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8703
AB- A full scale crash test of a BK117 helicopter was performed by dropping the helicopter from a height of 15 m above the ground and using the original pendulum method of crash testing. The instrumentation for obtaining data on the dynamic behavior of the helicopter structure and dummies consisted of the onboard accelerometer, high-speed motion picture cameras, and video cameras. External coverage of the crash sequence was provided by ground-based fixed cameras. The analysis has established the actual resultant impact velocity of 75.5 m/sec and the actual attitude at the impact of 5.7-deg pitch up, 0.9-deg roll right, 2.2-deg yaw left. The results showed that the helicopter has a good protective shell and provides sufficient (by the criteria of the

MIL-STD-1290) occupiable volume during severe crash loading. The maximum dynamic response index for the occupants was 35, as opposed to the value of 21 recommended by Sen et al. (1985). (I.S.)
SF- AIAA
DE- <MAJOR> *CRASH LANDING; *CRASHWORTHINESS; *HELICOPTER PERFORMANCE;
*IMPACT TESTS; *KAWASAKI AIRCRAFT
DE- HELICOPTER DESIGN; TEST FACILITIES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01630475
AN- <AEROSPACE> A87-13662
TI- National Specialist's Meeting on Crashworthy Design of Rotorcraft, Georgia Institute of Technology, Atlanta, April 7-9, 1986, Proceedings
AU- SCHRAGE, D. P.; HANAGUD, S. V.; MEYER, S. A. (Georgia Institute of Technology, Atlanta), EDS.
SO- Meeting sponsored by AHS and Georgia Institute of Technology. Alexandria, VA, American Helicopter Society, 1986, 263 p. For individual items see A87-13663 to A87-13687.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8703
AB- The topics discussed include crashworthy design criteria, specific aircraft and component crashworthy designs, structural crashworthiness research and analytical techniques, human tolerance and crashworthy seating systems, testing and instrumentation, materials and material properties related to crashworthy designs, and accident investigations and analysis of crash sequences. Papers are presented on the status of crashworthiness design criteria, design of aircraft structures for crash impact, landing gear performance simulation by the KRASH program, and crashworthy crewseat limit load optimization through dynamic testing. Consideration is given to Kane's method for analyzing crash sequences and crashworthy design, the role of fiber and matrix in the crash energy absorption of composite materials, correlation of the experimental static and dynamic response of simple structural components, the analysis of civil rotorcraft accidents for the development of improved design criteria, and impact severity and potential injury prevention in general aviation accidents. (I.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *AIRCRAFT SAFETY; *CONFERENCES; *CRASHWORTHINESS; *ROTORCRAFT AIRCRAFT
DE- AIRCRAFT ACCIDENT INVESTIGATION; AIRCRAFT CONSTRUCTION MATERIALS;
AIRCRAFT STRUCTURES; DROP TESTS; DYNAMIC STRUCTURAL ANALYSIS; HUMAN
TOLERANCES; SEATS; STRUCTURAL DESIGN CRITERIA
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01630192
AN- <AEROSPACE> A87-13379
TI- Multivariable flight control for an attack helicopter
AU- ENNS, D. (Honeywell Systems and Research Center, Minneapolis, MN)
SO- IN: 1986 American Control Conference, 5th, Seattle, WA, June 18-20, 1986, Proceedings. Volume 2 (A87-13301 03-63). New York, Institute of Electrical and Electronics Engineers, 1986, p. 858-863.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8703
AB- This paper discusses advanced flight control laws for the Apache YAH-64 helicopter. The control laws have been successfully flight tested and were extensively evaluated with fixed base piloted simulation as part of the Advanced Rotorcraft Technology Integration Flight Experiment. The control laws employ three body rate gyros, and normal and lateral accelerometers as sensors and collective, tail rotor, anad lateral and longitudinal cyclic controls. The control laws were developed to provide decoupling, gust attenuation, desensitization, and stability augmentation in the face of aircraft modelling uncertainty. A multivariable proportional plus integral element is the basic ingredient of the control laws. Various analyses including frequency and time responses are presented. Stability robustness properties of the control laws are presented using singular value and structured singular value techniques. Responses of the controlled helicopter to pilot and gust inputs are presented using time histories. (Author)
SF- AIAA
DE- <MAJOR> *AH-64 HELICOPTER; *CONTROL SYSTEMS DESIGN; *FLIGHT CONTROL;
*HELICOPTER CONTROL; *STABILITY AUGMENTATION

DE- CONTROL STABILITY; FEEDBACK CONTROL; GUST LOADS; PILOT PERFORMANCE;
PROPORTIONAL CONTROL; ROBUSTNESS (MATHEMATICS)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01627952
AN- <AEROSPACE> A87-11139
TI- Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes
AU- RIBOT, E.; ROLL, J. P.; GAUTHIER, G. M. (Aix-Marseille I, Universite, Marseille, France)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 792-799. Research supported by Aerospatiale and CNRS.
PY- 1986
PD- 198608
RF- 28
SN- 0095-6562
LA- English
GL- France
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8701
AB- The aim of this investigation was to assess the performance of subjects in a target recentering task, performed under both normal and vibration conditions. A conventional helicopter stick and an arm-side controller were used in both position and force control modes. The task was designed to simulate instrument flying. The results showed that in the no-vibration situation, the highest performance was achieved in the force control mode and little difference was observed between the two sticks. They also showed that vibration impaired the velocity control of the performance. It is suggested that the subject might be switching over from a visual and arm afferent and efferent control in the no-vibration situation, to a visual control only under vibration condition. From this study, it appears that the more efficient stick to execute the designed task is the mini-stick operating in the force control mode. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTER CONTROL; *MANUAL CONTROL; *SENSORIMOTOR PERFORMANCE; *VIBRATION EFFECTS; *VIBRATION PERCEPTION
DE- CONTROL STICKS; FLIGHT SIMULATION; HUMAN BODY; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; PHYSIOLOGICAL EFFECTS; VISUAL CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01627384
AN- <AEROSPACE> A87-10571
TI- Mechanical solid vibrations. II - Low and high frequency vibrations
TI- <ORIGINAL> Les vibrations mecaniques solidiennes. II - Les vibrations de basse frequence les vibrations de haute frequence
AU- POIRIER, J. L. (Centre d'Essais en Vol, Bretigny-sur-Orge, France)
SO- Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 153-161. In French.
PY- 1986
PD- 198600
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8701
AB- The sources and types of low and high frequency vibrations that affect the human body in moving vehicles, especially in land vehicles or in aircraft, are characterized, along with the effects on various parts of the body. Of particular interest is the frequency of the vibrations, which determines whether the body will act as a unit mass or as a series of connected masses. Typical vibratory rates of various vehicles are reviewed, along with the database on their effects on muscular activity, cardiovascular functioning, vision, breathing and the spine. Techniques are described for measuring the accelerations, the associated displacements of parts of the body, and noting symptoms of damage. The responses of the body are typified by discussing clinical data from helicopter pilots. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *HUMAN BODY; *PHYSIOLOGICAL EFFECTS;
*PILOT PERFORMANCE; *VIBRATION EFFECTS
DE- BACK INJURIES; CIRCULATORY SYSTEM; COMFORT; HEART FUNCTION; HUMAN
FACTORS ENGINEERING; LUMBAR REGION; MUSCULAR FUNCTION; POSTURE; RESPIRATION; SPINE; VISION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01626985
AN- <AEROSPACE> A87-10172
TI- Brain buckets
TI- <EXTENSION> development of helmets for aircraft pilots
AU- GLINES, C. V.
SO- Air Force Magazine (ISSN 0730-6784), vol. 69, Aug. 1986, p. 86-90.
PY- 1986
PD- 198608
SN- 0730-6784
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8701
AB- The development of helmets for aircraft pilots is examined. The initial use of football helmets and soft leather helmets and goggles, and the incorporation of oxygen mask and headsets into the design of the helmet are discussed. With the evolution of jet fighter and bomber aircraft fiberglass hard hats for pilots were introduced. Following the testing of various designs, helmets were custom fitted to each pilot for maximum protection and comfort during aircraft maneuvering and acceleration. Various methods for alleviating the noise interference problem are considered. The development of a helmet with a head cooling system for helicopter aircrew, a helmet with a rotating sound protective earcup to reduce outside noise interference, and the Integrated Chemical Defense System designed to protect against chemical and biological contamination is described. The development of a Visually Coupled Airborne Systems Simulator with a display in front of the pilots eyes and eye, hand, and voice command activation for use in flight simulators and future high-performance aircraft is currently being studied. (I.F.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HELMETS; *HUMAN FACTORS ENGINEERING
DE- FLIGHT CLOTHING; HELMET MOUNTED DISPLAYS; HISTORIES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01624219
AN- <AEROSPACE> A86-47768
TI- Anthropometric conditions for the construction of a helicopter cockpit
TI- <ORIGINAL> Anthropometrische Vorgaben fuer die Konstruktion eines Hubschrauber-Cockpits
AU- KROH, G. (Luftwaffe, Flugmedizinisches Institut, Manching, West Germany)
SO- IN: Evaluation of man-machine systems: Methods and problems; Symposium, November 14, 15, 1985, Cologne, West Germany, Reports (A86-47766 23-54). Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1985, p. 10-24. In German.
PY- 1985
PD- 198500
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8623
AB- Helicopter pilots were used to test the dummy cockpit of a helicopter now under development in order to develop a data base for the seating and the steering organs. Seated tests showed that the postures assumed by the pilots during flights generally did not agree with those envisioned in the construction specifications. This was due to the relatively large discrepancy in arm length between the 5th and the 99th percentile. To prevent their arms from getting tired, the pilots pushed the seat back farther than expected by the designer. Suggestions are also briefly made for the location of the stick and pedals. (C.D.)
SF- AIAA
DE- <MAJOR> *ANTHROPOMETRY; *COCKPITS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- ARM (ANATOMY); FIELD OF VIEW; SEATS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01624217
AN- <AEROSPACE> A86-47766
TI- Evaluation of man-machine systems: Methods and problems; Symposium, November 14, 15, 1985, Cologne, West Germany, Reports
TI- <ORIGINAL> Bewertung von Mensch-Maschine-Systemen: Methoden und Problematik; Symposium, November 14, 15, 1985, Cologne, West Germany, Vortraege
SO- Symposium sponsored by DGLR. Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1985, 276 p. In German and English. For individual items see A86-47767 to A86-47775.
PY- 1985
PD- 198500
RN- DGLR BERICHT 85-04
LA- MULTIPLE

GL- Germany
CP- Germany
DT- CONFERENCE PROCEEDINGS
JA- IAA8623
AB- Various papers on the evaluation of man-machine systems are presented. The topics discussed include: anthropometric conditions for the construction of a helicopter cockpit, obstacle warning radar for helicopters, determination of the load and stress on cockpit crew during flight using tasking networks and the SAINT simulation language, and application of the method of problem taxonomy to the simulation of human service reliability in the manual steering of aircraft. Also considered are: investigating the ocular fixation of targets as an anthropotechnical research method in man-machine systems, a basic concept for evaluating man-machine systems, techniques of asking questions in the evaluation of man-machine systems. (C.D.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- ANTHROPOMETRY; COCKPITS; HELICOPTER DESIGN; PILOT PERFORMANCE; RADAR; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01624046
AN- <AEROSPACE> A86-47595
TI- Analytical applications in the Army oil analysis program
AU- BROWN, C. M.; BOLEY, L. E. (U.S. Army, Materiel Command, Lexington, KY)

SO- IN: Materials characterization for systems performance and reliability; Proceedings of the Thirty-first Sagamore Army Materials Research Conference, Lake Luzerne, NY, August 13-17, 1984 (A86-47587 23-23). New York, Plenum Press, 1986, p. 403-412.
PY- 1986
PD- 198600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8623
AB- Tests and instruments used by the U.S. Army to determine the quality of soil being used in military equipment are discussed. Viscosity determination, the crack test, the blotter spot test, and testing for insolubles are briefly described along with ferrographic analysis. The advantages of ultrafine filtration combined with a full-flow chip detector superior to those now in use are summarized. Methods of taking oil samples from equipment, the intervals at which samples are taken, and the analytical procedure are reviewed. The analysis of used oils is addressed, and the advantages of modernizing the testing by using computers are discussed. New instrumentation being considered is described, including the ferrograph, infrared spectrometer, water analyzer, flash point tester, portable wear-metal analyzer, and portable physical property test monitor. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *CHEMICAL ANALYSIS; *FERROGRAPHY; *LUBRICATING OILS; *VISCOSITY
DE- ARMED FORCES (UNITED STATES); CONSTRUCTION INDUSTRY; HELICOPTERS
SH- 7538 Quality Assurance & Reliability (1975-)

AN- <DIALOG> 01622637
AN- <AEROSPACE> A86-46186
TI- Instrumentation for simultaneous infrared and microwave radiometric measurements
TI- <EXTENSION> for guidance of antitank missiles
AU- GAUFFRE, G.; DURAND, G.; LE CHEVALIER, F.; VAIZAN, B. (ONERA, Chatillon-sous-Bagneux, France)
SO- (Institution of Electrical Engineers, International Conference on Advanced Infrared Detectors and Systems, 3rd, London, England, June 3-5, 1986) ONERA, TP, no. 1986-50, 1986, 9 p.
PY- 1986
PD- 198600
RN- ONERA, TP NO. 1986-50
LA- English
GL- France
CP- France
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8622
AB- In order to collect data simultaneously in the infrared and microwave regions, a novel system is proposed whereby its IR and microwave components have a comparable field of view, resolution and acquisition speed. Intended for use onboard a helicopter, images were collected simultaneously, against a variety of backgrounds, and at two IR (3-5 and 8-12 microns) and at two millimeter wavebands (35 GHz and 94 GHz).

The microwave device is an active system from which a series of 50 ns pulses are emitted at intervals of 16 microsec. A range resolution of 7.5 m is achieved; these range profiles are ultimately converted into altitude information which is compared to data obtained using the IR device (obtained via mechanical scanning). (K.K.)
SF- AIAA
DE- <MAJOR> *INFRARED RADIOMETERS; *MICROWAVE RADIOMETERS; *MISSILE CONTROL

DE- ANTITANK MISSILES; GROUND TESTS; MICROWAVE ANTENNAS; MICROWAVE CIRCUITS
; MILLIMETER WAVES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01620734
AN- <AEROSPACE> A86-44283
TI- Flight testing of the navigation and flight control complexes of aircraft and helicopters
TI- <ORIGINAL> Letnye ispytaniia pilotazhno-navigatsionnykh kompleksov samoletov i vertoletov
TI- <EXTENSION> Russian book
AU- KHARIN, E. G., ED.
SO- Moscow, Izdatel'stvo Mashinostroenie, 1985, 128 p. In Russian. No individual items are abstracted in this volume.
PY- 1985
PD- 198500
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- COLLECTED WORK
JA- IAA8621
AB- Methods for testing and evaluating the performance characteristics of the navigation and flight control complexes of flight vehicles are presented. In particular, attention is given to the theory and methods of evaluating the accuracy of navigation and flight control, assessing the performance of the algorithms of on-board navigation systems, and identifying models of errors characteristic of the navigation and flight control equipment. The discussion also covers methods of evaluating flight safety in relation to the reliability of the navigation and flight control systems. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *FLIGHT CONTROL; *FLIGHT TESTS; *HELICOPTER
CONTROL; *NAVIGATION INSTRUMENTS
DE- ACCURACY; ALGORITHMS; AUTOMATIC FLIGHT CONTROL; DATA PROCESSING; ERROR
ANALYSIS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS
; MATHEMATICAL MODELS; METHODOLOGY; OPTIMIZATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01620543
AN- <AEROSPACE> A86-44092
TI- Low back pain in pilots
AU- FROOM, P.; BARZILAY, J.; CAINE, Y.; MARGALIOT, S.; FORECAST, D. (Israel Air Force, Aeromedical Center, Ramat Gan)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, July 1986, p. 694, 695.
PY- 1986
PD- 198607
RF- 9
SN- 0095-6562
LA- English
GL- Israel
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8621
AB- A questionnaire on low back pain (LBP) was administered to 373 fighter pilots, 165 transport pilots, and 264 helicopter pilots. Helicopter pilots had more pain during flight than did fighter or transport pilots (34.5, 12.9, and 5.1 percent, respectively). A history of LBP temporally unassociated with flight was found in 26.5 percent of helicopter pilots, 31.5 percent of transport pilots, and 25.2 percent of fighter pilots. It is concluded that, despite the pain experienced by helicopter pilots in flight, they are not at increased risk for LBP unassociated with flight. (Author)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *BACK INJURIES; *PAIN; *PILOT PERFORMANCE
DE- FIGHTER AIRCRAFT; HELICOPTERS; TRANSPORT AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01619233
AN- <AEROSPACE> A86-42782

TI- The T800 turbine engine solicitation - A new thrust in streamlining the acquisition process
AU- ACURIO, J.; BROWN, P. E. (U.S. Army, Aviation Research and Technology Activity, Fort Eustis, VA)
SO- AIAA, ASME, SAE, and ASEE, Joint Propulsion Conference, 22nd, Huntsville, AL, June 16-18, 1986. 8 p.
PY- 1986
PD- 198606
RN- AIAA PAPER 86-1669
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8620
AB- The request-for-proposal of the T800 engine to be used by the LHX family of military helicopters was structured to reflect interest in a performance-oriented product, stating requirements and defining boundaries without detailing the methods by which results are to be achieved. This resulted in manufacturers' greater flexibility in parametric tradeoff considerations leading to design optimization. Each proposal received gave detailed commitments and guarantees, citing liabilities that would be explicitly for failure to meet contractual requirements. (O.C.)
SF- AIAA
DE- <MAJOR> *GOVERNMENT PROCUREMENT; *GOVERNMENT/INDUSTRY RELATIONS; *LIGHT HELICOPTERS; *MILITARY HELICOPTERS; *TURBINE ENGINES
DE- AIRCRAFT RELIABILITY; AIRCRAFT SURVIVABILITY; HUMAN FACTORS ENGINEERING ; LIGHT AIRCRAFT; LIGHT HELICOPTERS; LOGISTICS; MAINTAINABILITY
SH- 7581 Administration & Management (1975-)

AN- <DIALOG> 01616016
AN- <AEROSPACE> A86-39565
TI- Low airspeed envelope determination of the CH-139 Jet Ranger helicopter
AU- JUPP, W. R. (Department of National Defence, Ottawa, Canada)
SO- (CASI, Helicopter Symposium, Montreal, Canada, May 28, 1985) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 32, March 1986, p. 23-33.
PY- 1986
PD- 198603
SN- 0008-2821
LA- English
GL- Canada
CP- Canada
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8618
AB- The results of engineering trials to determine the low-speed relative-wind limits of the Jet Ranger CH-139 helicopter for training purposes are reported. The low-speed performance was evaluated as a function of the longitudinal center of gravity (CG) and the gross weight (GW), ranging from 107-2300 in. and 2300-2800 lb, respectively. Trials were carried out in hover at wind speeds up to 30 kt. Instrumentation was installed for recording the rotor flap angle, heading, longitudinal and lateral control, fuel consumption and collective position control. The results indicated that the flight envelope is acceptable for training missions. The tests also revealed the worth of monitoring the rotor flapping angle for determining the flight envelope of teetering rotor helicopters. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AIRSPEED; *FLIGHT TESTS; *HELICOPTER CONTROL; *MILITARY HELICOPTERS
DE- ENVELOPES; FLIGHT ENVELOPES; HOVERING; LOW SPEED; ROTARY WINGS; WIND EFFECTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01613391
AN- <AEROSPACE> A86-36940
TI- The role of flight simulation in helicopter crew station design
AU- DEMASI, J. N.; HARPER, H. P. (Sikorsky Aircraft, Stratford, CT)
SO- IN: Flight simulation/simulators; Proceedings of the Aerospace Technology Conference and Exposition, Long Beach, CA, October 14-17, 1985 (A86-36939 16-01). Warrendale, PA, Society of Automotive Engineers, Inc., 1985, p. 1-10.
PY- 1985
PD- 198500
RF- 5
RN- SAE PAPER 851900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA8616
AB- The need for simulation is assessed in the context of changing missions and technology; and the helicopter simulation facilities at the Sikorsky Aircraft Division are described in detail. These facilities include the human factors engineering laboratory, the avionics laboratory, the fixed-base simulator, the motion base simulator, and an in-flight simulator. It has been shown that simulation, an essential part of the crew station design process, can be applied at many levels. Simulator capabilities must cover a broad spectrum of fidelity levels with the capability to tie real hardware with the software simulation. It is concluded that in-flight simulation is necessary to provide realism for critical mission elements and to provide a validation of anchor points. Block diagrams are included. (K.K.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *FLIGHT SIMULATION; *HELICOPTER DESIGN
DE- ACOUSTICS; AVIONICS; COMPUTER GRAPHICS; DATA BASES; FLIGHT CONTROL; FLIGHT CREWS; MOTION SIMULATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01612626
AN- <AEROSPACE> A86-36175
TI- An integrated display for vertical and translational flight Eight factors affecting pilot performance
AU- TATRO, J. S. (Bell Helicopter Textron, Fort Worth, TX); ROSCOE, S. N. (New Mexico State University, Las Cruces)
SO- Human Factors (ISSN 0018-7208), vol. 28, Feb. 1986, p. 101-120.
PY- 1986
PD- 198602
RF- 59
SN- 0018-7208
CN- N00014-81-K-0439
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8616
AB- As part of an overall research program to optimize both forward-looking and downward-looking tactical situation displays for all-weather instrument flight in vertical takeoff and landing (VTOL) aircraft, an integrated horizontal situation display was developed for both vertical and translational flight. This paper covers the developed and initial experimentation of the downward-looking portion of the overall display and control system. The effects of eight factors on pilot performance were tested, and a multiple regression model of VTOL pilot performance as a function of those eight factors was derived for each of three dependent performance measures. Factors having important effects were position error magnification, control order, prediction time, control gain, tracking mode, and several of their interactions. (Author)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *PILOT PERFORMANCE; *SYSTEMS INTEGRATION; *TRANSLATIONAL MOTION; *VERTICAL FLIGHT
DE- ALL-WEATHER LANDING SYSTEMS; FLIGHT CONTROL; MAN MACHINE SYSTEMS; POSITION ERRORS; REGRESSION ANALYSIS; RESEARCH AND DEVELOPMENT; VERTICAL TAKEOFF
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01612118
AN- <AEROSPACE> A86-35667
TI- Assessment of simulation fidelity using measurements of piloting technique in flight. II
AU- FERGUSON, S. W.; CLEMENT, W. F. (Systems Technology, Inc., Mountain View, CA); HOH, R. H. (Systems Technology, Inc., Hawthorne, CA); CLEVELAND, W. B. (NASA, Ames Research Center, Moffett Field, CA)
CS- Systems Technology, Inc., Mountain View, CA.
CS- <CODE> S9813870
SO- AHS, Annual Forum and Technology Display, 41st, Fort Worth, TX, May 15-17, 1985, Paper. 24 p. Army-sponsored research.
PY- 1985
PD- 198505
RF- 25
CN- NAS2-11098; NAS2-11731
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8616
AB- Two components of the Vertical Motion Simulator (presently being used to assess the fidelity of UH-60A simulation) are evaluated: (1) the dash/quickstop Nap-of-the-earth (NOE) piloting task, and (2) the bop-up task. Data from these two flight test experiments are presented which provide information on the effect of reduced visual field of view,

variation in scene content and texture, and the affect of pure time delay in the closed-loop pilot response. In comparison with task performance results obtained in flight tests, the results from the simulation indicate that the pilot's NOE task performance in the simulator is significantly degraded. (K.K.)
SF- AIAA
DE- <MAJOR> *BIOMETRICS; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE;
*PILOT PERFORMANCE; *TASK COMPLEXITY
DE- ACCURACY; ASSESSMENTS; FLIGHT TESTS; H-60 HELICOPTER; NAP-OF-THE-EARTH
NAVIGATION; VERTICAL MOTION SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01612113
AN- <AEROSPACE> A86-35662
TI- The design and development of new crashworthy seats for Navy helicopters
AU- CARNELL, B. L. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT)
SO- IN: American Helicopter Society, Annual Forum, 41st, Fort Worth, TX, May 15-17, 1985, Proceedings (A86-35601 16-01). Alexandria, VA, American Helicopter Society, 1985, p. 817-826.
PY- 1985
PD- 198500
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8616
AB- U.S. Navy funded programs to design and develop new crashworthy crew seats for the SH-3D, G, and H anti-submarine and the CH-53A/D troop/cargo helicopters are described. The specifications for the seats include the peculiar requirements of installing stroking, load-attenuating seats in the confines of the cockpit and the need to match the loads on the seat support structures to the strengths of those structures. The seats, designed by Simula, Inc., Tempe, AZ, use variable load energy attenuators to accommodate a wide range of occupant weights. The seats for the CH-53A/D helicopters also provide armor protection for the crewmembers. Comprehensive qualification tests including operational, environmental, static, and dynamic tests are described. The improvements in crash safety are related to those of the U.S. Army BLACK HAWK helicopter. (Author)
SF- AIAA
DE- <MAJOR> *CRASHWORTHINESS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS;
*SEATS
DE- DYNAMIC LOADS; H-53 HELICOPTER; HUMAN FACTORS ENGINEERING; LOAD TESTS;
NAVY; STATIC TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01612057
AN- <AEROSPACE> A86-35606
TI- Stored terrain data base aided pilotage for helicopters
AU- SEILER, N. C.; GRACIA, J. A. (Harris Corp., Harris Government Aerospace Systems Div., Melbourne, FL)
SO- IN: American Helicopter Society, Annual Forum, 41st, Fort Worth, TX, May 15-17, 1985, Proceedings (A86-35601 16-01). Alexandria, VA, American Helicopter Society, 1985, p. 101-109.
PY- 1985
PD- 198500
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8616
AB- A panoramic pilotage display, enhanced by a topographical data base, can significantly improve military helicopter pilot efficiency while reducing workloads. The basic task of geographic orientation is automated through the provision of a planview map with tactical symbology on a head-down display. The stored data base required allows for a look-ahead capability from topographical cover positions; this is especially useful when presented in a perspective format on the head-down display. A system of this type is applicable to the U.S. Army's next-generation 'LHX' single-crewmember combat helicopter. (O.C.
)
SF- AIAA
DE- <MAJOR> *AUTOMATED PILOT ADVISORY SYSTEM; *DATA BASES; *DISPLAY DEVICES
; *HELICOPTER DESIGN; *MILITARY HELICOPTERS

DE- COCKPITS; LIGHT HELICOPTERS; MAN MACHINE SYSTEMS; PILOT PERFORMANCE;
TERRAIN; VISUAL TASKS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01611892
AN- <AEROSPACE> A86-35441
TI- Pilot speech performance while talking to a speech recognizer and flying a competitive helicopter pursuit task
AU- SIMPSON, C. A. (Psycho-Linguistic Research Associates, Menlo Park, CA)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 4th, Long Beach, CA, October 14-17, 1985, Proceedings (A86-35426 15-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1985, p. 133-141. Army-supported research.
PY- 1985
PD- 198500
RF- 17
RN- SAE PAPER 851779
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8615
AB- The performance of pilots and connected-word speaker dependent speech recognizers under task loading conditions are evaluated. Ten male pilots performed recognizer template enrollment, pilot message categorization training, and warning message classification and gunner/scout pursuit tasks; the experimental conditions and procedures are described. Pilot response accuracy, pilot-machine system response accuracy, recognizer-computer performance, and recognition algorithm performance are examined. Individual performance differences among pilots and the effects of task loading on recognition accuracy are analyzed. The isolated-word recognition algorithm data of Simpson (1985) and the connected-word recognition algorithm data are compared. The data reveal that the isolated-word algorithm is inadequate for aircraft cockpit use; however, the connected-word algorithm is applicable for noncritical flight functions. (I.F.)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *PURSUIT TRACKING;
*SPEECH RECOGNITION; *VERBAL COMMUNICATION
DE- COMPETITION; MAN MACHINE SYSTEMS; STRESS (PSYCHOLOGY); VOICE DATA
PROCESSING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01611877
AN- <AEROSPACE> A86-35426
TI- Aerospace Behavioral Engineering Technology Conference, 4th, Long Beach, CA, October 14-17, 1985, Proceedings
SO- Conference sponsored by SAE. Warrendale, PA, Society of Automotive Engineers, Inc., 1985, 444 p. For individual items see A86-35427 to A86-35458.
PY- 1985
PD- 198500
RN- SAE P-168
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8615
AB- Papers are presented on assessing human fitness and performance; the use of simulation as a cockpit design tool; the man-machine interface; the Space Station; and human performance. Consideration is given to advanced transport aircraft technology; operator workload analysis; rotorcraft missions; the pilot in the operational loop; and flight crew training. Topics also discussed include cockpit communications; color displays; commercial air transport and general aviation operations; and space and military operations. (I.F.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENGINEERING; *AVIATION PSYCHOLOGY; *CONFERENCES;
*HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- ASTRONAUT PERFORMANCE; COCKPITS; DISPLAY DEVICES; FLIGHT FITNESS; FLY
BY WIRE CONTROL; HUMAN BEHAVIOR; MAN MACHINE SYSTEMS; ROTARY WING
AIRCRAFT; SPACE STATIONS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01611374
AN- <AEROSPACE> A86-34923

TI- Helicopter flight control with one hand
AU- LIPPAY, A. L.; KING, M.; KRUK, R. V. (CAE Electronics, Ltd., Montreal, Canada); MORGAN, M. (National Aeronautical Establishment, Ottawa, Canada)
SO- (CASI, Annual General Meeting, 32nd, Montreal, Canada, May 27, 1985) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 31, Dec. 1985, p. 335-345.
PY- 1985
PD- 198512
RF- 11
SN- 0008-2821
LA- English
GL- Canada
CP- Canada
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8615
AB- In a given control task, human error rate may increase in proportion to the number of control devices and mental transformations. A single device whose degrees of freedom coincide spatially with the principal task parameters, and whose dynamic characteristics provide a modicum of feedback representing the demands imposed on the system, should permit a reduction of the (human) control problem. A deflection-type side-arm controller developed in Montreal is described, which enables axis-by-axis or co-ordinated control in up to six degrees of freedom with one hand. The design minimizes unwanted inputs and cross-coupling between axes. Six-axis control was established in several spacecraft and manipulator simulations. A four-axis version has been installed in a research helicopter. Preliminary testing indicated good pilot acceptance, reduced training/familiarization requirements and - in some cases - significant improvement in control performance. A second generation engineering effort is currently in progress to produce high quality units for formal testing and eventual flight qualification. (Author)
SF- AIAA
DE- <MAJOR> *CONTROL STICKS; *FLIGHT CONTROL; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS; *MANUAL CONTROL; *PILOT ERROR
DE- CONTROLLERS; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01610256
AN- <AEROSPACE> A86-33805
TI- Applicability of using the CAR-II model in design and evaluation of multioperator workstations with shared controls
AU- MORRISSEY, S. J.; HERRING, B. E. (Auburn University, AL); GENNETTI, M. G. (Stanford University, CA)
SO- IN: Human Factors Society, Annual Meeting, 29th, Baltimore, MD, September 29-October 3, 1985, Proceedings. Volume 2 (A86-33776 15-53). Santa Monica, CA, Human Factors Society, 1985, p. 698-701.
PY- 1985
PD- 198500
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8615
AB- This study was done to show how a computerized workstation design program could be used to design and evaluate workstations having multiple operators with shared or common controls. To do this the Computerized Assessment of Reach program (CAR) was used to evaluate the cockpit of the OH-58A (Huey) helicopter. This same program was then used to demonstrate methods of cockpit redesign. (Author)
SF- AIAA
DE- <MAJOR> *COMPUTER AIDED DESIGN; *CREW WORKSTATIONS; *FLIGHT CONTROL; *HUMAN FACTORS ENGINEERING; *OPERATOR PERFORMANCE; *TECHNOLOGY UTILIZATION
DE- COCKPITS; HELICOPTER DESIGN; MAN MACHINE SYSTEMS; MATHEMATICAL MODELS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01610246
AN- <AEROSPACE> A86-33795
TI- Pro-SWAT applied to advanced helicopter crew station concepts
AU- KUPERMAN, G. G. (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH)
SO- IN: Human Factors Society, Annual Meeting, 29th, Baltimore, MD, September 29-October 3, 1985, Proceedings. Volume 1 (A86-33776 15-53). Santa Monica, CA, Human Factors Society, 1985, p. 398-402.
PY- 1985
PD- 198500
RF- 8
LA- English

GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8615
AB- The Subjective Workload Assessment Technique was applied projectively (Pro-SWAT) to the prediction of workload to be expected in a single-pilot, advanced scout/attack helicopter weapon system. A composite mission scenario was created. Five configurations of the pilot/vehicle interface were synthesized, each based on some form of a virtual panoramic display (VPD). They were assessed at each of six segments extracted from the mission scenario. An analysis of variance, with predicted workload as the dependent measure, found highly significant differences between both mission segments and VPD concepts (p less than 0.01). (Author)
SF- AIAA
DE- <MAJOR> *CREW WORKSTATIONS; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS
; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- ANALYSIS OF VARIANCE; AVIATION PSYCHOLOGY; DISPLAY DEVICES; WEAPON
SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01610213
AN- <AEROSPACE> A86-33762
TI- Systolic blood pressure in fighter pilots after 12-15 years service
AU- FROOM, P.; GROSS, M.; BARZILAY, J.; FORECAST, D. F.; MARGALIOT, S. (Israel Air Force, Aeromedical Centre, Tel Hashomer; Hadassah University Hospital, Jerusalem, Israel)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, April 1986, p. 367-369.
PY- 1986
PD- 198604
RF- 26
SN- 0095-6562
LA- English
GL- Israel
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8615
AB- Systolic blood pressure (SBP) was measured at entry and after 12-15 years in 112 fighter pilots and compared to 112 transport and helicopter pilots. the pilots were 20-24 years old on entry into the study. Mean SBP + or - 1 S.D on entry was 122 + or - 12 mm Hg in fighter pilots and 124 + or - 12 mm Hg in transport and helicopter pilots. After 12-15 years follow-up, the mean SBP was 118 + or - 12 mm Hg in both groups. It is concluded that the stress of flying fighter aircraft for 12-15 years is not associated with an increased risk of hypertension. (Author)
SF- AIAA
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *PILOT PERFORMANCE; *SYSTOLIC PRESSURE; *TIME DEPENDENCE
DE- AEROSPACE MEDICINE; BLOOD PRESSURE; FIGHTER AIRCRAFT; HELICOPTERS;
HYPERTENSION; TRANSPORT AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01608571
AN- <AEROSPACE> A86-32120
TI- The NASA modern technology rotors program
AU- WATTS, M. E.; CROSS, J. L. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- AIAA, AHS, CASI, DGLR, IES, ISA, ITEA, SETP, and SFTE, Flight Testing Conference, 3rd, Las Vegas, NV, Apr. 2-4, 1986. 13 p.
PY- 1986
PD- 198604
RF- 9
RN- AIAA PAPER 86-9788
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8614
AB- Existing data bases regarding helicopters are based on work conducted on 'old-technology' rotor systems. The Modern Technology Rotors (MTR) Program is to provide extensive data bases on rotor systems using present and emerging technology. The MTR is concerned with modern, four-bladed, rotor systems presently being manufactured or under development. Aspects of MTR philosophy are considered along with instrumentation, the MTR test program, the BV 360 Rotor, and the UH-60

Black Hawk. The program phases include computer modelling, shake test, model-scale test, minimally instrumented flight test, extensively pressure-instrumented-blade flight test, and full-scale wind tunnel test. (G.R.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS; *NASA PROGRAMS; *ROTARY WINGS
DE- AIR DATA SYSTEMS; DATA BASES; FLIGHT TEST INSTRUMENTS; GROUND TESTS; H-60 HELICOPTER; PRESSURE SENSORS; WIND TUNNEL TESTS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01607456
AN- <AEROSPACE> A86-31005
TI- Survival of helicopter accidents
TI- <ORIGINAL> Supervivencia en los accidentes de helicopteros
AU- ROJAS LOZANO, J. A. (Escuela Tecnica Superior de Ingenieros Aeronauticos, Madrid, Spain)
SO- IAA/Ingenieria Aeronautica y Astronautica (ISSN 0020-1006), Oct. 1985, p. 31-36. In Spanish.
PY- 1985
PD- 198510
RF- 8
SN- 0020-1006
LA- Spanish
GL- Spain
CP- Spain
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8613
AB- An evaluation is made of anthropometric factors relevant to the improvement of helicopter crash injury rates, in view of a U.S. Army study of helicopter crashes occurring in 1970-1971 which estimated that as many as 160 fatalities could have been prevented with suitable attention by designers to crash survival criteria. Attention is given to the capacity of the human body for absorption of the impact loads of sudden deceleration; data are presented for the effects of harnesses and the duration and magnitude limits of human resistance to injury by sudden deceleration. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *ANTHROPOMETRY; *CRASH INJURIES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *SURVIVAL
DE- ACCELERATION STRESSES (PHYSIOLOGY); FLIGHT CREWS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01606317
AN- <AEROSPACE> A86-29866
TI- Selecting color codes for a computer-generated topographic map based on perception experiments and functional requirements
AU- SPIKER, A.; ROGERS, S. P.; CICINELLI, J. (Anacapa Sciences, Inc., Santa Barbara, CA)
SO- IN: Symposium on Aviation Psychology, 3rd, Columbus, OH, April 22-25, 1985, Proceedings (A86-29851 13-53). Columbus, OH, Ohio State University, 1985, p. 151-158.
PY- 1985
PD- 198500
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8613
AB- The development of computer-generated topographic displays (CGTDs) for Army helicopter and other tactical vehicles provides a number of advantages related to terrain-correlation navigation, mission planning, and enroute navigation. A selection of suitable color code displays based on a study of human factors and functional requirements, can be a great help in an efficient implementation of functions to be provided by the CGTD. Attention is given to the digital map system, the primary functional requirements with respect to color and symbology, color naming studies involving the employment of 40 subjects in four experiments, map search studies with 20 subjects, and color set recommendations. It is concluded that depending on the distribution of chromaticities and luminances in the color set, color contrast, brightness contrast, and Gaussian spread may either hinder or help performance. (G.R.)
SF- AIAA
DE- <MAJOR> *COLOR CODING; *COMPUTER AIDED MAPPING; *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING; *TOPOGRAPHY
DE- CATHODE RAY TUBES; DIGITAL TECHNIQUES; SYMBOLS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01606306
AN- <AEROSPACE> A86-29855
TI- Helicopter-control-referenced strength capabilities of small individuals
AU- SCHOPPER, A. W.; MASTROIANNI, G. R. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, AL)
SO- IN: Symposium on Aviation Psychology, 3rd, Columbus, OH, April 22-25, 1985, Proceedings (A86-29851 13-53). Columbus, OH, Ohio State University, 1985, p. 47-54.
PY- 1985
PD- 198500
RF- 15
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8613
AB- An evaluation is made of helicopter control-referenced force exertion capabilities in a sample of U.S. Army males and females, with a view to the reevaluation of anthropometric criteria. These data were compared with the values cited as upper force limits for the design of helicopter controls. Due to their small size, these females of 152-167 cm stature and males of 159-167 cm stature represent the portion of the population least likely to meet 1961 strength limits for nonstandard flight maneuvers. Ten percent of the males and 27 percent of the females evaluated failed to achieve existing control force design limits, especially in the downward direction of collective control. (O.C.)
SF- AIAA
DE- <MAJOR> *ANTHROPOMETRY; *HELICOPTER CONTROL; *HUMAN PERFORMANCE; *MUSCULAR STRENGTH; *PILOT PERFORMANCE
DE- BODY SIZE (BIOLOGY); FAILURE ANALYSIS; FEMALES; HEIGHT; MALES
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01606303
AN- <AEROSPACE> A86-29852
TI- Levels of helicopter control force inputs during in-flight emergency conditions as a function of aviator experience
AU- SCHOPPER, A. W.; WELLS, J. H. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, AL)
SO- IN: Symposium on Aviation Psychology, 3rd, Columbus, OH, April 22-25, 1985, Proceedings (A86-29851 13-53). Columbus, OH, Ohio State University, 1985, p. 1-23.
PY- 1985
PD- 198500
RF- 24
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8613
AB- Twelve helicopter pilots flew six normal and six simulated emergency (hydraulics off) condition approaches and landings in a U.S. Army utility helicopter to document the magnitude of force inputs required for emergency operations; the pilots differed widely in number of hours previously flown, in order to determine the effect of pilot experience. Cyclic, collective, and pedal controls were strain gage-instrumented, and attention was given to the outputs recorded during the last 60 sec of flight prior to each touchdown. Analyses of variance undertaken on the means of the forces recorded during successive 5-sec intervals revealed significant differences in the magnitude of the forces applied as a function of hydraulic system condition and time-to-touchdown. Significant interactions with pilot experience are noted. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *APPROACH; *EMERGENCIES; *HELICOPTER CONTROL ; *PILOT PERFORMANCE
DE- ANALYSIS OF VARIANCE; EXPERIENCE; FLIGHT SIMULATION; STRAIN GAGES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01603037
AN- <AEROSPACE> A86-26585
TI- Flight testing of an ASW helicopter
AU- GUY, C. R.; WILLIAMS, M. J. (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia)
SO- (Netherlands Association of Aeronautical Engineers and Technische Hogeschool te Delft, European Rotorcraft Forum, 10th, The Hague, Netherlands, Aug. 28-31, 1984) Vertica (ISSN 0360-5450), vol. 9, no. 4, 1985, p. 317-330.
PY- 1985
PD- 198500
RF- 23
SN- 0360-5450

LA- English
GL- Australia
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8611
AB- A programme of flight trials carried out with a Sea King Mk 50 anti-submarine warfare helicopter is described. An outline is given of the aircraft instrumentation, the data-acquisition system and the data-analysis procedures. Results are presented for conditions of trimmed level flight together with typical examples of dynamic response tests, transition manoevres and Doppler and cable hover tests. The flight trials programme was designed to provide results both for use in the validation of a mathematical model of the Sea King helicopter and for more general use in helicopter flight behaviour studies. (Author)
SF- AIAA
DE- <MAJOR> *ANTISUBMARINE WARFARE; *FLIGHT STABILITY TESTS; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *SH-3 HELICOPTER
DE- AERODYNAMIC BALANCE; AIRCRAFT INSTRUMENTS; AIRCRAFT MANEUVERS; DATA ACQUISITION; HOVERING STABILITY; SONAR
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01602618
AN- <AEROSPACE> A86-26166
TI- Development testing of integrated avionics systems using dynamic environment simulation
AU- SHILLITO, P. L. (Westland Helicopters, Ltd., Yeovil, England)
SO- Netherlands Association of Aeronautical Engineers and Technische Hogeschool te Delft, European Rotorcraft Forum, 10th, The Hague, Netherlands, Aug. 28-31, 1984, Paper. 21 p.
PY- 1984
PD- 198408
RF- 6
LA- English
GL- United Kingdom
CP- Netherlands
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8610
AB- The evolution of sophisticated integrated avionics packages and their incorporation into civil and military helicopters has caused and will continue to cause significant perturbations to avionics and airframe manufacturers' integration plans. A coherent testing philosophy is discussed which co-ordinates avionic system design with its supporting development and validation tools. Highlighted is the use of inherent system performance data to maintain, system integrity during validation of the developed system core whilst permitting full test automation. Facilities developed for dynamic simulation and performance assessment and presentation are described. These techniques are shown to reduce costs, improve effectiveness, and provide a high demonstrable level of confidence in the resultant integrated system. (Author)
SF- AIAA
DE- <MAJOR> *AVIONICS; *COCKPIT SIMULATORS; *COMMERCIAL AIRCRAFT; *MILITARY HELICOPTERS; *SYSTEMS INTEGRATION; *TEST FACILITIES
DE- AIRFRAMES; AUTOMATION; COMPUTER SYSTEMS PROGRAMS; HUMAN FACTORS ENGINEERING; PILOT TRAINING
SH- 7562 Computer Systems (1975-)

AN- <DIALOG> 01602581
AN- <AEROSPACE> A86-26129
TI- CRT displays in modern helicopter data presentation
AU- DUELL, M. R. (Westland Helicopters, Ltd., Yeovil, England)
SO- Netherlands Association of Aeronautical Engineers and Technische Hogeschool te Delft, European Rotorcraft Forum, 10th, The Hague, Netherlands, Aug. 28-31, 1984, Paper. 23 p.
PY- 1984
PD- 198408
LA- English
GL- United Kingdom
CP- Netherlands
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8610
AB- The use of CRT displays as Electronic Flight Instruments (EFIS) for helicopters, and their adoption for the cockpit designs of Westland's 30-300 and EH101, are discussed. The multicolored, multifunctional CRT display resulting in more efficient use of the instrument panel area, in addition to its capability of displaying Torque and Tacho, Hover, and search pattern information, contributes to a reduction in pilot workload and cost. However, the weight penalty and higher initial cost of the CRT displays can be minimized by the multiple use of displays via careful format definition. Certification of EFIS for civil

helicopters requires comparable reliability to the electromechanical instruments it replaces, and a high level of system redundancy. EH101 display function requirements determined the choice of shadowmask CRT displays. The Westland 30-300 will incorporate EFIS into a system with interfaces between avionics and flight instrumentation already defined with possible adaptation. (R.R.)
SF- AIAA
DE- <MAJOR> *CATHODE RAY TUBES; *DISPLAY DEVICES; *ELECTRONIC EQUIPMENT;
*FLIGHT INSTRUMENTS; *HELICOPTERS
DE- ARCHITECTURE; COCKPIT SIMULATORS; FLIGHT CONDITIONS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01602480
AN- <AEROSPACE> A86-26028
TI- U.S. Army helicopter voice technology applications
AU- MALKIN, F. J. (U.S. Army, Human Engineering Laboratory, Aberdeen Proving Ground, MD)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 3rd, Long Beach, CA, October 15-18, 1984, Proceedings (A86-26001 10-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1984, p. 207-211.
PY- 1984
PD- 198400
RF- 10
RN- SAE PAPER 841609
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8610
AB- Voice technology provides a potential for alleviating the extremely high visual and manual workload of Army helicopter pilots. Before voice technology can be successfully employed in the cockpit, there are many human factors issues that must be resolved. This paper describes the approach used to identify potential applications of voice technology in an Army helicopter and the emulation of a voice interactive Doppler navigation set. (Author)
SF- AIAA
DE- <MAJOR> *AH-64 HELICOPTER; *AIRCRAFT PILOTS; *DOPPLER NAVIGATION; *VOICE COMMUNICATION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COMPUTER SYSTEMS PROGRAMS; MILITARY HELICOPTERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01602467
AN- <AEROSPACE> A86-26015
TI- FAA's human factors research and development plan - A cooperative effort
AU- HUNTLEY, M. S., JR. (DOT, Transportation Systems Center, Cambridge, MA) ; TINSLEY, H. G. (FAA, Washington, DC)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 3rd, Long Beach, CA, October 15-18, 1984, Proceedings (A86-26001 10-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1984, p. 101-104.
PY- 1984
PD- 198400
RN- SAE PAPER 841470
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8610
AB- In the process of developing future plans for human factors research, the FAA has held six workshops in 1980 for the users of the National Aviation System to identify and discuss cockpit-related human performance problems that arise with the advancement of automation. In the areas of air carrier operations, commuter operations, helicopter operations, air traffic control aeromedical concerns, and aircraft maintenance, 137 problem areas were identified, out of which 30 items, deemed to be particularly important, were sent to the SAE's Aerospace and Behavioral Engineering Technology Committee to rank them according to their importance to civil aviation. Problems leading the list are: the level determining pilot information requirements for monitoring automated systems, and developing certification criteria for advanced technology cockpits which are based upon objective measures of crew performance. (I.S.)
SF- AIAA
DE- <MAJOR> *CIVIL AVIATION; *GOVERNMENT/INDUSTRY RELATIONS; *HUMAN FACTORS
ENGINEERING; *RESEARCH AND DEVELOPMENT
DE- MAN MACHINE SYSTEMS; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01602456
AN- <AEROSPACE> A86-26004
TI- AI applications to military pilot decision aiding - A perspective on transition
AU- JAMES, W. G. (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 3rd, Long Beach, CA, October 15-18, 1984, Proceedings (A86-26001 10-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1984, p. 19-24.
PY- 1984
PD- 198400
RN- SAE PAPER 841533
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8610
AB- The process of transition of the Pilot Decision Aiding AI technology to operational application is discussed in the framework of various R&D programs. The experience of implementing the 'intent-driven' cockpit technology in a Coast Guard helicopter and in simulation and flight test programs is described. A priority list of the subsystems and activities sufficiently mature for early automation and decision aiding is given, and the three consecutive steps to be taken for the transition ('Imitate', 'Embellish', and 'Fully Exploit') are explained. The importance of an airborne development program that precedes the flight evaluation program is emphasized. (I.S.)
SF- AIAA
DE- <MAJOR> *ARMED FORCES (UNITED STATES); *DECISION MAKING; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- MENTAL PERFORMANCE; RESEARCH AND DEVELOPMENT; TASK COMPLEXITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01602453
AN- <AEROSPACE> A86-26001
TI- Aerospace Behavioral Engineering Technology Conference, 3rd, Long Beach, CA, October 15-18, 1984, Proceedings
SO- Conference sponsored by SAE. Warrendale, PA, Society of Automotive Engineers, Inc., 1984, 322 p. For individual items see A86-26002 to A86-26033.
PY- 1984
PD- 198400
RN- SAE P-151
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8610
AB- The topics addressed include the use of flight deck technology to complement the flight crew's role in automation; pilot-machine cooperation in presence of mission uncertainty in connection with military cockpit design; current and advanced displays; pilot workload and performance; and civil aviation human performance issues. Additional subjects include the Air Force test pilot's perspective of the man/machine interface; man/machine interface research and development needs for civil aviation; fitness for duty; safety assurance in the air carrier operating environment; advanced technology for rotorcraft; and a case for realistic training in abnormal and emergency situations. In addition, papers are presented on questions of flight deck automation decisions, effect of vibration on the readability of color CRT displays, the training and certification of the general aviation pilot, and effects of digital altimetry on pilot workload. (I.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *CONFERENCES; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT SAFETY; ARMED FORCES (UNITED STATES); AUTOMATIC CONTROL; CIVIL AVIATION; COCKPITS; DISPLAY DEVICES; EMERGENCIES; FLIGHT FITNESS; GENERAL AVIATION AIRCRAFT; HUMAN BEHAVIOR; INFORMATION TRANSFER; MILITARY AIRCRAFT; PILOT PERFORMANCE; PILOT TRAINING; RESEARCH AND DEVELOPMENT; ROTARY WING AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01600956
AN- <AEROSPACE> A86-24504
TI- Ophthalmological problems linked to helicopter flight
TI- <ORIGINAL> Problemes ophtalmologiques lies au vol sur helicoptere

AU- RODALLEC, Y.
SO- (Societe Francaise de Medecine des Armees, Seance de Medecine Aeronautique, Metz, France, June 19, 1985) Medecine Aeronautique et Spatiale, vol. 24, 4th Quarter, 1985, p. 221-225. In French.
PY- 1985
PD- 198500
RF- 12
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8609
AB- Military helicopter pilots flying low-level missions encounter dangers from obstacles and power lines, along with visual hallucinations due to fatigue or myopia. Corrective lenses can ameliorate the myopia in daylight, but pilots selected for night flight should not be subject to the refractive problems caused by myopia. The vibrational environment of helicopter flight causes lesions in the retinae of pilots. Also, the diet of helicopter pilots in training is usually nutritionally deficient and meals are eaten hurriedly to meet schedules, occasionally leading to hypertension and/or diabetes, both of which can cause degenerative ocular lesions and myopia. It is necessary, therefore, to throughly examine pilot candidates to detect those who will not be fit for flight duty in the future. Some drugs enhance the production of visual purple and retard vision fading, and wearing red glasses aids in night vision adaptation. Protective lenses can also shield against the vision loss from bright lights and explosions, although layered lenses can also multiply the number of photons which reach the eye to enhance night vision. It may be better for the pilot to watch the desired scenes on a CRT. Wearing an apparatus which transmits IR images increases night vision, provided that sufficient training is given to correctly perceive relief. Several vision-enhancing techniques which may be used in the future are discussed. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT FITNESS; *MILITARY HELICOPTERS; *NIGHT VISION; *OPHTHALMOLOGY; *PILOT PERFORMANCE
DE- FLIGHT SAFETY; IMAGE INTENSIFIERS; PHYSIOLOGICAL EFFECTS; PILOT SELECTION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01600953
AN- <AEROSPACE> A86-24501
TI- Clinical and psychological surveillance of student pilots at the beginning of training
TI- <ORIGINAL> La surveillance clinique et psychologique des eleves-pilotes en ecole de debut
AU- DESMARIS, G. (Armee de l'Air, Base Aerienne 709, France); PLESANT, J.
SO- (Societe Francaise de Medecine des Armees, Seance de Medecine Aeronautique, Metz, France, June 19, 1985) Medecine Aeronautique et Spatiale, vol. 24, 4th Quarter, 1985, p. 207-212. In French.
PY- 1985
PD- 198500
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8609
AB- The physical and psychological observations which flight surgeons must make of students at the schools for military pilots during training are outlined. The students, in addition to classroom instruction, ground training and flight training, are evaluated for aptitudes for the various branches of the French Air Force in which they will serve, whether helicopter, transport of fighter aircraft duty. The motivation level of each student is assessed, and the flight surgeons must monitor the psychological evolution of the students as they go through flight training, especially in high performance jets. The majority of students who wash out do so in the early days, either voluntarily, because of medical reasons or because they do not display the skills or appreciation of flight safety required. The latter is of particular importance during formation flying. Some of the students are temporarily suspended if they have colds which affect their Eustachian tubes, a condition which calls for automatic grounding. A particular responsibility that the flight surgeon has is to recommend temporary grounding to offset fatigue, although the student may be apprehensive of interrupting a scheduled flight test. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *PHYSIOLOGICAL FACTORS; *PILOT PERFORMANCE ; *PILOT TRAINING; *PSYCHOLOGICAL FACTORS
DE- ABILITIES; APTITUDE; ARMED FORCES (FOREIGN); FATIGUE (BIOLOGY); FLIGHT SAFETY; FRANCE; SICKNESSES
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01600170
AN- <AEROSPACE> A86-23718
TI- Retention of helicopter flight skills - Is there a 'critical period' for proficiency loss?
AU- RUFFNER, J. W.; WICK, D. T. (Anacapa Sciences, Inc., Fort Rucker, AL); BICKLEY, W. R. (U.S. Army, Research Institute, Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 28th, San Antonio, TX, October 22-26, 1984, Proceedings. Volume 1 (A86-23701 09-54). Santa Monica, CA, Human Factors Society, 1984, p. 370-374. Army-supported research.
PY- 1984
PD- 198400
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8609
AB- The maintenance of the flight proficiency of aviators represents a vital problem for Army aviation. Ruffner and Bickley (1983) conducted an investigation of the loss of helicopter contact flight skills over a six-month period during which active duty Army aviators did not fly. According to the results of this study, there was no significant loss in flight proficiency during the six-month period. The present paper reports data which extend the findings of Ruffner and Bickley to no-flying periods longer than six months. The conclusions about the retention of helicopter contact flight skills are discussed. There is little significant proficiency loss in either psychomotor or procedural tasks for as many as six months of no flying. There is a significant decrease in proficiency for aviators who have not flown for one year. The rate of proficiency loss is greater for no flying periods between six months and one year than for periods of no flying greater than one year. (G.R.)
SF- AIAA
DE- <MAJOR> *ABILITIES; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *TIME DEPENDENCE
DE- ARMED FORCES (UNITED STATES); HUMAN FACTORS ENGINEERING; PILOT TRAINING
; RETRAINING; TASK COMPLEXITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01600168
AN- <AEROSPACE> A86-23716
TI- An examination of ability requirements for various rotary wing missions
AU- JONES, D. H.; MCANULTY, D. M. (Anacapa Sciences, Inc., Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 28th, San Antonio, TX, October 22-26, 1984, Proceedings. Volume 1 (A86-23701 09-54). Santa Monica, CA, Human Factors Society, 1984, p. 361-365.
PY- 1984
PD- 198400
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8609
AB- The increasing specialization of rotary wing missions and aircraft has led to a reanalysis of traditional strategies for assigning student aviators to one of four rotary wing missions, including cargo, utility, aeroscout, or attack. The present paper has the objective to present analyses of data, originally compiled by Myers et al. (1982), which suggest that ability requirements for the four missions are indistinguishable when the most demanding mission tasks are included in the basis of comparison. (G.R.)
SF- AIAA
DE- <MAJOR> *MISSION PLANNING; *PILOT PERFORMANCE; *PILOT SELECTION; *ROTARY WING AIRCRAFT
DE- ABILITIES; FEASIBILITY ANALYSIS; PSYCHOMOTOR PERFORMANCE; SENSORIMOTOR
PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01600167
AN- <AEROSPACE> A86-23715
TI- An evaluation of aviator training ability requirements scale ratings
AU- MCANULTY, D. M.; JONES, D. H. (Anacapa Sciences, Inc., Fort Rucker, AL)
SO- IN: Human Factors Society, Annual Meeting, 28th, San Antonio, TX, October 22-26, 1984, Proceedings. Volume 1 (A86-23701 09-54). Santa Monica, CA, Human Factors Society, 1984, p. 356-360. Army-supported research.
PY- 1984
PD- 198400
RF- 13

LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8609
AB- It is pointed out that the ability requirements approach to job analysis has been effectively employed in a wide range of occupational specialities. This approach is based on the premise that a job can be described in terms of abilities required to perform the tasks associated with the job. The usefulness of the ability requirements approach has been repeatedly demonstrated. A recurrent problem, however, is related to the generally low level of agreement among raters with respect to the ratings. Thus, it has been found that 16 to 25 raters must be considered to obtain average ratings which are consistent. The present paper is concerned with ability requirements analyses limited to the instrument phase of Army helicopter training. Attention is given to details regarding the method, psychometric analyses, ratings transformation and evaluation, and a factor analysis of the normalized task-ability ratings. (G.R.)
SF- AIAA
DE- <MAJOR> *PILOT PERFORMANCE; *PILOT TRAINING; *TRAINING ANALYSIS
DE- FACTOR ANALYSIS; HELICOPTERS; INSTRUMENT FLIGHT RULES; PSYCHOMETRICS;
RATINGS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01597515
AN- <AEROSPACE> A86-21063
TI- Escape systems testing
AU- MCDONALD, J. B.; GRAGG, D. (USAF, Holloman AFB, NM)
SO- IN: Society of Experimental Test Pilots, Symposium, 28th, Beverly Hills, CA, September 26-28, 1984, Proceedings (A86-21051 08-05). Lancaster, CA, Society of Experimental Test Pilots, 1984, p. 191-206.
PY- 1984
PD- 198400
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8608
AB- The escape system's (ES's) aspects of flight testing, in particular the problems encountered in the dynamic speed ranges above 600 KEAS, are presented. The development history of ES in the last 20 years led to the introduction of an encapsulated ES and the new Advanced Concept Ejection Seat (ACES)-II. Problems posed to the ESs by helicopter blades are considered. Special problems involved in high-speed escape (up to 700 KEAS), where human tolerance may be exceeded due to the explosive catapult charge, windblast, and acceleration, resulting in disabling spine injuries, are discussed. A new generation of ejection seats, introduced by an advanced development program, the Crew Escape Technology (CREST), is examined. The CREST seats will enable a safe escape at 700 KEAS, needing only 75 ft at 300 KEAS and a flight path angle of 30 deg, and will have advantageous restraining capability. In addition, a new concept in sled design, the Multi-Axis Seat Ejection Sled, is discussed. (I.S.)
SF- AIAA
DE- <MAJOR> *ESCAPE SYSTEMS; *FLIGHT TESTS; *PERFORMANCE TESTS
DE- EJECTION SEATS; HIGH SPEED; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01597511
AN- <AEROSPACE> A86-21059
TI- Non-rigid airship testing
AU- WHITMER, L. D.; BEEKS, K.
SO- IN: Society of Experimental Test Pilots, Symposium, 28th, Beverly Hills, CA, September 26-28, 1984, Proceedings (A86-21051 08-05). Lancaster, CA, Society of Experimental Test Pilots, 1984, p. 118-127.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8608
AB- The flying qualities and performance of a lighter-than-air aircraft, the Patrol Airship Concept Evaluation (PACE) test airship, designated AI-500, were evaluated. NASA's Ames, in conjunction with Systems Technology, provided the instrumentation for dynamic tests and propeller thrust measurements. The results indicate that the AI-500 has a potential for use in maritime patrol missions. However, the conventional control system is inadequate for long-endurance or heavy-weather missions due to high control forces in maneuvering

flight, and a requirement for the pilot to continually monitor the controls to maintain proper altitude and heading alignment. The vectored thrust did provide a VTOL capability, but not an adequate rearward vector angle and lateral control in the hovering environment. An analysis indicated that these deficiencies were correctable. (I.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *AIRSHIPS; *FLIGHT CHARACTERISTICS;
*FLIGHT TESTS; *PERFORMANCE TESTS
DE- DIRECTIONAL CONTROL; FLIGHT SIMULATION; LIFT; THRUST
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01596490
AN- <AEROSPACE> A86-20038
TI- Helicopter fatigue monitoring using a single channel recorder
AU- SIMPSON, D. L. (National Aeronautical Establishment, Structures and Materials Laboratory, Ottawa, Canada)
SO- (CASI, Annual General Meeting, 31st, Ottawa, Canada, May 28, 1984) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 31, March 1985, p. 30-44.
PY- 1985
PD- 198503
RF- 11
SN- 0008-2821
LA- English
GL- Canada
CP- Canada
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8607
AB- The use of single channel recorders and loaded transfer functions to monitor fatigue damage in CH-113 helicopters is investigated. The equipment used includes two single channel recorders for monitoring the output from strain gauges on the longitudinal pitch links on both the fore and aft rotors, and the Rainflow counting method of Hutchinson and Steinman (1980) for data compression. Techniques used to generate transfer functions are analyzed. Identification of the maneuvers which produce cycles that exceed the component endurance limit by applying flight load survey data, and the methods of treating loads above the endurance limit are described. The analyses reveal that conservative estimates of fatigue damage are calculated using transfer functions and the measured longitudinal pitch load spectrum. It is concluded that indirect monitoring of fatigue damage with single channel recorders is possible; however, improvements in instrumentation are required to provide an increase in the percentage of accurate data obtained. (I.F.)

SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *FATIGUE (MATERIALS); *HELICOPTERS;
*MONITORS; *TRANSFER FUNCTIONS
DE- DAMAGE; DATA ACQUISITION; LOADS (FORCES); RECORDING INSTRUMENTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01595798
AN- <AEROSPACE> A86-19346
TI- Simulator sickness - Incidence of simulator aftereffects in Navy flight trainers
AU- KENNEDY, R. S.; DUTTON, B. (Essex Corp., Orlando, FL); LILIENTHAL, M. G.; RICARD, G. L. (U.S. Navy, Naval Training Equipment Center, Orlando, FL); FRANK, L. H. (Virginia Polytechnic Institute and State University, Blacksburg)
SO- IN: SAFE Association, Annual Symposium, 22nd, Las Vegas, NV, December 9-13, 1984, Proceedings (A86-19301 07-03). Van Nuys, CA, SAFE Association, 1985, p. 299-302.
PY- 1985
PD- 198500
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8607
AB- Simulator sickness in flight trainers is studied. Symptoms of simulator sickness include: disorientation, dizziness, nausea, vomiting, drowsiness, and visual problems. The negative implications of simulator sickness, such as learning improper adaptive responses to light situations or injury, are discussed. A program designed to survey the incidence of simulator sickness is implemented. A fine-grained analysis of motion sickness obtained during helicopter simulation, two case histories involving reactions to simulation, and a survey of simulator sickness at ten Navy simulators are described. Means of alleviating simulator symptoms until the problem can be eliminated are examined. (I.F.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT SIMULATION; *FLIGHT TRAINING;

*MOTION SICKNESS
DE- ADAPTATION; FLIGHT SIMULATORS; NAVY; PILOT PERFORMANCE
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01595762
AN- <AEROSPACE> A86-19310
TI- How much inherent buoyancy is acceptable in a helicopter passenger immersion suit
AU- BROOKS, C. J.; PROVENCHER, J. D. M.
SO- IN: SAFE Association, Annual Symposium, 22nd, Las Vegas, NV, December 9-13, 1984, Proceedings (A86-19301 07-03). Van Nuys, CA, SAFE Association, 1985, p. 75, 76.
PY- 1985
PD- 198500
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8607
AB- The buoyancy value of helicopter crewmembers' immersion suits (for hypothermia protection) may be so high as to actually prevent escape from an immersed helicopter's inverted cabin. A recent evaluation of quick-down immersion suits noted a wide range of inherent buoyancies. Attention is presently given to the tradeoffs between inherent buoyancy, hypothermia protection, and underwater escape capability. A 20-lb inherent buoyancy figure is recommended. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *BUOYANCY; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PROTECTIVE CLOTHING; *WATER IMMERSION
DE- HYPOTHERMIA; PASSENGERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01595753
AN- <AEROSPACE> A86-19301
TI- SAFE Association, Annual Symposium, 22nd, Las Vegas, NV, December 9-13, 1984, Proceedings
SO- Van Nuys, CA, SAFE Association, 1985, 398 p. For individual items see A86-19302 to A86-19353.
PY- 1985
PD- 198500
RN- AD-A199274
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8607
AB- The present conference on aircraft life support and escape systems considers the fire safety of commercial aircraft cabins, acceleration exposure limits for escape system development, the development of a zero-prebreathe spacesuit, an impermeable chemical defense protective ensemble, crew escape capsule technology, helicopter escape methods, an altitude and acceleration protection system for high performance aircraft, molecular sieve oxygen supply systems, vectored thrust digital control of ejection seats, and ballistically deployed parachutes for small aircraft. Also discussed are control law and logic development for an ejection seat catapult, real time recovery of vehicle data, escape system simulation methods, an underwater high pressure emergency breathing system, simulator sickness, decompression sickness, and the use of gliding parachutes for ejection seats. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *CONFERENCES; *ESCAPE SYSTEMS; *LIFE SUPPORT SYSTEMS
DE- EJECTION SEATS; FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING; MILITARY AIRCRAFT; OXYGEN SUPPLY EQUIPMENT; PARACHUTES; PROTECTIVE CLOTHING; UNDERWATER BREATHING APPARATUS; WATER IMMERSION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01594914
AN- <AEROSPACE> A86-18462
TI- Advanced technology cockpit simulator
AU- SHAW, A. H. (Westland Helicopters, Ltd., Yeovil, England)
SO- IN: Specialists' Meeting on Advanced Cockpit Design, Grapevine, TX, October 3, 4, 1984, Proceedings (A86-18451 06-06). Alexandria, VA, American Helicopter Society, 1984, 8 p.
PY- 1984
PD- 198400
LA- English
GL- United Kingdom
CP- United States

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8606
AB- An advanced technology cockpit simulator has been manufactured and evaluated whose design is oriented toward helicopter manufacturing and operating cost reduction, as well as the introduction of a high degree of commonality into civilian and military derivatives of a given helicopter design. Human factors implications of candidate advanced cockpit technologies were of primary importance during the simulator design stage. Attention is given to the incorporation of a side-arm controllers, direct pilot voice command inputs, control and display panels, and subsystems integration. (O.C.)
SF- AIAA
DE- <MAJOR> *COCKPIT SIMULATORS; *HELICOPTER DESIGN
DE- DISPLAY DEVICES; SYSTEMS INTEGRATION; VOICE CONTROL
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01594881
AN- <AEROSPACE> A86-18429
TI- The wind tunnel as a design tool
AU- BEVAN, D.; PYNE, E. J. (Boeing Vertol Co., Philadelphia, PA)
SO- IN: National Specialists' Meeting on Helicopter Testing Technology, Williamsburg, VA, October 29-November 1, 1984, Proceedings (A86-18401 06-05). Alexandria, VA, American Helicopter Society, 1984, 8 p.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8606
AB- Wind tunnels intended for use as rotorcraft design tools are noted, in view of a major helicopter manufacturer's experience, to require aircraft models that are sufficiently large for the incorporation of Mach-scaled and instrumented rotor blades, as well as a test section sufficiently wide to accept such rotors. Large power supplies and small electric, hydraulic and pneumatic power systems must be used for main rotor and tail rotor drives, control system actuation, drivetrain lubrication, and cooling. Also required are instrumentation and calibration facilities for the maintenance of models with as many as 100 channels; data acquisition and computation systems should be readily modifiable. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *ROTORCRAFT AIRCRAFT; *WIND TUNNEL TESTS
DE- DATA ACQUISITION; WIND TUNNEL APPARATUS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01594873
AN- <AEROSPACE> A86-18421
TI- The role of simulation for the LHX
AU- METZLER, T. R. (U.S. Army, Aviation Systems Command, St. Louis, MO)
SO- IN: National Specialists' Meeting on Helicopter Testing Technology, Williamsburg, VA, October 29-November 1, 1984, Proceedings (A86-18401 06-05). Alexandria, VA, American Helicopter Society, 1984, 7 p.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8606
AB- The use of full existing capabilities for simulation of the range of combat helicopter operational conditions and behavior, from aerodynamics to tactical performance, are expected to yield significant advantages in the design of major 'LHX' helicopter elements. Simulation has been rendered critical by a compressed and accelerated development program, crew size reductions, and complex integrations of advanced technologies. The state-of-the-art simulation technology in question is software-intensive, and is therefore substantially more independent of electromechanical systems than past simulation technologies. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *LIGHT AIRCRAFT; *LIGHT HELICOPTERS; *MILITARY HELICOPTERS; *SIMULATION
DE- COCKPITS; CREW WORKSTATIONS; DATA BASES; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01594861
AN- <AEROSPACE> A86-18409
TI- Gear tooth surface fatigue testing with full size test specimens
AU- DRAGO, R. J.; NONEMAKER, H. J. (Boeing Vertol Co., Philadelphia, PA)
SO- IN: National Specialists' Meeting on Helicopter Testing Technology,

Williamsburg, VA, October 29-November 1, 1984, Proceedings (A86-18401 06-05). Alexandria, VA, American Helicopter Society, 1984, 18 p.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8606
AB- Attention is given to the test rig configurations and control and instrumentation systems of a major helicopter manufacturer's Gear Research Test Facility. The approach used at this facility for the surface durability testing of full size spur, helical and spiral bevel gears, in support of a helicopter transmission design effort, is demonstrated. Data analyses yield a mean S/N curve, unbiased standard deviation, and 99-percent confidence limits on the mean curve. (O.C.)
SF- AIAA
DE- <MAJOR> *FATIGUE TESTS; *GEAR TEETH; *HELICOPTER ENGINES
DE- DATA REDUCTION; LUBRICATION; S-N DIAGRAMS; TEST FACILITIES
SH- 7537 Mechanical Engineering (1975-)

AN- <DIALOG> 01594858
AN- <AEROSPACE> A86-18406
TI- FAA certification of rotorcraft engine induction system for ice protection
AU- WHITLOCK, H. R. (FAA, Aircraft Certification Div., Fort Worth, TX)
SO- IN: National Specialists' Meeting on Helicopter Testing Technology, Williamsburg, VA, October 29-November 1, 1984, Proceedings (A86-18401 06-05). Alexandria, VA, American Helicopter Society, 1984, 8 p.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8606
AB- Attention is given to the methodology required for demonstration of compliance with Federal Aviation Regulations FAR 27.1093(b) and FAR 29.1093(b), which require that helicopter engine induction systems operate throughout the aircraft/engine design envelope without the accumulation of ice that might adversely effect engine operations. The present discussion notes the variety of engine air intakes for which these requirements must be met. Dry air tests, tanker and spray rig tests, icing tunnel tests, and natural icing tests, together with the type of flight data required and the instrumentation that furnishes it, are discussed. (O.C.)
SF- AIAA
DE- <MAJOR> *CERTIFICATION; *ENGINE INLETS; *HELICOPTER ENGINES; *ICE PREVENTION; *PERFORMANCE TESTS
DE- AIRCRAFT ENGINES; FLIGHT TESTS; ICE FORMATION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01590984
AN- <AEROSPACE> A86-14531
TI- Impact of flying qualities on mission effectiveness for helicopter air combat
AU- HARRIS, T. M.; BEERMAN, D. A. (Flight Systems, Inc., Newport Beach, CA) ; BIVENS, C. C. (NASA, Ames Research Center, Moffett Field, CA)
CS- Flight Systems, Inc., Newport Beach, CA.
CS- <CODE> FS898322
SO- (Atmospheric Flight Mechanics Conference, Seattle, WA, August 21-23, 1984, Technical Papers, p. 286-293) Journal of Aircraft (ISSN 0021-8669), vol. 22, Nov. 1985, p. 973-978. Previously cited in issue 20, p. 2855, Accession no. A84-42354.
PY- 1985
PD- 198511
RF- 8
SN- 0021-8669
CN- NAS2-11178
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8604
SF- AIAA
DE- <MAJOR> *AIRCRAFT SURVIVABILITY; *COMBAT; *HELICOPTER PERFORMANCE; *MILITARY HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION; *P-531 HELICOPTER
DE- FLIGHT CHARACTERISTICS; FLIGHT SIMULATION; HELICOPTER CONTROL; HOVERING STABILITY; PILOT PERFORMANCE; TANKS (COMBAT VEHICLES)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01590810
AN- <AEROSPACE> A86-14356
TI- The in-flight simulation program at the NAE Flight Research Laboratory
AU- SINCLAIR, M.; MORGAN, M.; KERELIUK, S. (National Aeronautical Establishment, Ottawa, Canada)
SO- Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 31, June 1985, p. 116-124.
PY- 1985
PD- 198506
RF- 7
SN- 0008-2821
LA- English
GL- Canada
CP- Canada
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8603
AB- The Canadian National Aeronautical Establishment's In-Flight Simulator is an adaptable flight mechanics facility serving in a wide range of aircraft and flight system research roles relevant to V/STOL systems. Three specially instrumented airborne simulation helicopters are used in this research work, which has recently encompassed the testing of a multimode matrix display, pilot workload studies, the design and performance of multiaxis side-arm controllers, and helicopter instrument flight handling qualities. (O.C.)
SF- AIAA
DE- <MAJOR> *COMPUTER PROGRAMS; *COMPUTERIZED SIMULATION; *FLIGHT MECHANICS ; *IN-FLIGHT MONITORING; *RESEARCH AND DEVELOPMENT
DE- AIRBORNE EQUIPMENT; DISPLAY DEVICES; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01590025
AN- <AEROSPACE> A86-13571
TI- Thermal stress imposed on pilots by NBC protective clothing
TI- <ORIGINAL> Contrainte thermique imposee au personnel navigant par la protection N.B.C.
TI- <EXTENSION> Nuclear-Biological-Chemical
AU- BOUTELIER, C.; LONCLE, M. (Centre d'Essais en Vol, Bretigny-sur-Orge, France)
SO- Medecine Aeronautique et Spatiale, vol. 24, 3rd Quarter, 1985, p. 161-168. In French.
PY- 1985
PD- 198500
RF- 10
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8603
AB- The results of experimental determinations of the effects of thermal stress imposed on pilots by NBC clothing and anti-g suits are reported. The NBC cowling provides protection from chemical weapons, is made of neoprene, and has an air supply, but is water vapor resistant. Subjects donned the NBC suits and anti-g equipment and were then strapped in a helicopter seat in a controlled environment. Cutaneous temperatures and heart rates were monitored during the 1-hr sessions at temperatures from 20-40 C. Moderate heating in the chamber was sufficient to induce severe thermal stresses on the subjects. The results imply a necessity exists for limiting flight duration in warm weather climates or seasons, particularly at low altitudes, if pilots wear the protective gear. The situation might be helped if the suits were actively cooled. (M.S.K.)
SF- AIAA
DE- <MAJOR> *BODY TEMPERATURE; *HYPERTHERMIA; *PERFORMANCE TESTS; *PILOT PERFORMANCE; *PROTECTIVE CLOTHING
DE- HEART RATE; HEAT TOLERANCE; PRESSURE SUITS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01590023
AN- <AEROSPACE> A86-13569
TI- Mourning and traumatic neuroses - Clinical aspects and aeronautical incidents for one helicopter pilot
TI- <ORIGINAL> Deuil et nevrose traumatique - Aspects cliniques et incidences aeronautiques chez un pilote d'helicoptere
AU- DUBOUIS-BONNEFOND, J. C. (Armee de l'Air, Centre Medical de Psychologie Clinique, Paris, France)
SO- Medecine Aeronautique et Spatiale, vol. 24, 3rd Quarter, 1985, p. 155-158. In French.
PY- 1985

PD- 198500
RF- 6
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8603
AB- The case history of the onset, progression, diagnosis and analysis of the traumatic neuroses which rendered a military helicopter pilot unable to continue flying are summarized in terms of general principles. The trauma was initiated by the deaths of several other pilots in the same squadron due to air accidents. The pilot eventually could not handle his own aircraft, had continuous nightmares about death and helicopters, and began expressing guilt for his friends' deaths. He became aggressive toward superiors and was relieved of flight duty, after which the anguish-driven behavior patterns diminished, followed by depression. The application of a number of personality profile tests supported previous speculation that a pilot's professional attitude and ignorance of death actually suppresses a continuous awareness of death. Life events, on or off duty, which expose the pilot to the reality of death remove the psychic barriers to the continuous perception of terminal hazards faced by pilots. The pilot may then need to be retrained for some other task. (M.S.K.)
SF- AIAA
DE- <MAJOR> *CASE HISTORIES; *NEUROSES; *PILOT PERFORMANCE; *PSYCHOLOGICAL FACTORS
DE- AEROSPACE MEDICINE; HELICOPTER CONTROL; PERSONALITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01587399
AN- <AEROSPACE> A86-10945
TI- Simulation evaluation of display/FLIR concepts for low-altitude, terrain-following helicopter operations
AU- SWENSON, H. N.; PAULK, C. H., JR. (NASA, Ames Research Center, Moffett Field, CA); KILMER, R. L.; KILMER, F. G. (IBM Corp., Federal Systems Div., Owego, NY)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- AIAA, AHS, and ASEE, Aircraft Design Systems and Operations Meeting, Colorado Springs, CO, Oct. 14-16, 1985. 11 p.
PY- 1985
PD- 198510
RF- 8
RN- AIAA PAPER 85-3093
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8601
AB- Trials were run on a six degree of freedom combat helicopter simulator to evaluate head-down displays with integrated FLIR imagery for terrain-following, course-steering, and transition to approach and hover helicopter pilot tasks. Three display formats were tested, providing varying levels of symbology for, e.g., the flight path angle, pitch-attitude data, vertical speed, altitude, etc. The pilots were also furnished flight director guidance, i.e., terrain-following, course steering, airspeed hold, and approach to hover. All the displays permitted the pilots to fly satisfactory mission in the CGI scenarios. The results revealed that the pilots preferred a nonconformal FLIR display superposition. (M.S.K.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *FLIR DETECTORS; *MILITARY HELICOPTERS; *TERRAIN FOLLOWING AIRCRAFT
DE- ATTITUDE (INCLINATION); FLIGHT PATHS; PILOT PERFORMANCE; PITCH (INCLINATION); VERTICAL MOTION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01585889
AN- <AEROSPACE> N85-35596
TI- The research programme of the Institute for Aerospace Medicine
AU- KLEIN, K. E.
CS- European Space Agency, Paris (France).
CS- <CODE> E6854803
PY- 1984
PD- 198411
NT- In its Proc. of a Sci. Meeting on the Occasion of the Inauguration of New Buildings for the DFVLR Inst. for Aerospace Med. (DFVLR-Mitt-83-19) p 6-11 (SEE N85-35595 24-52)
NT- Transl. into ENGLISH from ""Vortraege eines flugmed. Kolloq. aus Anlass der Vorstellung des Naubaues des DFVLR-Inst. fuer Flugmed." rept. DFVLR-Mitt-83-19 DFVLR, Cologne, 1983 p 9-14
LA- English

GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8524
AB- Research into the medical, biological, physiological, and psychological effects of air travel, space flight, and deep sea diving is summarized. Biodynamic effects of helicopter vibration; biorhythm effects of jet travel; pilot performance; and space environment effects on cells and tissues are studied. (Author (ESA))
SF- ESA
DE- <MAJOR> *AEROSPACE MEDICINE; *AIR TRANSPORTATION; *BIOASTRONAUTICS; *DIVING (UNDERWATER)
DE- BIOLOGICAL EFFECTS; GRAVITATIONAL EFFECTS; PHYSIOLOGICAL EFFECTS; PRESSURE EFFECTS; SPACE ENVIRONMENT SIMULATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01581364
AN- <AEROSPACE> N85-31051
TI- The helicopter, instrument of choice for health evacuation
TI- <ORIGINAL> L'HELICOPTERE, INSTRUMENT D'ELECTION POUR L'EVACUATION SANITAIRE
CS- Societe Nationale Industrielle Aerospatiale, La Courneuve (France).
CS- <CODE> SQ444405
PY- 1984
PD- 198412
PG- 12P.
NT- Submitted for publication
RN- SNIAS-851-220-101
LA- French
GL- France
CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8520
AB- The advantages of the use of helicopters for the evacuation and transportation of persons in danger, injured, or with severe health problems are discussed. The transport time reduction is reduced by a factor of 4 to 5 times when using the Dauphin SA-365N helicopter compared to surface transportation. The economic justification and the effectiveness in saving human lives are analyzed. (Author (ESA))
SF- ESA
DE- <MAJOR> *ECONOMIC ANALYSIS; *EVACUATING (TRANSPORTATION); *HELICOPTERS; *INJURIES
DE- DELAY; ECONOMIC FACTORS; HOSPITALS; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01579268
AN- <AEROSPACE> N85-28918
TI- Mission requirements and handling qualities
AU- GMELIN, B.; PAUSDER, H. J.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugmechanik.
CS- <CODE> DO696666
PY- 1985
PD- 198504
NT- In AGARD Helicopter Aeromech. 37 p (SEE N85-28913 18-01)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8518
AB- With the appearance of new missions for helicopters and with the development of a new generation of rotary-wing aircraft it has become obvious at the latest that future activities in the field of handling qualities must include the mission characteristics as well as the influences of the different subsystems implemented in the helicopter system. Therefore, mission analyses and consideration of system elements influencing mission performance are the basis for this work. The missions under consideration emphasize military missions but refer to civil missions, too. The system elements influencing mission performance include the basic helicopter, the pilot, the information system, the control system, interfaces, etc. (G.L.C.)
SF- NASA CASI
DE- <MAJOR> *CONTROLLABILITY; *HELICOPTERS; *MISSION PLANNING; *PERFORMANCE PREDICTION

DE- CIVIL AVIATION; FLIGHT SIMULATORS; HELICOPTER CONTROL; MILITARY OPERATIONS; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01576509
AN- <AEROSPACE> N85-26150
TI- Activities report for FOA 53: Laboratory for man and information systems
TI- <SUPPLEMENT> Annual Report, 1983 - 1984
CS- Research Inst. of National Defence, Stockholm (Sweden). Lab. for Man and Information Systems.
CS- <CODE> RR628060
PY- 1984
PD- 198410
PG- 17P.
SN- 0347-7665
RN- FOA-C-53019-H
LA- English
GL- Sweden
CP- Sweden
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8515
AB- Research concerning color graphics and coding; image quality in graphical displays; a hand sized terminal for coded combat orders; mental models in information seeking; reading textual information from VDU's; dynamic decision making; a computer aided display system for surveillance; user centered design and the computers of 1990; electronic displays of flight information; and analyses of helicopter pilot performance is summarized. (Author (ESA))
SF- ESA
DE- <MAJOR> *COMPUTER GRAPHICS; *COMPUTER SYSTEMS DESIGN; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- DECISION MAKING; DISPLAY DEVICES; IMAGE RESOLUTION; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01570393
AN- <AEROSPACE> N85-19920
TI- Proceedings of the 14th Army Science Conference. Volume 1: Principal Authors A through H
CS- Deputy Chief of Staff for Research Development and Acquisition (Army), Washington, DC.
CS- <CODE> DM608207
PY- 1984
PD- 198406
PG- 372P.
NT- Proc. held at West Point, N.Y., 19-21 Jun. 1984
RN- AD-A149200
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A16/MF A02
JA- STAR8510
AB- These Proceedings of the 1984 Army Science Conference are a compilation of all papers presented at the conference and the supplemental papers that were submitted. Papers included in this volume follow: Development of a Portable Neutron Source for Radographic Evaluation and Aircraft Structural Defects; Eye Protection Against Lasers; Winter Traction Aids for Wheeled Vehicles; Thrust Dynamics and Helicopter Handling Qualities; Model Helicopter Rotor High-Speed Impulsive Noise; Evaluation of Potential Multipurpose Propellant Additives: Flash-Erosion Suppressant; Laser Projected Live Fire Target System; Deuterium Kinetic Isotope Effect; An experimental Probe for the Molecular Processes Governing the Initiation of TNT and RDX; Field Applicable Micro enzyme-linked Immunosorbent Assay for Detecting Malaria Infected Mosquitoes; A Primitive Driven, Artificial Intelligence Threat Model; Composite Materials for Electrocatalysts; Energy-less Manufacturing of Advanced Ceramics by SHS; Requirements and Specifications for Cartographic Video Discs; A Combined Mangetic and DTA Method for the Determination of Heat Treatment Data for Armament Steels; Symbolic Filtering of Military Messages Using Artificial Intelligence Techniques; Medical Defense Against the Potential Biological Warfare Agent Saxitoxin; Mine Detection in Cold Regions Using Non-Sinusoidal Radar; Field Production of Water for Injection; Light Emission Immunoassay. (DTIC)
SF- DTIC
DE- <MAJOR> *ARTIFICIAL INTELLIGENCE; *CONFERENCES; *HUMAN FACTORS ENGINEERING; *IMMUNOASSAY; *MILITARY HELICOPTERS; *RADIOGRAPHY
DE- AIRFRAMES; CERAMICS; EXPLOSIVES; LASER DAMAGE; MEDICAL SCIENCE; PROPELLANTS; THRUST; TRACTION
SH- <COSATI> 5B Documentation & Information Technology

SH- 7599 General (1975-)

AN- <DIALOG> 01570148
AN- <AEROSPACE> N85-19672
TI- Aircrew-aircraft integration issues in future US Army helicopters
AU- HARTZELL, E. J.; AIKEN, E. W.; VOORHEES, J. W.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198411
NT- In AGARD Human Factors Considerations in High Performance Aircraft 16 p (SEE N85-19653 10-54)
LA- English
GL- United States
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A02
JA- STAR8510
AB- Some human factors research issues, the resolution of which will be vital to the successful operation of future military helicopters are reviewed. Understanding and reducing the helicopter pilot's workload is examined by a diverse program directed at answering some of the more fundamental questions relating to the transfer displays and interactions between pilot and automated systems. The results of three experimental studies which address the issues of display control compatibility, characteristics of integrated controllers, and voice systems are presented. (E.A.K.)
SF- NASA CASI
DE- <MAJOR> *DISPLAY DEVICES; *HUMAN BEHAVIOR; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AUTOMATION; MAN MACHINE SYSTEMS; MILITARY OPERATIONS; VOICE COMMUNICATION
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01567319
AN- <AEROSPACE> N85-16817
TI- Assessment of simulation fidelity using measurements of piloting technique in flight
AU- CLEMENT, W. F. (Systems Technology, Inc., Mountain View, Calif.); CLEVELAND, W. B.; KEY, D. L.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198408
NT- In AGARD Helicopter Guidance and Control Systems for Battlefield Support 12 p (SEE N85-16797 08-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A13/MF A02
JA- STAR8508
AB- The U.S. Army and NASA joined together on a project to conduct a systematic investigation and validation of a ground based piloted simulation of the Army/Sikorsky UH-60A helicopter. Flight testing was an integral part of the validation effort. Nap-of-the-Earth (NOE) piloting tasks which were investigated included the bob-up, the hover turn, the dash/quickstop, the sidestep, the dolphin, and the slalom. Results from the simulation indicate that the pilot's NOE task performance in the simulator is noticeably and quantifiably degraded when compared with the task performance results generated in flight test. The results of the flight test and ground based simulation experiments support a unique rationale for the assessment of simulation fidelity: flight simulation fidelity should be judged quantitatively by measuring pilot's control strategy and technique as induced by the simulator. A quantitative comparison is offered between the piloting technique observed in a flight simulator and that observed in flight test for the same tasks performed by the same pilots. (R.S.F.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT SIMULATION; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE; *UH-60A HELICOPTER
DE- EXPERIMENT DESIGN; FLIGHT TESTS; HELICOPTER CONTROL; MATHEMATICAL MODELS
SH- <COSATI> 14B Laboratories, Test Facilities, & Test Equipment
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01567315
AN- <AEROSPACE> N85-16813

TI- Integration of sensor fusion in advanced helicopter cockpit design
AU- COHILL, G. L.; STROTHER, D. D.; HENDERSON, H. B. (Texas Instruments, Dallas, Tex.)
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
PY- 1984
PD- 198408
NT- In AGARD Helicopter Guidance and Control Systems for Battlefield Support 9 p (SEE N85-16797 08-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A13/MF A02
JA- STAR8508
AB- Effective operation and survival in the battlefield of the future can impose great demands on helicopter weapon systems and the crews who manage them. Among these are: time to detect and respond to threats and targets; ability to integrate many types of sensor data and assess the intelligence portrayed by these sensors; and requirements for highly trained systems management personnel who can process highly technical information while operating in the very demanding NOE environment. Helicopter cockpit designs for the future and how crew performance can be improved are discussed and subsystems are addressed which can improve human performance. Sensor fusion systems, related misconceptions and their proposed use are highlighted. It is shown that the fused system is more reliable, less costly, lighter, and has more performance potential. System fusion provides a way to unload the harried system operator and assure mission success at a cost/performance ratio that decreases proportionally with overall system complexity. (A.R.H.)
SF- NASA CASI
DE- <MAJOR> *AVIONICS; *CHANNELS (DATA TRANSMISSION); *COCKPITS; *DISPLAY DEVICES; *HELICOPTER DESIGN; *SYSTEMS INTEGRATION
DE- ARCHITECTURE (COMPUTERS); BLOCK DIAGRAMS; HUMAN FACTORS ENGINEERING; INTEGRATED CIRCUITS; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01567302
AN- <AEROSPACE> N85-16800
TI- A Computer-generated topographic display system for navigation and mission planning in helicopters
AU- ROGERS, S. P.
CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> AU848790
PY- 1984
PD- 198408
NT- In AGARD Helicopter Guidance and Control Systems for Battlefield Support 11 p (SEE N85-16797 08-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A13/MF A02
JA- STAR8508
AB- The Integrated Mission-Planning Station (IMPS) is a computer-generated topographic display system. The IMPS will provide not only a greatly enhanced navigation capability, but also a combination of dramatic improvements in cartographic support, map information content, and aviator-map interactions. The powerful computational capability of the IMPS can be used to present a shaded relief map, to display areas masked from visual or radar observation, to construct perspective views of key terrain, to support a self-contained terrain correlation navigation system, and to permit rapid solutions to problems of previously forbidding complexity. The tasks conducted to provide detailed human factors engineering specifications for the construction and programming are described. The outcome of these efforts is described in terms of an overview of system components and functions. Each of the major functions of the IMPS system is discussed, and the operational requirements, present deficiencies, and IMPS capabilities are identified. (Author)
DE- <MAJOR> *COMPUTER GRAPHICS; *DISPLAY DEVICES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MISSION PLANNING; *TOPOGRAPHY
DE- AIRBORNE/SPACEBORNE COMPUTERS; MAPPING; MILITARY OPERATIONS; NAP-OF-THE-EARTH NAVIGATION; TERRAIN; WARFARE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01567300
AN- <AEROSPACE> N85-16798
TI- Operational requirements versus technological capabilities

AU- COYLE, S.
CS- Aerospace Engineering Test Establishment, Cold Lake (Alberta).
CS- <CODE> AG375016
PY- 1984
PD- 198408
NT- In AGARD Helicopter Guidance and Control Systems for Battlefield Support 9 p (SEE N85-16797 08-01)
LA- English
GL- Canada
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A13/MF A02
JA- STAR8508
AB- The lessons learned in the wartime use of helicopters, and the impact that modern technology can have on what have become common themes are discussed. Lessons learned, the constraints on helicopter operations, and the requirements of the battlefield helicopter are integrated to show where technology would better serve the operators. Performance monitoring, handling qualitites and radio communications examples are presented, and a brief outline of how existing technology could be used to update an existing helicopter is made. (Author)
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *CONTROLLABILITY; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *MILITARY OPERATIONS; *RADIO COMMUNICATION
DE- CONSTRAINTS; DISPLAY DEVICES; FLIGHT HAZARDS; NIGHT FLIGHTS (AIRCRAFT); REGULATIONS; SAFETY
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01565355
AN- <AEROSPACE> N85-14827
TI- Avionics system design for requirements for the United States Coast Guard HH-65A Dolphin
AU- YOUNG, D. A.
CS- Sikorsky Aircraft, Stratford, CT.
CS- <CODE> SL280853
PY- 1984
PD- 198412
NT- In NASA. Ames Research Center Technical Workshop: Advan. Helicopter Cockpit Design Concepts p 285-293 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Aerospatiale Helicopter Corporation (AHC) was awarded a contract by the United States Coast Guard for a new Short Range Recovery (SRR) Helicopter on 14 June 1979. The award was based upon an overall evaluation of performance, cost, and technical suitability. In this last respect, the SRR helicopter was required to meet a wide variety of mission needs for which the integrated avionics system has a high importance. This paper illustrates the rationale for the avionics system requirements, the system architecture, its capabilities and reliability and its adaptability to a wide variety of military and commercial purposes. (Author)
DE- <MAJOR> *AVIONICS; *COASTS; *DESIGN ANALYSIS; *HELICOPTER DESIGN; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *RESCUE OPERATIONS
DE- ADAPTIVE CONTROL; ARCHITECTURE (COMPUTERS); DIGITAL SYSTEMS; MILITARY OPERATIONS; RELIABILITY
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01565354
AN- <AEROSPACE> N85-14826
TI- Attack helicopter (AH-1T) cockpit systems integration
AU- GRAF, V. A.
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> TV739419
PY- 1984
PD- 198412
RF- 1
NT- In NASA. Ames Research Center Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 271-316 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- This discussion summarizes the effort conducted by the BHTI Human

Factors and Cockpit Arrangement group for a study and design of the integration of a cockpit control system for the AH 1T (TOW). The resulting design is a culmination of studies that were conducted using the existing configuration as a baseline and complementing it with new equipment and subsystems that fulfill the attack helicopter requirements for the foreseeable future. Of primary concern was the requirement to add a missile control system, with secondary considerations for improved NOE and night operations. In addition, growth capabilities for improved target acquisition, weapons delivery, and precise navigation was considered. Along with the addition of new equipment, the aircraft was assumed to have a central multiplex data bus system for information transfer throughout the aircraft and its subsystems. (B.W.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MILITARY
OPERATIONS; *SYSTEMS ENGINEERING; *WEAPON SYSTEMS
DE- ARCHITECTURE (COMPUTERS); CREW WORKSTATIONS; DESIGN ANALYSIS; NAVIGATION
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01565353
AN- <AEROSPACE> N85-14825
TI- Man-machine interface requirements - advanced technology
AU- REMINGTON, R. W.; WIENER, E. L.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 247-266 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Research issues and areas are identified where increased understanding of the human operator and the interaction between the operator and the avionics could lead to improvements in the performance of current and proposed helicopters. Both current and advanced helicopter systems and avionics are considered. Areas critical to man-machine interface requirements include: (1) artificial intelligence; (2) visual displays; (3) voice technology; (4) cockpit integration; and (5) pilot work loads and performance. (B.W.)
SF- NASA CASI
DE- <MAJOR> *DECISION MAKING; *HELICOPTERS; *HUMAN FACTORS ENGINEERING;
*MAN MACHINE SYSTEMS; *REQUIREMENTS
DE- ARTIFICIAL INTELLIGENCE; DISPLAY DEVICES; REAL TIME OPERATION; RELIABILITY; SPEECH RECOGNITION; VOICE DATA PROCESSING
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01565352
AN- <AEROSPACE> N85-14824
TI- Avionics technology - system concepts
AU- BULL, J. S.; HUNTOON, R. B.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 239-246 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Avionics System Concepts to meet technology needs of advanced helicopter integrated cockpit design are identified. Specific avionics system concepts which should be conducted and/or support by NASA to most effectively aid industry in advanced helicopter integrated cockpit design are also identified. Candidate Missions and Mission Requirements to meet technology needs are considered. (B.W.)
SF- NASA CASI
DE- <MAJOR> *AVIONICS; *COCKPITS; *DESIGN ANALYSIS; *DISPLAY DEVICES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *SYSTEMS ENGINEERING
DE- COMPUTER PROGRAMS; PILOT PERFORMANCE; RELIABILITY; WORKLOADS (PSYCHOPHYSIOLOGY)

SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01565351
AN- <AEROSPACE> N85-14823
TI- Operational requirements - system concepts
AU- VOORHEES, J. W.; SNYDER, H. L.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 229-238 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Nine research areas that are most critical to the issue of cockpits for the single pilot are discussed. Helicopter are addressed in this report. They are as follows: (1) automation priority issues; (2) increased complexity of systems; (3) cockpit workload highest in navigation; (4) auto hover and flight trim controls; (5) voice technology in integrated form; (6) systems must have visual and auditory declutter modes; (7) cockpit should be designed to be NBC resistant; and (8) considerations for spillover to civilian public service. (B.W.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *HELICOPTERS; *NAVIGATION; *PILOT PERFORMANCE; *REQUIREMENTS; *SYSTEMS ANALYSIS
DE- CREW WORKSTATIONS; DISPLAY DEVICES; PILOT TRAINING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01565342
AN- <AEROSPACE> N85-14814
TI- Some thoughts on the implementation of pilot night vision devices for helicopters
AU- TUCKER, G. E.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 95-104 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Night vision enhancement devices greatly expand the range and quality of services by extending night operational capabilities. Evolving military tactical concepts for helicopters survivability and battlefield effectiveness necessitate nap-of-the-earth (NOE) flying under both day and night conditions. From a pilot workload standpoint, flying a helicopter NOE in day VFR conditions with minimum clearance between rotors and obstacles is quite demanding. Doing the same job at night is several times more difficult. There are two general categories of night vision devices in operation in helicopter aviation: the Night Vision Goggles (NVG) and forward looking infrared (FLIR) system. The capabilities and limitations of those two devices are discussed. (B.G.)

SF- NASA CASI
DE- <MAJOR> *FLIR DETECTORS; *GOGGLES; *HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION; *PILOT PERFORMANCE
DE- FATIGUE (BIOLOGY); HAZARDS; NAP-OF-THE-EARTH NAVIGATION; SPACE PERCEPTION; VISIBILITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01565336
AN- <AEROSPACE> N85-14808
TI- Helicopter human factors programs and plans
AU- HUFF, E. M.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984

PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 13-22 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Design concepts for pilot interaction with highly computerized systems and particularly the dialog aspects (transfer of information back and forth between the pilot and the system) are examined. Principles for blending the various input-output media are needed. Applied artificial intelligence aspects dealing with input and output grammar, message understanding, and message prioritization are studied. (B.G.)
SF- NASA CASI
DE- <MAJOR> *AUGMENTATION; *COCKPITS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- DISPLAY DEVICES; ENVIRONMENTS; HAZARDS; INFORMATION FLOW; MICROCOMPUTERS; PILOT PERFORMANCE; SOFTWARE ENGINEERING; SPEECH RECOGNITION
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01565335
AN- <AEROSPACE> N85-14807
TI- Superaugmented rotorcraft program
AU- SHOWMAN, R. D.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1984
PD- 198412
NT- In its Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 7-12 (SEE N85-14806 06-04)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8506
AB- Concepts, design criteria, and methodology will be examined in four areas: control systems, guidance systems, cockpit dialogue systems, and the integrated intelligence. The approach is to investigate these areas in an individual manner through analysis and simulation and in an integrated manner through simulation and flight. Finally, the integrated concepts will be validated in flight. (B.G.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *HELICOPTERS; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *STRUCTURAL DESIGN CRITERIA; *SYSTEMS INTEGRATION
DE- ACTIVE CONTROL; DISPLAY DEVICES; FLIGHT CONTROL; NAP-OF-THE-EARTH NAVIGATION; WEAPON SYSTEMS
SH- <COSATI> 1B Aeronautics
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01565032
AN- <AEROSPACE> N85-14502
TI- Helicopter pilot performance for discrete-maneuver flight tasks
AU- HEFFLEY, R. K.; BOURNE, S. M.; HINDSON, W. S. (Stanford Univ., Calif.)
CS- Manudyne Systems, Inc., Los Altos, CA.
CS- <CODE> MF354062
PY- 1984
PD- 198409
NT- In NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 223-232 (SEE N85-14487 05-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A04
JA- STAR8505
AB- This paper describes a current study of several basic helicopter flight maneuvers. The data base consists of in-flight measurements from instrumented helicopters using experienced pilots. The analysis technique is simple enough to apply without automatic data processing, and the results can be used to build quantitative matah models of the flight task and some aspects of the pilot control strategy. In addition to describing the performance measurement technqiue, some results are presented which define the aggressiveness and amplitude of maneuvering for several lateral maneuvers including turns and sidesteps. (Author)
DE- <MAJOR> *AMPLITUDES; *DATA BASES; *HELICOPTERS; *MANEUVERS; *PILOT

PERFORMANCE; *TASKS
DE- FEEDBACK CONTROL; FLIGHT CHARACTERISTICS; MATHEMATICAL MODELS; PILOT
ERROR
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01559713
AN- <AEROSPACE> N84-34424
TI- More use of helicopters in construction work urged
AU- CHERNITSKIY, A.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1984
PD- 198409
NT- In its USSR Rept.: Transp. (JPRS-UTR-84-027) p 5-7 (SEE N84-34422 24-01)
NT- Transl. into ENGLISH from Vozdushnyy Transp. (Moscow), 12 Jun. 1984 p 2
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04
JA- STAR8424
AB- The high effectiveness of helicopter assembly work was described. It is indicated that with good organization and work preparation cost can be reduced, labor intensiveness and construction duration, and the ahead of schedule start up of projects provide an overall national economic effect which greatly surpasses the expenses of helicopter uses. (E.A.K.)
SF- NASA CASI
DE- <MAJOR> *CONSTRUCTION; *CONSTRUCTION INDUSTRY; *HELICOPTER PERFORMANCE;
*LATERAL CONTROL
DE- COST EFFECTIVENESS; FEASIBILITY ANALYSIS; HELICOPTER CONTROL; PILOT
PERFORMANCE; STRUCTURAL ENGINEERING; STRUCTURAL MEMBERS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01557221
AN- <AEROSPACE> N84-31878
TI- Regional wind energy assessment program
TI- <SUPPLEMENT> Progress Report, Oct. 1982 - Sep. 1983
AU- BAKER, R. W.; WADE, J. E.
CS- Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
CS- <CODE> OZ736722
PY- 1984
PD- 198402
PG- 115P.
NT- Sponsored by Bonneville Power Admin., Portland, Oreg.
RN- DE84-011832; DOE/BP-211; BPA-83-12
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR8421
AB- The Bonneville Power Administration's (BPA) planning function requires that estimates be made of the magnitude, cost, and availability of all energy resources which may be available over a 20-year planning horizon. In order to assess the quantity, quality and location of wind energy resources in the Pacific Northwest, BPA commenced in 1980 a five year Regional Wind Energy Assessment Program through a contracting with the Oregon State University Wind Resource Assessment Laboratory. The program centers on wind prospecting, site instrumentation, data collection and analysis, and area verification in the BPA service area. The area covered in the study is extensive (over 250,000 sq mi.) as it includes Washington, Oregon, Idaho, western Montana, and portions of nothern Neveda and northern California. The topography is often complex and rugged and the wind characteristics (persistence and strength) can change dramatically in a short distance. Because of the spatial variability of the wind throughout the BPA service area, effort has been directed at instrumenting and analyzing data at sites throughout the service area. Over the past several years a large number of sites have been selected, instrumented and the data analyzed. (DOE)
SF- DOE
DE- <MAJOR> *CLIMATOLOGY; *DATA ACQUISITION; *STATISTICAL ANALYSIS; *WIND
VELOCITY MEASUREMENT; *WINDPOWER UTILIZATION
DE- HELICOPTERS; SITE SELECTION; WIND EFFECTS; WIND MEASUREMENT; WIND
VELOCITY

SH- 7547 Meteorology & Climatology (1975-)

AN- <DIALOG> 01556047
AN- <AEROSPACE> N84-30696
TI- Analysis of computer interactive tests for assigning helicopter pilots to different missions
TI- <SUPPLEMENT> Research Note, 2 Nov, 1981 - 2 May 1983
AU- MYERS, D. C.; SCHEMMER, F. M.; FLEISHMAN, E. A.
CS- Advanced Research Resources Organization, Silver Spring, MD.
CS- <CODE> AD229821
PY- 1984
PD- 198406
PG- 58P.
CN- DA PROJ. 2Q2-63731-A-792
RN- AD-A142434; ARI-RN-84-87
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8420
AB- A test battery was developed to represent a broad range of abilities and skills that were identified as important in piloting helicopters. The battery was developed on the basis of a taxonomic approach to job analysis which linked pilot tasks to ability requirements for different mission tracks. The tests developed were based on an earlier review, by ARRO staff, of the kinds of tests likely to measure the abilities identified in the job analysis approach employed. The present study included the development, programming and pre-testing of computer interactive tests designed to measure abilities identified as underlying critical tasks in the various helicopter missions. Optimum conditions of administration were developed and test reliability was determined. Tasks judged by expert pilots to be critical for pilot effectiveness were identified as possible measures of performance in the different mission tracks. These tasks can be translated into criterion measures and used in validating the test battery developed. The purpose of the validation will be to empirically link test scores with performance in these critical tasks representing the different mission tracks. The findings would indicate if all the tests are needed or if empirical validities showed which limited set of tests can be used to predict mission performance. (Author (GRA))
SF- DTIC
DE- <MAJOR> *COMPUTER TECHNIQUES; *COMPUTERIZED SIMULATION; *HELICOPTERS;
*MILITARY OPERATIONS; *PERFORMANCE TESTS; *PILOT PERFORMANCE; *PILOT
TRAINING
DE- ABILITIES; COMPUTERS; FLIGHT TESTS; PERFORMANCE PREDICTION; PILOTS
(PERSONNEL); PROVING; RANKING; RELIABILITY; REQUIREMENTS; SCORING; STUDENTS; TASKS; TIME SHARING; TRACKING (POSITION)
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01555031
AN- <AEROSPACE> N84-29675
TI- Psychoacoustic considerations for helicopter noise quantification: Metrics, human response and criteria
AU- POWELL, C. A.
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
PY- 1982
PD- 198207
NT- In its Rotorcraft Noise p 245-260 (SEE N84-29662 19-71)
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A18/MF A03
JA- STAR8419
AB- The purpose of this paper is to examine several aspects of helicopter noise quantification from the standpoint of psychoacoustics. Noise metrics in common use to describe far-field aircraft noise and the noise characteristics which they consider are discussed. Some findings of recent psychoacoustic research related specifically to helicopter noise quantification are presented. Criteria for the accuracy of noise metrics to quantify helicopter noise are discussed. Finally, the prospects for improved metrics and research needed to develop and validate improved metrics or existing metrics are discussed. (B.W.)
SF- NASA CASI
DE- <MAJOR> *ACCURACY; *AIRCRAFT NOISE; *COST EFFECTIVENESS; *HELICOPTERS;
*HUMAN FACTORS ENGINEERING; *HUMAN REACTIONS

DE- NOISE MEASUREMENT; NOISE PREDICTION (AIRCRAFT); PHYSIOLOGICAL RESPONSES
; PSYCHOACOUSTICS
SH- <COSATI> 20A Acoustics
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 01551669
AN- <AEROSPACE> N84-26285
TI- Hearing loss associated with helicopter flight
AU- NEYE, W.
CS- German Air Force, Fuerstenfeldbruk (Germany). Inst. of Aerospace Medicine.
CS- <CODE> GX542434
PY- 1984
PD- 198404
NT- In AGARD Aeromed. Support in Mil. Helicopter Operations 9p (SEE N84-26279 16-52)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The occurrence and the influence of hearing damages caused by aircraft noise is investigated. In the audiometry tests conducted in the course of examinations for qualification, marked hearing losses in the high frequencies, especially in Army helicoper pilots are occasionally found. Through a comparative examination an attempt is made to determine whether higher hearing losses can be observed in helicopter pilots of the Army as compared to pilots of the other Services. Helicoper specific noise characteristics that cause significant hearing losses in pilots, which are more pronounced in Army pilots as compared to pilots of other aircraft types are examined. (M.A.C.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *AUDIOLOGY; *AUDIOMETRY; *AUDITORY DEFECTS
; *HELICOPTERS; *PILOT PERFORMANCE; *PILOT SELECTION
DE- ARMED FORCES; AUDITORY FATIGUE; COMPARISON; FLIGHT FATIGUE; FLIGHT
SAFETY; FLIGHT TIME; SOUND INTENSITY
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01551668
AN- <AEROSPACE> N84-26284
TI- Disorientation in helicopter flight
AU- FEHLER, F.
CS- German Army, Bueckburg (Germany). Aviation School.
CS- <CODE> GX620424
PY- 1984
PD- 198404
NT- In AGARD Aeromed. Support in Mil. Helicopter Operations 15p (SEE N84-26279 16-52)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The incapacity of the pilot to maintain a safe path of flight due to inadequate, erroneous or disregarded visual cues is investigated. The psychological process of visual perceptions is discussed espcially with regard to the differences between optical stimuli from the surroundings and their subjective perception by the individual. Emphasis is placed on the fact that the human brain is an active organ and not just a mirror reflecting the visual stimuli from outside. To minimize disorientation the aviator should have in mind the basic programs according to which the brain processes visual stimuli, visual configurations which are prone to elicit visual illusions, and means to prevent the onset of disorientation. (M.A.C.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *ATTITUDE (INCLINATION); *HELICOPTERS;
*PILOT PERFORMANCE; *POSITION (LOCATION); *VISUAL DISCRIMINATION; *VISUAL STIMULI
DE- BINOCULAR VISION; FLIGHT OPERATIONS; MOTION PERCEPTION; PSYCHOLOGICAL
EFFECTS; SIZE DETERMINATION; SPACE PERCEPTION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01551667
AN- <AEROSPACE> N84-26283
TI- Visual problems in helicopter operations
AU- BRENNAN, D. H.

CS- Royal Aerospace Establishment, Farnborough (England).
CS- <CODE> R1297595
PY- 1984
PD- 198404
NT- In AGARD Aeromed. Support in Mil. Helicopter Operations 11p (SEE N84-26279 16-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The importance of ocular physiology, visual standards, transparency optics and cockpit lighting systems in ensuring an adequate level of performance is discussed. Ocular hazards from impact, nuclear flash, chemical warfare agents and lasers are discussed and related to the advantages and disadvantages of protective equipment. A review of some of the devices currently available for visual enhancement and the problems associated with their use is included. (M.A.C.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT OPERATIONS; *HELICOPTERS; *PILOT PERFORMANCE; *VISUAL DISCRIMINATION; *VISUAL FLIGHT
DE- COLOR; EYE (ANATOMY); EYE PROTECTION; FLIGHT HAZARDS; PHOTOSENSITIVITY; VISUAL AIDS; VISUAL CONTROL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01551666
AN- <AEROSPACE> N84-26282
TI- Stressful mission profiles, part 2: Workload and fatigue
AU- DURNFORD, S. J.
CS- British Army, Detmold (Germany). Medical Centre.
CS- <CODE> BX851767
PY- 1984
PD- 198404
NT- In AGARD Aeromed. Support in Mil. Helicopter Operations 8p (SEE N84-26279 16-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The way that stressors combine with factors within the man (such as previous training) and the demands of the actual flying mission to produce an overall workload are investigated. The manner in which different levels of workload may affect performance are discussed and methods that might be used by flight surgeons to reduce aircrew workload levels are covered. The impact of future technology is briefly considered. (M.A.C.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT STRESS (BIOLOGY); *HELICOPTERS; *HUMAN REACTIONS; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AROUSAL; CIRCADIAN RHYTHMS; STRESS (PSYCHOLOGY); TASK COMPLEXITY; TASKS ; TRAINING ANALYSIS; WORK CAPACITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01551665
AN- <AEROSPACE> N84-26281
TI- Stressful mission profiles, part 1
AU- DURNFORD, S. J.
CS- British Army, Detmold (Germany). Medical Centre.
CS- <CODE> BX851767
PY- 1984
PD- 198404
NT- In AGARD Aeromed. Support in Mil. Helicopter Operations 8p (SEE N84-26279 16-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The stressors in those types of flights that are considered particularly stressful - NOE Nap Of the Earth flying, night flying with and without aids, mountain flying, flight over water, flight in Nuclear, Biological, and Chemical NBC clothing, instructional flying peacetime and flight in adverse weather conditions are described and analyzed. The stressors invoked by these flight profiles are set

against the stressors found in all helicopter flying. (M.A.C.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT OPERATIONS; *FLIGHT STRESS (BIOLOGY); *HELICOPTERS; *PILOT PERFORMANCE; *STRESS (PHYSIOLOGY)
DE- COMFORT; FLIGHT HAZARDS; NAP-OF-THE-EARTH NAVIGATION; NIGHT FLIGHTS (AIRCRAFT); PHYSIOLOGICAL EFFECTS; PHYSIOLOGICAL RESPONSES; WEATHER
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01551663
AN- <AEROSPACE> N84-26279
TI- Aermedical Support in Military Helicopter Operations
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1984
PD- 198404
PG- 99P.
NT- Lecture series held in Soesterberg, Netherlands, 4-5 Jun., Fuerstenfeldbruck, West Germany, 7-8 Jun., and Oslo, 12-13 Jun. 1984
RN- AGARD-LS-134; ISBN-92-835-1468-8; AD-A145809
LA- English
GL- France
CP- International Organization
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8416
AB- The medical aspects of military helicoper operations are discussed. Emphasis is placed on pilot performance and the physiological and psychological stresses that effect flight operations. Visual and acoustic perception is discussed with methods of protection against hazardous environments included. Specifics such as flight crew back injuries, emergency medical evacuation, and crash injury analysis are also investigated. For individual titles, see N84-26280 through N84-26289.
DE- <MAJOR> *AEROSPACE MEDICINE; *AUDIOLOGY; *BACK INJURIES; *CRASHWORTHINESS; *EVACUATING (TRANSPORTATION); *FLIGHT OPERATIONS; *HELICOPTER DESIGN; *HELICOPTERS; *HUMAN TOLERANCES; *VISUAL DISCRIMINATION
DE- AUDIOMETRY; FLIGHT STRESS (BIOLOGY); NAP-OF-THE-EARTH NAVIGATION; PHYSIOLOGICAL EFFECTS; PILOT PERFORMANCE; TRAINING ANALYSIS; VISUAL FLIGHT; VISUAL STIMULI
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01551064
AN- <AEROSPACE> N84-25679
TI- Safety recommendation(s) A-84-16
AU- BURNETT, J.
CS- National Transportation Safety Board, Washington, DC.
CS- <CODE> NN052488
PY- 1984
PD- 198403
PG- 3P.
RF- 1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A01/MF A01
JA- STAR8416
AB- On July 23, 1982, at 0220 Pacific daylight time, a Bell UH-1B helicopter, N87701, crashed during the filming of a movie in Valencia, California. The helicopter hovered about 25 ft above a motion picture set showing a typical Vietnam village under attack from heavy ordinance. As the pilot turned to facilitate camera coverage, the tail section was engulfed in a fireball created by the detonation of special effects explosives. The tail rotor assembly separated and the helicopter descended out of control. The main rotor blade fatally injured three actors on the ground. Six occupants on the aircraft sustained minor injuries and the aircraft was damaged substantially. The facts, conditions, and circumstances of this accident amply demonstrate the need for a requirement that helicopter operators prepare a manual and carry out its provisions as a prerequisite for the use of a helicopter in movie and television film production. The manual should contain provisions for pilot qualification, mandatory briefings of film production personnel on the risks involved, safeguards needed during operations, a plan for communications among all participating personnel, and a provision confirming the pilot-in-command's ultimate authority to control all flight regimes relative to this type of operation. (A.R.H.)
SF- NASA CASI

DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *AIRCRAFT PILOTS; *FLIGHT
HAZARDS; *FLIGHT SAFETY; *UH-1 HELICOPTER
DE- CINEMATOGRAPHY; CRASH INJURIES; FLIGHT; FLIGHT RULES; MANUALS; MORTALITY; PILOT PERFORMANCE; REGULATIONS; RISK
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01546512
AN- <AEROSPACE> N84-21062
TI- Sustained Intensive Air Operations: Physiological and Performance Aspects
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1983
PD- 198311
PG- 220P.
NT- Conf. held in Paris, 18-22 Apr. 1983
RN- AGARD-CP-338; ISBN-92-835-0343-0; AD-A139324
LA- MULTIPLE
LA- <NOTE> In ENGLISH and FRENCH
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8411
AB- The symposium addressed the aeromedical and human factors aspects of the capabilities of aircrew and ground crew to perform their duties at high intensities at irregular times of the day and night over many days or weeks under military operational conditions. Laboratory studies on the measurement of aircrew workload, the effects of disturbances of circadian rhythms and deprivation of sleep and the use of hypnotics and stimulants to influence sleep and wakefulness are reported. The effects of protective equipment and procedures on air and ground crew with particular reference to fast jet and helicopter operations are examined. Field studies of fatigue, performance and physiological disturbances in aircrew and ground personnel engaged in sustained air operations are described. For individual titles, see N84-21063 through N84-21081.
DE- <MAJOR> *AEROSPACE MEDICINE; *DESYNCHRONIZATION (BIOLOGY); *FLIGHT
CREWS; *GROUND CREWS; *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE;
*STRESS (PHYSIOLOGY); *STRESS (PSYCHOLOGY); *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- ACTIVITY CYCLES (BIOLOGY); CIRCADIAN RHYTHMS; EMOTIONAL FACTORS; HUMAN
BEHAVIOR; HYPNOSIS; MENTAL PERFORMANCE; MILITARY OPERATIONS; PHYSIOLOGICAL EFFECTS; PILOT PERFORMANCE; PROTECTIVE CLOTHING; PSYCHOMETRICS; SLEEP; THERMAL COMFORT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01545335
AN- <AEROSPACE> N84-19867
TI- AVRADCOM research helicopter vibration
AU- STEVENS, S. C.
CS- Army Aviation Research and Development Command, Saint Louis, MO.
CS- <CODE> AZ145548
PY- 1983
PD- 198305
NT- In Shock and Vibration Inform. Center The Shock and Vibration Bull., Part 1 p 3-20 (SEE N84-19866 10-39)
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375

JA- STAR8410
AB- Since the maiden flight in 1940, the Army helicopter has encountered a multitude of vibration problems. These problems have decreased system productivity and increased life cycle costs. Improvements were achieved, for the most part, by add-on vibration control devices designed to reduce rotor vibratory loads and airframe vibrations. Numerous vibration related problems still persist in the design of the modern helicopter. Today's vibration problems are more critical due to changes in overall mission requirements which include: nap-of-the-earth and high speed flight, advanced weapons delivery, survivability, transportability, high reliability, and low maintenance. Research efforts are directed towards vibration analysis, vibration control and vibration testing. (Author)
DE- <MAJOR> *DESIGN ANALYSIS; *HELICOPTERS; *MAINTENANCE; *MILITARY TECHNOLOGY; *VIBRATION EFFECTS

DE- AIRFRAMES; FLIGHT TESTS; HIGH SPEED; HUMAN FACTORS ENGINEERING; NAP-OF-THE-EARTH NAVIGATION; VIBRATION TESTS; WEAPONS DELIVERY
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01542650
AN- <AEROSPACE> N84-17176
TI- Crashworthy cyclic control stick
TI- <SUPPLEMENT> Final Report, Oct. 1982 - Jun. 1983
AU- EISENTRAUT, D. K.; ZIMMERMAN, R. E.
CS- Simula, Inc., Tempe, AZ.
CS- <CODE> SL704970
PY- 1983
PD- 198311
PG- 78P.
CN- DAAK51-82-C-0039; DA PROJ. 1L1-62209-AH-76
RN- AD-A135150; TR-83412; USAAVRADCOM-TR-83-D-23
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8408
AB- In helicopter crashes, a potential source of injury is crewmember impact with the cyclic control stick. This program sought to alleviate that hazard through the development of a crashworthy cyclic control stick retrofittable to the UH-60A Black Hawk and AH-1S Cobra helicopters. Concepts examined for this application included those employing frangible, deformable, telescoping, collapsing, and separating sticks, as well as the cutters. The selected design was a slip joint separating stick, with an energy absorber, activated by crewmember impact. Four prototypes were fabricated and tested, both statically and dynamically. The newly designed sticks were shown to withstand specified emergency loads, while separating at crash impact loads of 1/2 to 1/3 that of conventional sticks. Further, the energy-absorbing capacity of the stick prevents completion of stick delethalization motion for loads of very short duration and thus minimizes the risk of inadvertant separation. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ACCIDENT PREVENTION; *CONTROL STICKS; *CRASHWORTHINESS; *HAZARDS; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS
DE- AIRCRAFT RELIABILITY; CRASH INJURIES; EMERGENCIES; ENERGY ABSORPTION; FLIGHT CREWS; IMPACT LOADS; JOINTS (JUNCTIONS); RETROFITTING; RIGIDITY
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01542283
AN- <AEROSPACE> N84-16802
TI- Low-level flight simulation: Vertical cues
TI- <SUPPLEMENT> Interim Report, Sep. 1980 - Aug. 1981
AU- MARTIN, E. L.; RINALDUCCI, E. J.
CS- Air Force Human Resources Lab., Brooks AFB, TX.
CS- <CODE> AI169645
PY- 1983
PD- 198309
PG- 34P.
CN- AF PROJ. 1123
RN- AD-A133612; AFHRL-TR-83-17
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HCA03/MFA01
JA- STAR8407
AB- This report presents the results of two studies investigating the impact of variations in vertical cue characteristics on pilot performance on a simulated low-level flight task. The studies were conducted in the Advanced Simulator for Pilot Training in its F-16 configuration. Subjects were pilots transitioning to the F-16 aircraft. The experimental task consisted of flying a course that had irregularly placed vertical cues. The pilots' task was to maintain an assigned altitude and airspeed. The pilots' ability to maintain the specified altitude was analyzed for level flight and turning flight. The frequency of terrain crashes was also monitored. (Author (GRA))
SF- DTIC
DE- <MAJOR> *DISPLAY DEVICES; *F-16 AIRCRAFT; *FLIGHT SIMULATION; *PILOT PERFORMANCE; *PILOT TRAINING
DE- COMPUTER TECHNIQUES; CUES; FLIGHT SIMULATORS; HUMAN REACTIONS; INDICATING INSTRUMENTS; RESPONSES; VERTICAL FLIGHT; VISUAL PERCEPTION
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation

SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01540530
AN- <AEROSPACE> N84-15025
TI- Aeroacoustics: Ten Years of Research
TI- <EXTENSION> conferences
CS- Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
CS- <CODE> V9672648
PY- 1983
PD- 198300
PG- 313P.
NT- Proc. of Lecture Series, Rhode Saint Genese, Belgium, 18-22 Apr. 1983
RN- VKI-LS-1983-05
LA- English
GL- Belgium
CP- Belgium
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A02
JA- STAR8406
AB- Noise certification of propeller aircraft and helicopters; helicopter rotor noise generation; experimental methods in compressor noise studies; noise source location/assessment techniques; shock associated noise in convergent nozzles; sound generation in turbulent shear flows; and instrumentation and signal analysis in aeroacoustics research were discussed. For individual titles, see N84-15026 through N84-15032.
DE- <MAJOR> *AEROACOUSTICS; *AIRCRAFT NOISE; *CONFERENCES; *NOISE MEASUREMENT
DE- CERTIFICATION; CONVERGENT NOZZLES; HELICOPTERS; SIGNAL ANALYSIS; TURBOCOMPRESSORS; TURBULENT FLOW
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01536235
AN- <AEROSPACE> N84-10713
TI- Research facilities report, fiscal year 1982
TI- <SUPPLEMENT> Annual Report
CS- National Oceanic and Atmospheric Administration, Miami, FL. Research Facilities Center.
CS- <CODE> NJ927523
PY- 1983
PD- 198304
PG- 34P.
RN- PB83-224857; NOAA-83062702
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8401
AB- The resources and accomplishments are described. Instrumented aircraft are provided to support to research programs. Large, complex state of the art instrumentation systems for long duration missions under all weather conditions including severe weather and hurricane penetrations are operated. (NTIS)
DE- <MAJOR> *AERIAL RECONNAISSANCE; *CLOUD PHYSICS; *METEOROLOGICAL FLIGHT; *METEOROLOGICAL INSTRUMENTS; *RESEARCH FACILITIES
DE- HELICOPTERS; HURRICANES; P-3 AIRCRAFT
SH- <COSATI> 4B Meteorology
SH- 7547 Meteorology & Climatology (1975-)

AN- <DIALOG> 01533467
AN- <AEROSPACE> A85-48075
TI- Development of computer interactive tests for assigning helicopter pilots to different training missions
AU- MYERS, D. C.; SCHEMMER, F. M.; FLEISHMAN, E. A. (Advanced Research Resources Organization, Silver Spring, MD)
SO- Vertiflite (ISSN 0042-4455), vol. 31, Sept.-Oct. 1985, p. 48-50.
PY- 1985
PD- 198510
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8523
AB- Due to the increasingly complex and specialized role played by helicopter pilots, the U.S. Army has undertaken the development of improved procedures for the assignment of student pilots to those missions in which they may be most effective: aeroscout, attack, cargo, or utility. A study has accordingly been conducted employing job analysis methods for the conversion of tasks into ability requirements

and test procedures; a battery of 10 tests was then developed for the measurement of one or more of the abilities found to be critical to pilot effectiveness. Memorization, limb coordination, kinesthetic memory, divided attention, reaction time, perceptual speed, flexibility of pattern closure, spatial orientation, and selective attention were tested. (O.C.)
SF- AIAA
DE- <MAJOR> *COMPUTER TECHNIQUES; *HELICOPTER CONTROL; *PILOT SELECTION;
*PILOT TRAINING
DE- PERFORMANCE TESTS; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01533466
AN- <AEROSPACE> A85-48074
TI- Simplifying the cockpit
AU- BITTON, D. A. (Astronautics Corporation of America, Milwaukee, WI)
SO- Vertiflite (ISSN 0042-4455), vol. 31, Sept.-Oct. 1985, p. 45-47.
PY- 1985
PD- 198510
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8523
AB- A development status and performance enhancement evaluation is made of a variety of proprietary advanced helicopter avionics and display system designs. Among these are the horizontal situation indicator and attitude director indicator CRT display, the former encompassing flight director cues, glidescope and localizer data, and turn and slip indicator, by means of which UH-60A Black Hawk helicopter pilots during the Grenada intervention obtained course and distance data. Attention is given to a range of CRT multifunction displays, which, as in the case of the 530MG display system, can facilitate nap-of-the-earth helicopter flight by overlaying vertical and horizontal steering commands, radar altitude, and terrain clearance, over forward looking IR sensor imagery. (O.C.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- AIRCRAFT INSTRUMENTS; DISPLAY DEVICES; GRENADA; MAN MACHINE SYSTEMS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01530497
AN- <AEROSPACE> A85-45105
TI- Alerting prefixes for speech warning messages
TI- <EXTENSION> in helicopters
AU- BUCHER, N. M.; VOORHEES, J. W. (NASA, Ames Research Center, Moffett Field, CA); KARL, R. L. (San Jose State University, CA); WERNER, E. (Informatics General Corp., Palo Alto, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- IN: NAECON 1984; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 21-25, 1984. Volume 2 (A85-44976 21-01). New York, IEEE, 1984, p. 924-931.
PY- 1984
PD- 198400
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8521
AB- A major question posed by the design of an integrated voice information display/warning system for next-generation helicopter cockpits is whether an alerting prefix should precede voice warning messages; if so, the characteristics desirable in such a cue must also be addressed. Attention is presently given to the results of a study which ascertained pilot response time and response accuracy to messages preceded by either neutral cues or the cognitively appropriate semantic cues. Both verbal cues and messages were spoken in direct, phoneme-synthesized speech, and a training manipulation was included to determine the extent to which previous exposure to speech thus produced facilitates these messages' comprehension. Results are discussed in terms of the importance of human factors research in cockpit display design. (O.C.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *SPEECH RECOGNITION; *VOICE DATA PROCESSING; *WARNING

SYSTEMS
DE- CATHODE RAY TUBES; MESSAGE PROCESSING; NAP-OF-THE-EARTH NAVIGATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01530010
AN- <AEROSPACE> A85-44618
TI- Differences in health risks by aircraft model among U.S. Navy pilots
AU- HOIBERG, A. (U.S. Navy, Naval Health Research Center, San Diego, CA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, July 1985, p. 676-682. Navy-supported research.
PY- 1985
PD- 198507
RF- 22
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8521
AB- The purpose of this study was to identify health risks associated with eight aircraft models in a population of U.S. Navy pilots (n = 22,245) during a 12.5-year time period. Results showed that pilots in the trainer/miscellaneous group (not greater than 35 years of age) had significantly higher hospitalization rates than other pilot groups for almost all diagnoses whereas reconnaissance pilots were distinguished from others by lower total hospitalization rates. Younger helicopter pilots had significantly higher hospitalization rates for joint diseases than four other groups and significantly higher rates for nervous system disorders than attack and patrol/antisubmarine groups. Explanations for these and mortality rate results were provided by examining the influence of selection and retention criteria; age, experience, and exposure; pilot population characteristics; and aircraft model assignments. (Author)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT MODELS; *HEALTH PHYSICS; *NAVY; *PILOT PERFORMANCE; *RISK
DE- AGE FACTOR; ARMED FORCES (UNITED STATES); JOINTS (ANATOMY); PSYCHOLOGICAL EFFECTS; RECONNAISSANCE AIRCRAFT; TRAINING AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01529249
AN- <AEROSPACE> A85-43857
TI- Investigation of outside visual cues required for low speed and hover
AU- HOH, R. H. (Systems Technology, Inc., Hawthorne, CA)
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
SO- IN: Atmospheric Flight Mechanics Conference, 12th, Snowmass, CO, August 19-21, 1985, Technical Papers (A85-43826 21-08). New York, AIAA, 1985, p. 337-349. NASA-supported research.
PY- 1985
PD- 198500
RF- 16
RN- AIAA PAPER 85-1808
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8521
AB- Knowledge of the visual cues required in the performance of stabilized hover in VTOL aircraft is a prerequisite for the development of both cockpit displays and ground-based simulation systems. Attention is presently given to the viability of experimental test flight techniques as the bases for the identification of essential external cues in aggressive and precise low speed and hovering tasks. The analysis and flight test program conducted employed a helicopter and a pilot wearing lenses that could be electronically fogged, where the primary variables were field-of-view, large object 'macrotexture', and fine detail 'microtexture', in six different fields-of-view. Fundamental metrics are proposed for the quantification of the visual field, to allow comparisons between tests, simulations, and aircraft displays. (O.C.)
SF- AIAA
DE- <MAJOR> *FIELD OF VIEW; *HELICOPTERS; *HOVERING; *V/STOL AIRCRAFT; *VISUAL FIELDS
DE- DISPLAY DEVICES; FLIGHT TESTS; LOW VISIBILITY; MODULATION TRANSFER FUNCTION; PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01527473
AN- <AEROSPACE> A85-42081
TI- Age and pilot performance

AU- EYRAUD, M. Y.; BOROWSKY, M. S. (U.S. Naval Safety Center, Norfolk, VA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, June 1985, p. 553-558.
PY- 1985
PD- 198506
RF- 7
SN- 0095-6562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8520
AB- The relationship between pilot age and the likelihood of pilot-factor aviation mishaps is investigated statistically using data on naval pilots of fighter, attack, and helicopter aircraft for the period 1977-1982. The numbers of mishaps of various types are determined per 100,000 h flown by pilots of the age groups 26 and under, 27-29, 30-33, 34-37, and 38 and over, and the results are presented in tables and graphs. Of the mishap types found to be strongly associated with age, several (including improper use of flight controls, overrun/undershoot at landing, improper landing response/technique, carrier landings, failure to maintain flying speed, and loss of control of attack and fighter aircraft) occur most frequently with pilots aged 26 or under; the highest rates for violation of regulations (helicopters) improper instrument procedures, and inadequate flight preparation are found in pilots aged 38 or more. The implications of these findings for the certification and (re)training of older pilots are considered. (T.K.)
SF- AIAA
DE- <MAJOR> *AGE FACTOR; *AIRCRAFT ACCIDENT INVESTIGATION; *PILOT ERROR; *PILOT PERFORMANCE
DE- FIGHTER AIRCRAFT; HELICOPTER PERFORMANCE; STATISTICAL ANALYSIS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01526463
AN- <AEROSPACE> A85-41071
TI- Can helicopters be controlled by voice?
SO- Aerospace Engineering (ISSN 0736-2536), vol. 5, July 1985, p. 42-47.
PY- 1985
PD- 198507
SN- 0736-2536
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8519
AB- The possible use of computer speech-generation and speech-recognition systems for display/warning and control functions in the cockpits of military helicopters for high-pilot-workload missions such as nap-of-the-earth flying is discussed, summarizing the results of recent R&D efforts. Consideration is given to the information-processing demands of advanced aircraft and weapon systems, the role of multifunction displays in streamlining the visual input to the pilot, the principles of voice-interactive system design (speech recognizers, speech generators, and syntax processors), the identification of cockpit tasks suitable for voice control, and the optimization of voice warning systems. It is argued that while voice systems are feasible in many applications, their use should be limited (in keeping with the overall strategy of streamlining and simplifying cockpit instrumentation) to the areas of greatest need. (T.K.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *DOPPLER NAVIGATION; *MILITARY HELICOPTERS; *ONBOARD DATA PROCESSING; *VOICE CONTROL
DE- AIRCRAFT INSTRUMENTS; FLIGHT CREWS; NASA PROGRAMS; RESEARCH AND DEVELOPMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01525739
AN- <AEROSPACE> A85-40347
TI- Specific differences in future cockpit design due to civil and military applications
AU- HELLMUTH, H.; SCHYMANIETZ, K. (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany)
SO- Deutsche Gesellschaft fuer Luft- und Raumfahrt, Jahrestagung, Hamburg, West Germany, Oct. 1-3, 1984, Paper. 10 p.
PY- 1984
PD- 198410
LA- English
GL- Germany
CP- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- IAA8519
AB- An evaluation and charcaterization is conducted for the divergences between civil and military helicopter cockpit designs anticipated for next-generation technology, encompassing control, navigation, communications, sensor, and display systems. Attention is given to the results obtained by a major civil and military helicopter manfacturer in the course of simulator-based studies of the range of component technologies whose maturity is anticipated in the near term. Attempts have been made in the simulation study to reduce the number of cockpit displays and integrate their symbologies, to relegate additional functions to direct vocal command control by the pilot, and to institute a fly-by-wire (or light) system which will not be mechanically constrained in its cockpit positions. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPITS; *DESIGN ANALYSIS; *DISPLAY DEVICES; *HELICOPTER DESIGN
DE- CIVIL AVIATION; DEGREES OF FREEDOM; HUMAN FACTORS ENGINEERING; MILITARY AIRCRAFT; MILITARY HELICOPTERS; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01524349
AN- <AEROSPACE> A85-38957
TI- Display technology and the role of human factors
AU- ROSCOE, S. N.; TATRO, J. S.; TRUJILLO, E. J. (New Mexico State University, Las Cruces, NM)
SO- IN: Advanced Aircrew Display Symposium, 6th, Patuxent River, MD, May 15, 16, 1984, Proceedings (A85-38951 18-06). Patuxent River, MD, U.S. Naval Air Test Center, 1984, p. 126-136.
PY- 1984
PD- 198400
RF- 13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8518
AB- While the transition from electromechanical flight instruments to multifunction electronic displays gains currently momentum, human factors engineers are not well prepared to provide quantitative information as contribution to the design process. However, Tatro et al. (1983) have reported a step toward the demonstration of a holistic, multifactor experimental strategy for the design and evaluation of display and control systems. It is pointed out that vertical takeoff and landing (VTOL) aircraft have not reached their operational potential during all-weather instrument flight. The arising problems can be partly attributed to the inherent instability of the VTOLs' current control systems, while the remainder of the difficulties is caused by inadequate flight displays. Research is being conducted with the aim to eliminate these problems, taking into account the development of a multiple regression model of helicopter and VTOL pilot performance. Attention is given to a systems approach, and a simulation facility. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING
DE- FLIGHT PATHS; HOVERING; VERTICAL TAKEOFF AIRCRAFT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01523624
AN- <AEROSPACE> A85-38232
TI- The application of direct voice control to battlefield helicopters
AU- ROY, S. D.; CORT, A.; RIXON, G. A. (Westland Helicopters, Ltd., Yeovil, Somerset, England)
SO- Future, Spring 1985, p. 2-7.
PY- 1985
PD- 198500
RF- 8
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8517
AB- Military helicopters' high speed/low altitude battlefield flight regimes call for the simultaneous operation of such cockpit systems as radio sets, navigation aids, maps, etc. Attention is presently given to the prospects for crew workload reduction and flight performance enhancement through the incorporation of direct pilot voice control systems. Such a system is projected to incorporate a preprocessor for microphone signals, a word matcher, a word spotter, a command interpreter, and a systems interface. In the case of simultaneous radio operation, simulations of a voice control system have exhibited 14 percent reduction in frequency change time, 85 percent reduction in

pilot eyes-down time, and 100 percent reduction in time with hands off collective controls, by comparison with manual radio control. (O.C.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *HELICOPTER CONTROL; *MILITARY HELICOPTERS;
*RECONNAISSANCE AIRCRAFT; *VOICE CONTROL; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT PERFORMANCE; COCKPITS; COMMAND AND CONTROL; HUMAN FACTORS
ENGINEERING; WORDS (LANGUAGE)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01520645
AN- <AEROSPACE> A85-35253
TI- BK 117 for dual pilot IFR operation
AU- FAULKNER, A.; KOENIG, H. (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany)
SO- European Rotorcraft Forum, 10th, The Hague, Netherlands, Aug. 28-31, 1984, Paper. 18 p.
PY- 1984
PD- 198408
RN- MBB-UD-422-84-OE
LA- English
GL- Germany
CP- International Organization
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8515
AB- The instrumentation of the BK 117 rotorcraft, certified for dual-pilot IFR, is described. Cockpit instrumentation, and navigation and communication instruments are detailed, with consideration of both basic and alternative systems and displays. Particular attention is paid to the pitch, roll, and yaw control and stability augmentation system (CSAS); all three axes operate independently of each other, and may be operated on the single-axis basis under VFR. In addition, the trim and force feel system is described. Finally, flight test evaluation and its results are included, with consideration of the flight testing concept, the design optimization and stabilization parameters, and dynamic and static stability; testing has demonstrated a flexible flight envelope with a 45 KIAS V(min), a 1500-ft/min climb and descent, and a 9-deg steep approach. (L.T.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *CERTIFICATION; *FLIGHT TESTS; *HELICOPTER
CONTROL; *HELICOPTER PERFORMANCE; *INSTRUMENT FLIGHT RULES
DE- AIRCRAFT INSTRUMENTS; FLIGHT ENVELOPES; HYDRAULIC CONTROL; LATERAL
CONTROL; LONGITUDINAL CONTROL; OPTIMIZATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01519977
AN- <AEROSPACE> A85-34585
TI- Flight instrumentation
AU- FORD, T.
SO- Aircraft Engineering (ISSN 0002-2667), vol. 57, April 1985, p. 2-4, 23.
PY- 1985
PD- 198504
SN- 0002-2667
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8515
AB- Current trends in flight instrumentation technology are briefly reviewed. Consideration is given to: integrated primary flight and navigation displays; two color CRTs; shadow mask color tubes; and head-up display designs. The flight intrumentation displays of the British Hawk and Harrier combat aircraft are discussed as examples of the state-of-the-art of CRT display systems. (I.H.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *ELECTRONIC CONTROL; *FLIGHT INSTRUMENTS; *HELICOPTER CONTROL
DE- CATHODE RAY TUBES; HEAD-UP DISPLAYS; NAVIGATION AIDS; TECHNOLOGY ASSESSMENT; UNITED KINGDOM
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01519143
AN- <AEROSPACE> A85-33751
TI- Prediction of aircrew performance under different environmental conditions
AU- WISSLER, E. H. (Texas, University, Austin, TX); NUNNELEY, S. A. (USAF, School of Aerospace Medicine, Brooks AFB, TX)
SO- AIAA, SAE, ASME, AIChE, and ASMA, Intersociety Conference on

Environmental Systems, 14th, San Diego, CA, July 16-19, 1984. 9 p.
PY- 1984
PD- 198407
RF- 19
RN- SAE PAPER 840939
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8515
AB- If thermal problems are to be avoided in both military and commercial aviation, a rational procedure is required for evaluating the effect of various environmental parameters on the condition of aircrew members. In this paper, the authors describe a computer model which has been shown to predict accurately human thermal responses over a wide range of conditions. The model allows one to evaluate the effect on aircrew members of important parameters, such as the work profile, regional and temporal variation in windspeed, temperature, and solar load, and the type of garment worn. It is also possible to simulate the use of liquid cooled garments to reduce thermal stress, and the effect of immersion in cold water. Representative applications involving three different situations are presented in the paper. (Author)
SF- AIAA
DE- <MAJOR> *BIOLOGICAL MODELS (MATHEMATICS); *HUMAN FACTORS ENGINEERING;
*MAN ENVIRONMENT INTERACTIONS; *PILOT PERFORMANCE; *TEMPERATURE EFFECTS
; *THERMAL COMFORT
DE- ATMOSPHERIC TEMPERATURE; DITCHING (LANDING); FIGHTER AIRCRAFT;
HELICOPTERS; HYPERTHERMIA; HYPOTHERMIA; PROTECTIVE CLOTHING; WIND
VELOCITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01518864
AN- <AEROSPACE> A85-33472
TI- Preliminary study of man-machine problems in hovering above a moving platform
AU- NEGRIN, M.; GRUNWALD, A.; ROSEN, A. (Technion - Israel Institute of Technology, Haifa, Israel)
SO- (European Rotorcraft Forum, 9th, Stresa, Italy, Sept. 13-15, 1983) Vertica (ISSN 0360-5450), vol. 9, no. 1, 1985, p. 51-64.
PY- 1985
PD- 198500
RF- 23
SN- 0360-5450
LA- English
GL- Israel
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8515
AB- A one-dimensional problem of hovering over a moving platform is investigated analytically on the basis of optimal control theory, with the main objective of determining the optimal configuration of the display augmentation systems. A fixed-base simulation experiment was conducted, with the pilot instructed to maintain a constant inertial height (vertical motion only) above a small ship platform. Good correlation is noted to exist between the experimental and analytical results. It is inferred that pilot's absolute measurements in the absence of display augmentation are inaccurate; in the presence of display augmentation the observations noise levels were considerably lower. (L.T.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *HELICOPTER PERFORMANCE; *HOVERING; *MAN
MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AIRCRAFT CARRIERS; COMPUTERIZED SIMULATION; OPTIMAL CONTROL; PLATFORMS;
TASK COMPLEXITY; WEIGHTING FUNCTIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01517407
AN- <AEROSPACE> A85-32015
TI- Development of piloting techniques to reduce helicopter approach noise
AU- COX, C. R. (Bell Helicopter Textron, Fort Worth, TX)
SO- American Helicopter Society, Annual Forum, 40th, Arlington, VA, May 16-18, 1984, Paper. 7 p.
PY- 1984
PD- 198405
RF- 6
LA- English
GL- United States
CP- United States
DT- PREPRINT

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8514
AB- This paper discusses the development of piloting techniques which mitigate main rotor blade/wake interaction noise and documents the resulting noise reductions measured by a ground-based microphone array. Noise levels and acoustic time histories are presented for variations in approach speeds, descent rates, and combinations thereof. Changes in landing speed and descent rate for fixed glideslope approaches are shown to vary noise levels by 2 to 5 dBA. The impulsive characteristic of main rotor noise can be dramatically reduced in these cases. Similar reductions are shown to be possible using an approach procedure in which airspeed is slowly bled off while maintaining moderately low rotor collective pitch. A description of the piloting technique is given. It is shown to be practical for normal approach operations and be acceptable and comfortable to passengers on board. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *APPROACH CONTROL; *HELICOPTER CONTROL; *NOISE
REDUCTION; *PILOT PERFORMANCE
DE- AERODYNAMIC NOISE; HELICOPTER WAKES; LANDING SPEED; NOISE MEASUREMENT
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01517403
AN- <AEROSPACE> A85-32011
TI- A mission oriented approach to cockpit design as applied to observation and attack helicopters
AU- TAYLOR, R. R.; POOLE, E. R. (Bell Helicopter Textron, Fort Worth, TX)
SO- American Helicopter Society, Annual Forum, 40th, Arlington, VA, May 16-18, 1984, Paper. 11 p.
PY- 1984
PD- 198405
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8514
AB- A description is provided of a mission and task analysis methodology which has been developed and refined over a number of years. The methodology is built on human engineering techniques specified in MIL-H-56855. Analytical techniques are combined from Operational Research, Systems Engineering, and Human Engineering to provide the requisite capability for analyzing a total mission environment. It is pointed out that the results of these analyses, when applied to a design problem in a timely manner, can help the designers to produce a helicopter cockpit and systems suite which will optimize human and helicopter systems performance. (G.R.)
SF- AIAA
DE- <MAJOR> *ATTACK AIRCRAFT; *COCKPITS; *HELICOPTER DESIGN; *HUMAN FACTORS
ENGINEERING; *MISSION PLANNING; *USER REQUIREMENTS
DE- DESIGN ANALYSIS; MAN MACHINE SYSTEMS; SYSTEM EFFECTIVENESS; SYSTEMS
ENGINEERING; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01517348
AN- <AEROSPACE> A85-31956
TI- Assessment of simulation fidelity using measurements of piloting technique in flight
AU- FERGUSON, S. W.; CLEMENT, W. F. (Systems Technology, Inc., Mountain View, CA); CLEVELAND, W. B. (NASA, Ames Research Center, Moffett Field, CA); KEY, D. L. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA)
CS- Systems Technology, Inc., Mountain View, CA.
CS- <CODE> S9813870
SO- IN: American Helicopter Society, Annual Forum, 40th, Arlington, VA, May 16-18, 1984, Proceedings (A85-31951 14-01). Alexandria, VA, American Helicopter Society, 1984, p. 67-92. Army-sponsored research.
PY- 1984
PD- 198400
RF- 20
CN- NAS2-11098
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8514
AB- The U.S. Army and NASA have undertaken the systematic validation of a ground-based piloted simulator for the UH-60A helicopter. The results of previous handling quality and task performance flight tests for this helicopter have been used as a data base for evaluating the fidelity of the present simulation, which is being conducted at the NASA Ames Research Center's Vertical Motion Simulator. Such nap-of-the-earth

piloting tasks as pop-up, hover turn, dash/quick stop, sidestep, dolphin, and slalom, have been investigated. It is noted that pilot simulator performance is significantly and quantifiable degraded by comparison with flight test results for the same tasks. (O.C.)
SF- AIAA
DE- <MAJOR> *FLIGHT CONTROL; *FLIGHT SIMULATION; *FLIGHT TESTS; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *UH-60A HELICOPTER
DE- ACCURACY; AIRCRAFT MANEUVERS; HOVERING; MATHEMATICAL MODELS; NAP-OF-THE-EARTH NAVIGATION; TURNING FLIGHT; VERTICAL MOTION SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01517171
AN- <AEROSPACE> A85-31779
TI- Tachistoscopic studies of powerplant instruments
TI- <ORIGINAL> Badania tachistoskopowe przyrzadow kontroli pracy zespolu napedowego dwusilnikowego
AU- KAZIMIERSKA, Z.
SO- Instytut Lotnictwa, Prace (ISSN 0509-6669), no. 97, 1984, p. 53-60. In Polish.
PY- 1984
PD- 198400
RF- 5
SN- 0509-6669
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8513
AB- The functions and tasks performed by the pilot in flight are examined in relation to the types and functions of the control instruments of the powerplant. Details and results of tachistoscopic studies conducted during the development of a torque meter for a two-engine helicopter are discussed. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *TACHISTOSCOPES; *TORQUEMETERS
DE- DESIGN ANALYSIS; STATISTICAL ANALYSIS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01514035
AN- <AEROSPACE> A85-28643
TI- Development and qualification testing of S-76 helicopter takeoff and landing procedures for reduced field length
AU- COLE, J. L. (United Technologies Corp., Sikorsky Aircraft Div., West Palm Beach, FL)
SO- IN: Flight testing today: Innovative management and technology; Proceedings of the Fourteenth Annual Symposium, Newport Beach, CA, August 15-19, 1983 (A85-28632 12-01). Lancaster, CA, Society of Flight Test Engineers, 1983, p. 3.6-1 to 3.6-9.
PY- 1983
PD- 198300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8512
AB- In 1974, an American aerospace company initiated the S-76 program with the objective to develop a modern, high performance, twin engine light helicopter for commercial applications. Initial FAA and CAA transport category certification approvals were granted in 1978 and 1979 respectively. In order to improve the suitability of the S-76A for European commercial applications, an expansion of CAA certification approval to include reduced field length takeoff and landing procedures was considered. In July 1981, a development and qualification program was initiated to demonstrate the potential of S-76A helicopter operation up to 9,000 pounds gross weight within the shortest possible field length bounds achievable. Attention is given to the employed instrumentation, the test procedures, the vertical takeoff technique deployment, and aspects of landing technique development. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *AIRCRAFT RELIABILITY; *FLIGHT TESTS; *HELICOPTER CONTROL; *SIKORSKY AIRCRAFT; *VERTICAL TAKEOFF
DE- FLIGHT CHARACTERISTICS; FLIGHT PATHS; LIGHT HELICOPTERS; QUALIFICATIONS ; WIND EFFECTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01514024
AN- <AEROSPACE> A85-28632
TI- Flight testing today: Innovative management and technology; Proceedings

of the Fourteenth Annual Symposium, Newport Beach, CA, August 15-19, 1983
SO- Symposium sponsored by the Society of Flight Test Engineers. Lancaster, CA, Society of Flight Test Engineers, 1983, 231 p. For individual items see A85-28633 to A85-28658.
PY- 1983
PD- 198300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8512
AB- In a discussion of subjects related to management, attention is given to the training and development of engineers at the Air Force Flight Test Center, automation and flight test engineering, the use of engineering simulation to support aircraft flight testing at the U.S. Air Force Flight Test Center, the unique management experience obtained in connection with the flight testing of the digital electronic engine control concept, the automated KC-135R test program, and ground support facilities as an approach to effective avionics flight testing. Other topics explored are related to test results, test methods, data reduction and analysis, and instrumentation and data acquisition. The flight test and evaluation of the A-10 is considered along with the Model 2100 emergency egresss system, natural icing flight tests, the use of oil for in-flight flow visualization, community noise testing, fighter aircraft dynamic performance, the microcomputer in flight test data reduction, takeoff performance data using onboard instrumentation, and a digital pressure transducer. (G.R.)
SF- AIAA
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *CONFERENCES; *FLIGHT MANAGEMENT SYSTEMS; *FLIGHT TESTS
DE- AERODYNAMIC CHARACTERISTICS; AIRCRAFT MODELS; AIRCRAFT PERFORMANCE; AUTOMATIC FLIGHT CONTROL; AVIONICS; COMPUTERIZED SIMULATION; ELECTRONIC CONTROL; ENGINE CONTROL; ESCAPE SYSTEMS; FLOW VISUALIZATION; GROUND SUPPORT EQUIPMENT; HELICOPTER CONTROL; ICE FORMATION; IN-FLIGHT MONITORING; JET AIRCRAFT NOISE; PASSENGER AIRCRAFT; PROJECT MANAGEMENT; TEST FACILITIES; VERTICAL TAKEOFF
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01511012
AN- <AEROSPACE> A85-25620
TI- Prevention measures for the adverse effects of vibration
TI- <ORIGINAL> O merakh profilaktiki neblagopriiatnogo vozdeistviia vibratsii
TI- <EXTENSION> on flight personnel
AU- IVANOV, V. V.; MIGACHEV, S. D.
SO- Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Dec. 1984, p. 47, 48. In Russian.
PY- 1984
PD- 198412
RF- 7
SN- 0026-9050
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8510
AB- Measures for preventing the adverse effects of vibration in flight personnel are briefly described. Particular attention is given to methods for enhancing the static endurance of various muscles (including weight lifting), massage and water treatments, and the administration of vitamins. (B.J.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *PHYSIOLOGICAL EFFECTS; *PILOT PERFORMANCE; *PROPHYLAXIS; *VIBRATION EFFECTS; *WORK CAPACITY
DE- AEROSPACE MEDICINE; FLIGHT SAFETY; HELICOPTERS; MASSAGING; MUSCULAR FUNCTION; PHYSICAL EXERCISE; VITAMINS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01508167
AN- <AEROSPACE> A85-22775
TI- U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979
AU- GUILL, F. C. (U.S. Naval Air Systems Command, Crew Systems Div., Washington, DC)
SO- IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings (A85-22751 09-03). Van Nuys, CA, SAFE Association, 1984, p. 201-216.

PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8509
AB- Anthropometric statistics generated from a survey of accident reports filled out by flight medical examiners for 9671 U.S. Navy aircrew involved in air accidents were examined for accuracy and found to be seriously distorted and/or incomplete. The study was conducted to discover anthropometric factors which may have precipitated the accidents due to crew-equipment mismatches. Efforts were expended to identify the precise events which caused the accidents. However, a disproportionate number of height, weight and age factors had been recorded, to the exclusion of other normally required data. Furthermore, the data which were recorded often described aircrew with bizarre body dimensions, due either to carelessness in the original document or during transcription of the data into a computerized database. Several techniques are discussed for ensuring that the flight medical examiners will in the future furnish more accurate and complete data and thereby enhance the capabilities of human factors engineers to design safer operational and emergency equipment and environments. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT DESIGN; *ANTHROPOMETRY; *FLIGHT CREWS; *NAVY
DE- COCKPITS; ESCAPE SYSTEMS; FIXED WINGS; HELICOPTERS; LIFE SUPPORT SYSTEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01508143
AN- <AEROSPACE> A85-22751
TI- SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings
SO- Van Nuys, CA, SAFE Association, 1984, 257 p. For individual items see A85-22752 to A85-22777.
PY- 1984
PD- 198400
RN- AD-A199273
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8509
AB- The present conference discusses factors affecting human tolerance to sustained acceleration, the technology base of the High Acceleration Cockpit, a selectable thrust rocket motor for crew escape systems, crew training in a simulated toxic chemical/biological environment, helicopter crash survivability and emergency escape, Kevlar and fiberglass reinforcements for helmet shells, the development of a ram air-inflated flexible wing, advanced oxygen life support systems, and the development history of immersion suits. Also covered is an analysis of the reported incidence of ejectee tumble, flail, and windblast, factors influencing ejection-associated neck injuries, the laboratory assessment of the Advanced Chemical Defense Aircrew Respirator, side-by-side unsequenced ejection from A-6 aircraft, and nuclear/biological/chemical protection for combat aircraft crews. (O.C.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT CREWS; *FLIGHT SAFETY
DE- ADAPTIVE CONTROL; ANTHROPOMETRY; BIOTECHNOLOGY; BREATHING APPARATUS; COMPUTERIZED SIMULATION; CRASHWORTHINESS; EJECTION SEATS; ESCAPE SYSTEMS; HEAD (ANATOMY); LIFE SUPPORT SYSTEMS; NAVY; PARACHUTES; PILOT PERFORMANCE; RETROFITTING; ROCKET ENGINES; SUBMERGING
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01507003
AN- <AEROSPACE> A85-21611
TI- Synthesized speech rate and pitch effects on intelligibility of warning messages for pilots
AU- SIMPSON, C. A.; MARCHIONDA-FROST, K. (Psycho-Linguistic Research Associates, Menlo Park, CA)
CS- Psycho-Linguistic Research Associates, Menlo Park, CA.
CS- <CODE> P6249806
SO- Human Factors (ISSN 0018-7208), vol. 26, Oct. 1984, p. 509-517.
PY- 1984
PD- 198410
RF- 13
SN- 0018-7208
CN- NAS2-11341
LA- English

GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8508
AB- In civilian and military operations, a future threat-warning system with a voice display could warn pilots of other traffic, obstacles in the flight path, and/or terrain during low-altitude helicopter flights. The present study was conducted to learn whether speech rate and voice pitch of phoneme-synthesized speech affects pilot accuracy and response time to typical threat-warning messages. Helicopter pilots engaged in an attention-demanding flying task and listened for voice threat warnings presented in a background of simulated helicopter cockpit noise. Performance was measured by flying-task performance, threat-warning intelligibility, and response time. Pilot ratings were elicited for the different voice pitches and speech rates. Significant effects were obtained only for response time and for pilot ratings, both as a function of speech rate. For the few cases when pilots forgot to respond to a voice message, they remembered 90 percent of the messages accurately when queried for their response 8 to 10 sec later. (Author)
SF- AIAA
DE- <MAJOR> *AUDIO FREQUENCIES; *PILOT PERFORMANCE; *SPEECH RECOGNITION; *TASK COMPLEXITY; *VERBAL COMMUNICATION; *WARNING SYSTEMS
DE- ACCURACY; HELICOPTER CONTROL; HUMAN REACTIONS; PHONEMES; SYNTHESIS; VELOCITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01506966
AN- <AEROSPACE> A85-21574
TI- Helicopter copilot workload during nap-of-the-earth flight
AU- COTE, D. O.; KRUEGER, G. P.; SIMMONS, R. R. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, AL)
SO- IN: Symposium on Aviation Psychology, 2nd, Columbus, OH, April 25-28, 1983, Proceedings (A85-21551 08-53). Columbus, OH, Ohio State University, 1984, p. 289-298.
PY- 1984
PD- 198400
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8508
AB- Two automatic navigation systems, a Doppler radar system and a projected map system, and a hand-held map were examined for their effects on copilot/navigator workload and performance. The automatic navigation systems reduced the number of navigation errors and the size of deviations from intended track. The Doppler system reduced the time devoted to navigating and the number of verbal navigation messages exchanged between the pilot and copilot. The projected map system reduced visual workload. However, with all three navigation systems, more than 80 percent of the copilot's time was spent on navigation tasks, less than 10 percent of their time was visual 'free time' that could be used for other tasks and greater than 20 percent of the aircrew's time was occupied with navigation communications. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AUTOMATIC FLIGHT CONTROL; DATA ACQUISITION; DATA PROCESSING; DOPPLER RADAR; HUMAN FACTORS ENGINEERING; SOCIAL FACTORS; VERBAL COMMUNICATION; VISUAL TASKS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01506950
AN- <AEROSPACE> A85-21558
TI- Computer-animated displays for vertical and translational flight
AU- ROSCOE, S. N. (New Mexico State University, Las Cruces, NM)
SO- IN: Symposium on Aviation Psychology, 2nd, Columbus, OH, April 25-28, 1983, Proceedings (A85-21551 08-53). Columbus, OH, Ohio State University, 1984, p. 55-67.
PY- 1984
PD- 198400
RF- 16
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8508
AB- A conceptual analysis and review of human factors problems in piloting

VTOL aircraft including helicopters is presented. VTOL mission and flight requirements are contrasted with those of CTOLs. Deficiencies in present VTOL flight instrumentation are summarized. An experimental approach that is based on established display principles and emphasizes dynamically predictive skeletal, perspective, vertical and horizontal situation displays is presented. (Author)
SF- AIAA
DE- <MAJOR> *COMPUTER TECHNIQUES; *DISPLAY DEVICES; *HELICOPTER CONTROL;
*PILOT PERFORMANCE; *TRANSLATIONAL MOTION; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT CONTROL; COCKPITS; HUMAN FACTORS ENGINEERING; MAN MACHINE
SYSTEMS; SYSTEMS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01506943
AN- <AEROSPACE> A85-21551
TI- Symposium on Aviation Psychology, 2nd, Columbus, OH, April 25-28, 1983, Proceedings
AU- JENSEN, R. S., ED. (Ohio State University, Columbus, OH)
SO- Symposium sponsored by the Ohio State University. Columbus, OH, Ohio State University, 1984, 652 p. For individual items see A85-21552 to A85-21609.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8508
AB- Aspects of cockpit technology are discussed, taking into account color coding in fighter cockpits, the pilot-computer direct access interface provided by touch panels, performance evaluation of electronic flight instruments, a pilot's desk flight station, voice recognition technology as challenge of the 80's, synthesized voice and voice actuated control in the cockpit, and the cockpit display of traffic information and the threat alert and collision and avoidance system integration. Other topics explored are related to design reduced error, cockpit resource management, workload, judgment, pilot reliability, physiology and performance assessment, visual perception, selection, training, and simulation. Attention is given to progress in Army helicopter flight simulation, simulation as a national resource, strategy to the certification of private pilots, pilot performance evaluation involving human observer and computer, the identification of processes underlying skilled aviator performance, and an optic flow cueing model for low level flight. (G.R.)
SF- AIAA
DE- <MAJOR> *AERONAUTICS; *AIRCRAFT PILOTS; *CONFERENCES; *PSYCHOLOGY
DE- AIRCRAFT PERFORMANCE; COCKPITS; COMPUTER AIDED DESIGN; DISPLAY DEVICES;
FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS;
PILOT ERROR; PILOT PERFORMANCE; PILOT TRAINING; RESOURCES MANAGEMENT;
SENSORIMOTOR PERFORMANCE; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY);
TASK COMPLEXITY; TECHNOLOGY ASSESSMENT; VISUAL PERCEPTION; WORKLOADS
(PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01506848
AN- <AEROSPACE> A85-21456
TI- Design and advanced concepts of avionics/weapons system integration; Proceedings of the Symposium, London, England, April 3, 4, 1984
SO- Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1984, 96 p. For individual items see A85-21457 to A85-21467.
PY- 1984
PD- 198400
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA8508
AB- Among the topics discussed are software design methods for advanced military avionics, a design methodology for integrated avionics, hardware design techniques, packaging and interconnection practices for avionics, integrated navigation systems, and aspects of the man-machine interface in military aircraft. Also covered are flight-critical phases of the man-machine interface, trends in both digital flight control and digital engine control system designs, and integrated avionics for helicopters. (O.C.)
SF- AIAA

DE- <MAJOR> *AIRCRAFT DESIGN; *AVIONICS; *CONFERENCES; *SYSTEMS INTEGRATION
; *WEAPON SYSTEMS
DE- AIR NAVIGATION; AIRBORNE/SPACEBORNE COMPUTERS; AIRCRAFT COMMUNICATION;
AUTOMATIC FLIGHT CONTROL; COMMERCIAL AIRCRAFT; CONTROL SYSTEMS DESIGN;
DIGITAL NAVIGATION; ELECTRONIC PACKAGING; FLIGHT MANAGEMENT SYSTEMS;
HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; MILITARY AIRCRAFT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01504950
AN- <AEROSPACE> A85-19557
TI- Low cost simulation of a UH-1 training mission using array processors-pilot performance evaluation
AU- KRISHNAKUMAR, K. S.
SO- American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 23rd, Reno, NV, Jan. 14-17, 1985. 10 p.
PY- 1985
PD- 198501
RF- 6
RN- AIAA PAPER 85-0160
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8507
AB- Features and performance capabilities of a UH-1 helicopter pilot flight training simulator designed with cost in mind are described. The FPS 100 array processor was selected to handle computations of the Euler body axes equations of motion, Euler's angles, inertial velocities, the mechanical control system and engine torque, and atmospheric gust statistics. The system was configured to simulate the total aerodynamic forces and moments for the six degree of freedom motion equations with fully nonlinear kinematics expressed as a Taylor series expansion about a reference trim trajectory. The display, driven by two microprocessors, furnishes out-the-cockpit-window color graphics night scenes with mirror-beam-splitter optics, which furnish the scenes independent of the pilot head motions. Instrument displays include the airspeed, altitude, rate of climb, heading, torque pressure, side slip, and turn. Details of the training course map and scoring methods are outlined. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *FLIGHT SIMULATION; *HELICOPTERS; *PILOT
PERFORMANCE; *TRAINING EVALUATION; *TRAINING SIMULATORS
DE- COMPUTER SYSTEMS PROGRAMS; COMPUTERIZED SIMULATION; DIGITAL SIMULATION;
DISPLAY DEVICES; HARDWARE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01503252
AN- <AEROSPACE> A85-17859
TI- Pilot command interfaces for discrete control of automated nap-of-earth flight
AU- MOUNTFORD, S. J.; PENNER, R.; BURSCH, P.
SO- IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings (A85-17801 06-01). New York, American Institute of Aeronautics and Astronautics, 1984, p. 386-392.
PY- 1984
PD- 198400
RF- 5
RN- AIAA PAPER 84-2621
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8506
AB- It is pointed out that workload levels are excessive in many crewstations. This applies, in particular, to the two-man crew of an attack helicopter performing nap-of-the-earth (NOE) flight. For a number of reasons, it would be desirable to reduce the crew size to that of a single operator. Preliminary workload studies conducted by an American aerospace company on single pilot mission scenarios of scout-attack helicopters indicate that multitask performance during continuous flight control can only be achieved by automating some tasks. The automation of some features of flight control could be one of the prime candidates for implementation. An important human engineering design issue is related to the design of the control interface to allow the pilot to reenter the flight control loop to update flight objectives. The present investigation represents a preliminary attempt to develop some command language interface concepts

for integration with an automatic flight control system. (G.R.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *COMMAND AND CONTROL; *HELICOPTER
CONTROL; *MAN MACHINE SYSTEMS; *NAP-OF-THE-EARTH NAVIGATION; *PILOT
PERFORMANCE
DE- FLIGHT MANAGEMENT SYSTEMS; FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING
; INTERFACES; TASK COMPLEXITY; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01503194
AN- <AEROSPACE> A85-17801
TI- Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings
SO- Conference sponsored by the American Institute of Aeronautics and Astronautics and Institute of Electrical and Electronics Engineers. New York, American Institute of Aeronautics and Astronautics, 1984, 704 p. For individual items see A85-17802 to A85-17902.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8506
AB- The present conference on digital avionics discusses development methods for avionics systems and their software, commercial transport aircraft applications, advanced avionics sensor systems, human factors and artificial intelligence issues in crew system design, digital flight control technology, evaluation tools, avionics for general aviation aircraft, fault-tolerant avionics design, advanced control/display systems for aircraft crews, and software verification and testing techniques. Also considered are rotorcraft avionics, data bus concepts and practices, the development and testing of crew systems, communication, navigation and identification terminals, ADA systems and their software, onboard monitoring and testing of avionics, VLSI avionics design and testing, data link applications, airborne separation assurance, all-electric aircraft, standardized modular avionics, and digital propulsion control and monitoring systems. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *AIRCRAFT INSTRUMENTS;
*AVIONICS; *CONFERENCES; *DIGITAL SYSTEMS; *SYSTEMS ENGINEERING
DE- ADA (PROGRAMMING LANGUAGE); ARTIFICIAL INTELLIGENCE; CHANNELS (DATA
TRANSMISSION); DATA LINKS; EMBEDDED COMPUTER SYSTEMS; FLIGHT CONTROL;
FLY BY WIRE CONTROL; HUMAN FACTORS ENGINEERING; IMAGE PROCESSING;
INTEGRATED CIRCUITS; REAL TIME OPERATION; SIGNAL PROCESSING; VERY LARGE
SCALE INTEGRATION
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01500232
AN- <AEROSPACE> A85-14839
TI- On the development of a data base for the Navstar GPS phase IIB user equipment DT&E (OR) field testing
AU- BESER, J. (Intermetrics, Inc., Huntington Beach, CA); SPROSEN, B. J. (RAF, Global Positioning System Joint Program Office, Los Angeles, CA)
SO- IN: Institute of Navigation, Annual Meeting, 40th, Cambridge, MA, June 25-28, 1984 (A85-14826 04-04). Washington, DC, Institute of Navigation, 1984, p. 144-154.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8504
AB- The user segment GPS test program is described, together with the data base, the processing and analyses performed to validate the equipment performance and the results available to a prospective equipment developer. The prototype user equipment was tailored to the needs of the host vehicles, e.g., fighters, helicopters, and people. The tests examined GPS signal acquisition time, navigation performance, alignment capabilities, mission applications, human factors design, reliability, availability and maintainability, multipath propagation effects, and interoperability of the receivers and support equipment. The tests are being run on the desert and open seas. The data base covers the mission configuration, test structure, equipment, individual unit performances, and test results. Potential bidders for production equipment agreements

access the results data base on-line or from archives through menu-driven screens, except when classified data are transmitted. (M.S.K.)
SF- AIAA
DE- <MAJOR> *DATA BASES; *ELECTRONIC EQUIPMENT TESTS; *GLOBAL POSITIONING SYSTEM; *NAVSTAR SATELLITES; *SOFTWARE TOOLS; *USER REQUIREMENTS
DE- AUTOMATIC TEST EQUIPMENT; DATA BASE MANAGEMENT SYSTEMS; DATA MANAGEMENT ; HUMAN FACTORS ENGINEERING; PERFORMANCE TESTS; PRODUCT DEVELOPMENT; RELIABILITY ANALYSIS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01498984
AN- <AEROSPACE> A85-13591
TI- Design and development of a dynamically scaled model AH-64 main rotor
AU- STRAUB, F. K.; JOHNSTON, R. A.; HEAD, R. E. (Hughes Helicopters, Inc., Culver City, CA); KELLEY, H. L. (U.S. Army, Research and Technology Laboratories, Hampton, VA)
SO- AIAA, AHS, ASEE, Aircraft Design Systems and Operations Meeting, San Diego, CA, Oct. 31-Nov. 2, 1984. 22 p. Army-supported research.
PY- 1984
PD- 198410
RF- 6
RN- AIAA PAPER 84-2532
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8503
AB- The AH-64 Apache Advanced Attack Helicopter (AAH) has recently been put into production. Under contract an American aerospace company developed a 27 percent dynamically Mach scaled model of the AH-64 main rotor. The present investigation is concerned with the scaling requirements and the design of the model rotor hub and blades, as well as the instrumentation provided with them. The model rotor hub has been tested in the Langley V/STOL tunnel using the General Rotor Model System (GRMS). The main part of the investigation deals with the dynamic analysis of the model rotor and its integration with the GRMS. Attention is given to the basic scaling requirements for model rotor performance testing, the AH-64 main rotor geometry, and aspects of aerodynamic stability. (G.R.)
SF- AIAA
DE- <MAJOR> *AH-64 HELICOPTER; *HELICOPTER DESIGN; *ROTARY WINGS
DE- AEROELASTICITY; ROTOR SPEED; SCALE MODELS; WIND TUNNEL TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01498965
AN- <AEROSPACE> A85-13572
TI- Aeronautical technology 2000 - A projection of advanced vehicle concepts
AU- ROSEN, C. C., III (NASA, Office of Aeronautics and Space Technology, Washington, DC); BURGER, R. J. (National Research Council, Washington, DC); SIGALLA, A. (Boeing Commercial Airplane Co., Seattle, WA)
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
SO- AIAA, AHS, ASEE, Aircraft Design Systems and Operations Meeting, San Diego, CA, Oct. 31-Nov. 2, 1984. 18 p.
PY- 1984
PD- 198410
RN- AIAA PAPER 84-2501
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8503
AB- At the request of NASA and under the aegis of the National Research Council, representatives from industry, academic institutions and government have participated in a workshop to consider opportunities for the exploitation of aircraft technology in such fields as aerodynamics, materials, structures, guidance, navigation and control, human factors, propulsion, computers and data processing, and systems integration. Attention is given to the advanced vehicle concepts that have emerged for possible year-2000 implementation, which encompass such diverse aircraft types as supersonic transports, hypersonic airliners, missiles, and interceptors, transatmospheric vehicles, next-generation space shuttles, subsonic transports and attack aircraft, advanced helicopter, tilt-rotor VTOL configurations, and solar- and microwave beam-powered extremely high altitude aircraft. (O.C.)
SF- AIAA

DE- <MAJOR> *AERONAUTICAL ENGINEERING; *AIRCRAFT DESIGN; *NASA PROGRAMS;
*RESEARCH AND DEVELOPMENT; *TECHNOLOGICAL FORECASTING
DE- AERODYNAMIC CHARACTERISTICS; AEROSPACE SYSTEMS; AIR NAVIGATION;
AIRCRAFT CONSTRUCTION MATERIALS; AIRCRAFT GUIDANCE; PROPULSION SYSTEM
PERFORMANCE; RESEARCH AIRCRAFT; SYSTEMS INTEGRATION; TRANSATMOSPHERIC
VEHICLES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01498139
AN- <AEROSPACE> A85-12746
TI- Pilot differences and motion cuing effects on simulated helicopter hover
AU- RICARD, G. L. (U.S. Navy, Naval Training Equipment Center, Orlando, FL)
; PARRISH, R. V. (NASA, Langley Research Center, Hampton, VA)
CS- Naval Training Equipment Center, Orlando, FL.
CS- <CODE> NT855045
SO- Human Factors (ISSN 0018-7208), vol. 26, June 1984, p. 249-256.
PY- 1984
PD- 198406
RF- 26
SN- 0018-7208
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8503
AB- The effects that cues of aircraft motion, delays in visual scene, and movement of a ship model have on pilots' ability to hover a simulated helicopter near a destroyer-class ship were examined. Twelve pilots were tested in a within-subject factorial combination of fixed-base, moving-base, and G-seat conditions in which delays of 66 or 128 ms existed in the simulator's visual display and the pilots had to hover near a moving or stationary ship. Best control performance was seen under the moving-base conditions, whereas poorest control was associated with the fixed-base simulation. An intermediate level of performance was produced by the G-seat. In addition, visual delay affected control of the roll axis of the simulation, and interactions between pilots and motion cuing and visual delay were seen. Movement of the ship model had little effect. (Author)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *HOVERING STABILITY; *MOTION SIMULATORS;
*PILOT PERFORMANCE
DE- CUES; DISPLAY DEVICES; FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING;
SEATS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01497818
AN- <AEROSPACE> A85-12425
TI- Aviation medicine
TI- <EXTENSION> Book
AU- HARDING, R. M.; MILLS, F. J. (RAF, Institute of Aviation Medicine, Farnborough, Hants., England)
SO- London, British Medical Association, 1983, 148 p.
PY- 1983
PD- 198300
RF- 330
LA- English
GL- United Kingdom
CP- United Kingdom
DT- BOOK
JA- IAA8502
AB- After discussing the range of medical emergencies for which commercial airline operators must be prepared, and the various factors affecting the fitness of passengers for air travel, attention is given to such fundamental problems of flight at high altitudes as pressure and temperature drops with increasing altitude, the required pressurization of cabins, and the emergency measures called for by safe depressurization. The physiological factors responsible for hypoxia, hyperventilation, and decompression thickness are then treated, as well as the response of passengers to various forces of acceleration. The ways in which the visual, vestibular and auditory senses respond to abnormal flight environments are discussed, together with the perceptual and workload limitations affecting 'aviation psychology'. Attention is given to the fitness of crew members for airline operations. (O.C.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT FITNESS; *MANNED SPACECRAFT;
*PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *PSYCHOLOGICAL FACTORS

DE- AIRLINE OPERATIONS; ALTITUDE SICKNESS; ALTITUDE TOLERANCE; BALLOON
FLIGHT; EMERGENCIES; FLIGHT CREWS; HANG GLIDERS; HELICOPTERS; PHYSICAL
FITNESS; SENSORY PERCEPTION; SUPERSONIC AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01492076
AN- <AEROSPACE> A84-46362
TI- LHX simulation - Evaluation of a cockpit of the future
AU- DOMENIC, R. E.; HUTCHINSON, C. K. (Boeing Vertol Co., Philadelphia, PA)

SO- IN: American Helicopter Society, Annual Forum, 39th, St. Louis, MO, May 9-11, 1983, Proceedings (A84-46326 22-01). Alexandria, VA, American Helicopter Society, 1984, p. 390-395.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8422
AB- Piloted flight simulations were conducted to determine the feasibility of a single crewman cockpit for a small scout aircraft of the 1990's. Various methods were used to simulate the conceptual control and display equipment which is not available for installation in the simulator cockpit. A large visual display, moving map, voice control of communications and systems, automatic flight functions, a smart systems monitor and overlaid symbology were evaluated. Six subject pilots flew simulated missions with threats, battlefield management tasks, systems failures, communications, precise navigation tasks and target engagements. The evaluation included subjective comments from the pilots and data collected by computer during the missions. Mission success criteria and pilot opinion indicates that a single crewman, provided with the necessary automation, displays and aids, can perform the scout mission simulated during this program. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *COCKPITS; *FLIGHT SIMULATION; *LIGHT HELICOPTERS; *RESEARCH AIRCRAFT
DE- DATA CORRELATION; EVALUATION; MILITARY AIRCRAFT; PILOT PERFORMANCE;
WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01492065
AN- <AEROSPACE> A84-46351
TI- Advanced systems applications - Foundations for LHX
TI- <EXTENSION> avionics for future army helicopters
AU- PARKS, R. E.; INGRAM, T. W. (Bell Helicopter Textron, Inc., Fort Worth, TX)
SO- IN: American Helicopter Society, Annual Forum, 39th, St. Louis, MO, May 9-11, 1983, Proceedings (A84-46326 22-01). Alexandria, VA, American Helicopter Society, 1984, p. 259-269.
PY- 1984
PD- 198400
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8422
AB- A definitional foundation for LHX is provided by an analysis of the projected deficiencies in the current Army helicopter fleet and by various estimates of capabilities required to fulfill future operational requirements. Some of the deficiencies are related to adverse weather-day/night capability, aircraft survivability measures, and strategic deployment capabilities. It has been found that there is a need for a new development program which yields a family of small, lightweight, high-speed aircraft that are affordable, self-deployable, and meet the rigorous requirements of future combat operations. It appears currently that LHX meets this need. The present investigation is concerned with the LHX advanced systems which are to make the required capabilities possible. Attention is given to current generation integrated systems, LHX avionics/cockpit systems, radiation hardening, and a self-healing and fault-tolerant architecture. (G.R.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *HELICOPTER DESIGN; *LIGHT HELICOPTERS; *MILITARY
HELICOPTERS; *TECHNOLOGICAL FORECASTING
DE- COCKPITS; HUMAN FACTORS ENGINEERING; OPTIMIZATION; SYSTEMS MANAGEMENT;
VHSIC (CIRCUITS)
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01492048
AN- <AEROSPACE> A84-46334
TI- T700 engine - Designed for the pilot and mechanic
AU- WANSONG, J. F. (General Electric Co., Aircraft Engine Business Group, Lynn, MA)
SO- IN: American Helicopter Society, Annual Forum, 39th, St. Louis, MO, May 9-11, 1983, Proceedings (A84-46326 22-01). Alexandria, VA, American Helicopter Society, 1984, p. 102-107.
PY- 1984
PD- 198400
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8422
AB- The development of the T700 engine is traced from its inception through its first 250,000 hours of fielded operation from the perspective of reliability, maintainability, and human factors. The design requirements are discussed and the control system is described. The impact of the design considerations on the integrated logistics support of the engine is considered. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *ENGINE DESIGN; *HELICOPTER CONTROL; *HELICOPTER ENGINES; *RELIABILITY ENGINEERING
DE- MAINTAINABILITY; PILOT TRAINING; SPARE PARTS; TORQUE; TURBOSHAFTS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01489452
AN- <AEROSPACE> A84-43737
TI- The energy expenditure of helicopter pilots
AU- THORNTON, R.; BROWN, G. A.; HIGENBOTTAM, C. (RAF, Institute of Aviation Medicine, Farnborough, Hants., England)
SO- (Aerospace Medical Association, Annual Scientific Meeting, 54th, Houston, TX, May 23-26, 1983) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Aug. 1984, p. 746-750.
PY- 1984
PD- 198408
RF- 16
SN- 0095-6562
LA- English
GL- United Kingdom
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8421
AB- The results of an experiment to measure the energy cost of Army Air Corps and Royal Air Force helicopter pilots during flight in Gazelle and Puma helicopters are reported. For comparison, the energy expenditure of the subjects was measured at rest and while walking to and from the aircraft. Heart rates were also recorded. The results of the experiment confirm the findings of other authors that the energy cost of flying helicopters is about 50 percent higher than that of sitting at rest. (I.H.)
SF- AIAA
DE- <MAJOR> *HEART RATE; *HELICOPTERS; *PHYSIOLOGICAL TESTS; *PILOT PERFORMANCE; *WORK CAPACITY
DE- ENERGY DISSIPATION; REST; WALKING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01489157
AN- <AEROSPACE> A84-43442
TI- Pilot modeling and control augmentation for the XV-15 in in-ground-effect hover
AU- EDMUNDS, R. S. (Sperry Corp., Albuquerque, NM); VANGAASBEEK, J. (Bell Helicopter Textron, Fort Worth, TX)
SO- IN: Guidance and Control Conference, Seattle, WA, August 20-22, 1984, Technical Papers (A84-43401 21-63). New York, American Institute of Aeronautics and Astronautics, 1984, p. 368-378.
PY- 1984
PD- 198400
RF- 23
RN- AIAA PAPER 84-1892
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8421
AB- This paper presents design and simulation results related to pilot modeling and control augmentation for the NASA-Army-Navy-Bell XV-15 tilt rotor aircraft during hover in ground effect. Pilot models are developed using a combination of optimal and classical control theory. These models, when combined with the aircraft, its stability and

control augmentation system (SCAS), and a gust disturbance model, reproduce the flight test results observed during in-ground-effect (IGE) hover with good fidelity. Pilot work load is considered high with the present SCAS and there is a tendency toward pilot-induced oscillation (PIO). The control augmentation systems presented in this paper reduce pilot work load and the tendency toward PIO. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *GROUND EFFECT (AERODYNAMICS); *HOVERING; *PILOT PERFORMANCE; *XV-15 AIRCRAFT
DE- AIRCRAFT MODELS; COMPUTER PROGRAMS; FLIGHT TESTS; PILOT INDUCED OSCILLATION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01486779
AN- <AEROSPACE> A84-41064
TI- Human factors considerations in the development of a voice warning system for helicopters
AU- BERTONE, C. M. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT)
SO- IN: Behavioral Objectives in Aviation Automated Systems Symposium; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 25-28, 1982 (A84-41051 19-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1982, p. 133-142.
PY- 1982
PD- 198200
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8419
AB- Results of research to determine the messages, priority, and type of voice to be used in a voice warning system for a commercial helicopter (S-76) are reported. The goal of voice warning systems is to permit the pilot to fly 'head-up' for longer periods and to relieve him of the task of monitoring warning displays. Feasibility studies were conducted on the benefits and requirements of warning systems for helicopters, and a human factors study group investigated which noise levels, types of human voices, and order of commands are most effective in warning the pilot of possible hazards without distracting him. The system was tested successfully before being sent on a tour of several European air shows. A number of recommendations are made concerning future improvements in the VWS. (I.H.)
SF- AIAA
DE- <MAJOR> *HEAD-UP DISPLAYS; *HELICOPTER PERFORMANCE; *HUMAN FACTORS ENGINEERING; *PILOT SELECTION; *VOICE CONTROL; *WARNING SYSTEMS
DE- AVIONICS; FLIGHT TESTS; HUMAN FACTORS LABORATORIES; SIKORSKY AIRCRAFT; SPEECH RECOGNITION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01485855
AN- <AEROSPACE> A84-40140
TI- Flight testing of airplane and helicopter gas turbine engines
TI- <ORIGINAL> Letnye ispytaniia gazoturbinnykh dvigatelei samoletov i vertoletov
TI- <EXTENSION> Russian book
AU- DOLGOLENKO, G. P., ED.
SO- Moscow, Izdatel'stvo Mashinostroenie, 1983, 112 p. In Russian.
PY- 1983
PD- 198300
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- COLLECTED WORK
JA- IAA8419
AB- The principal types, objectives, and schedules of flight tests conducted on gas turbine engines during various stages on their development and during the service of airplanes and helicopters are reviewed. Test procedures and the equipment used are discussed in detail, with attention given to flying laboratories, special instrumentation, and computer-controlled ground and airborne systems for collecting, processing, and analyzing flight test data. Methods for the in-flight evaluation of the performance and process parameters of gas turbine engines, gas turbine engines, both under steady and transient conditions, as well as their gas dynamic stability and the loading of structural elements are examined. No individual items are abstracted in this volume (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ENGINES; *ENGINE TESTS; *FLIGHT TESTS; *GAS TURBINE ENGINES; *HELICOPTER ENGINES

DE- AERODYNAMIC CHARACTERISTICS; AERODYNAMIC STABILITY; AIRBORNE EQUIPMENT;
AUTOROTATION; COMBUSTION CHAMBERS; COMPUTER PROGRAMMING; FLIGHT SAFETY;
MECHANICAL PROPERTIES; TEST FACILITIES
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01482238
AN- <AEROSPACE> A84-36523
TI- Flight tests for the assessment of task performance and control activity
AU- PAUSDER, H.-J.; HUMMES, D. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmechanik, Brunswick, West Germany)
SO- (American Helicopter Society and NASA, Specialists' Meeting on Helicopter Handling Qualities, Moffett Field, CA, April 14, 15, 1982) American Helicopter Society, Journal (ISSN 0002-8711), vol. 29, April 1984, p. 34-41.
PY- 1984
PD- 198404
RF- 7
SN- 0002-8711
LA- English
GL- Germany
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8417
AB- The tests were performed with the helicopters BO 105 and UH-1D. Closely connected with tactical demands the six test pilots' task was to minimize the time and the altitude over the obstacles. The data reduction yields statistical evaluation parameters describing the control activity of the pilots and the achieved task performance. The results are shown in form of evaluation diagrams. Additionally dolphin tests with varied control strategy were performed to get more insight into the influence of control techniques. From these test results recommendations can be derived to emphasize the direct force control and to reduce the collective to pitch crosscoupling for the dolphin. Previously announced in STAR as N82-23213 (T.M.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *BO-105 HELICOPTER; *FLIGHT CONTROL; *FLIGHT TESTS; *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE; *UH-1 HELICOPTER
DE- ATTITUDE CONTROL; CONTROLLABILITY; DATA ACQUISITION; HELICOPTER PERFORMANCE; HOVERING; MILITARY OPERATIONS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01481382
AN- <AEROSPACE> A84-35666
TI- Development of the Engine Condition Monitoring System for the HH-65A helicopter
AU- EHLERS, K. K. (Aerospatiale Helicopter Corp., Grand Prairie, TX)
SO- AIAA, SAE, and ASME, Joint Propulsion Conference, 20th, Cincinnati, OH, June 11-13, 1984. 9 p.
PY- 1984
PD- 198406
RN- AIAA PAPER 84-1411
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8416
AB- The Engine Condition Monitoring System (ECMS) developed for the U.S. Coast Guard's Short Range Recovery Helicopter has as its goals the reduction of operating costs, the reduction of flight crew workload, and the elimination of monitoring system weight increases through the obviation of dedicated hardware. ECMS software is supplied to the Mission Computer Unit, in order to coordinate aircraft sensor data with the Cockpit Control/Display units, Caution Advisory Panel, and Flight Data Storage Unit. The resulting flight data processing is used to accurately calculate and record cycles, trends, and out-of-limit conditions. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *ENGINE MONITORING INSTRUMENTS;
*HELICOPTER ENGINES; *IN-FLIGHT MONITORING
DE- AIRCRAFT MAINTENANCE; AVIONICS; ENGINE CONTROL; MILITARY HELICOPTERS;
ONBOARD DATA PROCESSING; SYSTEMS INTEGRATION
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01478684
AN- <AEROSPACE> A84-32968
TI- Design guidelines and flight test comments XH-16

AU- LAVASSAR, L. J.
SO- Cockpit (ISSN 0742-1508), vol. 19, Jan.-Feb.-Mar. 1984, p. 21-26.
PY- 1984
PD- 198403
SN- 0742-1508
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8414
AB- Attention is given to the development history and design validation flight testing of the XH-16 long range search and rescue helicopter, with emphasis on the operational restrictions and advantages associated with the unprecedentedly large dimensions of this rotorcraft. Exceptional handling characteristics in gusts due to aircraft inertia, and low airframe vibration levels despite the absence of vibration isolation devices, were noted during the flight test program. This experimental aircraft was lost in a crash due to faulty instrumentation. (O.C.)
SF- AIAA
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS; *PIASECKI AIRCRAFT
DE- AIRCRAFT MANEUVERS; COCKPITS; FLIGHT CHARACTERISTICS; HUMAN FACTORS ENGINEERING; ROTARY WINGS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01477023
AN- <AEROSPACE> A84-31307
TI- Advanced cockpit designs for helicopters
AU- ROY, S. D. (Westland Helicopters, Ltd., Yeovil, England)
SO- Future, Winter 1983, p. 2-10.
PY- 1983
PD- 198300
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8413
AB- Progress in the development of the next generation of helicopter cockpits is discussed. The design strategy guiding research and development of helicopter cockpits is to improve the interface between the pilot and aircraft instrumentation, and to reduce costs. The areas of electronic display, data entry and extraction and voice control are currently the most active areas of flight simulator studies. Rugged shadow mask CRT tubes are being developed to provide full-color electronic display with rasters for shadowing particular display areas or radar symbology. A multifunction control and display unit is considered which will be software programmable, increasing control flexibility and reducing cockpit clutter. A hardware preprocessor is described which compresses speech input into a series of phonetic features. These features are then matched to a set of commands stored in the memory of a 16-bit microprocessor which carries out the desired control command. In a series of color diagrams different cockpit design configurations for both military and civilian aircraft in the 1990's are presented. Flat panel displays attached to the seats are expected to replace interseat and overhead consoles, thus simplifying the activity of the pilot and reducing cost. (I.H.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- CATHODE RAY TUBES; DATA SYSTEMS; DESIGN ANALYSIS; FLIGHT SIMULATION; MICROPROCESSORS; MINICOMPUTERS; VOICE CONTROL
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01475240
AN- <AEROSPACE> A84-29524
TI- Voice interactive electronic warning systems (VIEWS) - An applied approach to voice technology in the helicopter cockpit
AU- VOORHEES, J. W. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA); BUCHER, N. M. (NASA, Ames Research Center, Moffett Field, CA)
CS- Army Research and Technology Labs., Moffett Field, CA.
CS- <CODE> A2025071
SO- IN: Aerospace Behavioral Engineering Technology Conference, 2nd, Long Beach, CA, October 3-6, 1983, Proceedings (A84-29476 12-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1983, p. 445-452.
PY- 1983
PD- 198300
RN- SAE PAPER 831545
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8412
AB- The cockpit has been one of the most rapidly changing areas of new aircraft design over the past thirty years. In connection with these developments, a pilot can now be considered a decision maker/system manager as well as a vehicle controller. There is, however, a trend towards an information overload in the cockpit, and information processing problems begin to occur for the rotorcraft pilot. One approach to overcome the arising difficulties is based on the utilization of voice technology to improve the information transfer rate in the cockpit with respect to both input and output. Attention is given to the background of speech technology, the application of speech technology within the cockpit, voice interactive electronic warning system (VIEWS) simulation, and methodology. Information subsystems are considered along with a dynamic simulation study, and data collection. (G.R.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *HELICOPTER DESIGN; *INTERACTIVE CONTROL; *SPEECH RECOGNITION; *VOICE CONTROL; *WARNING SYSTEMS
DE- DATA ACQUISITION; ELECTRONIC CONTROL; INFORMATION SYSTEMS; PILOT PERFORMANCE; SYSTEMS INTEGRATION; SYSTEMS SIMULATION; TECHNOLOGY UTILIZATION; VOICE DATA PROCESSING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01475231
AN- <AEROSPACE> A84-29515
TI- Integrated voice controls and speech displays for rotorcraft mission management
AU- SIMPSON, C. A. (Psycho-Linguistic Research Associates, Menlo Park, CA)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 2nd, Long Beach, CA, October 3-6, 1983, Proceedings (A84-29476 12-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1983, p. 359-368.
PY- 1983
PD- 198300
RF- 37
RN- SAE PAPER 831523
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8412
AB- After assessing the development status of computer voice generation and speech recognition technology in the context of potential rotorcraft cabin applications, suggestions are made toward the integrated development and design of such systems for missions typical of rotorcraft. Attention is also given to the most pertinent set of human factors issues that must influence such design efforts. Currently commercially available voice recognition systems physically suitable for incorporation by aircraft are speaker-dependent, recognize only isolated words, and respond to a fixed, though user-alterable, vocabulary. (O.C.)
SF- AIAA
DE- <MAJOR> *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS; *SPEECH RECOGNITION; *VOICE CONTROL
DE- COMMAND AND CONTROL; COMPUTER SYSTEMS PERFORMANCE; DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; PHONEMES; PSYCHOLINGUISTICS; TECHNOLOGY ASSESSMENT; VOICE COMMUNICATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01475210
AN- <AEROSPACE> A84-29494
TI- Testing ground proximity warning systems for Navy tactical aircraft
AU- HOERNER, F. C. (U.S. Navy, Naval Air Test Center, Patuxent River, MD)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 2nd, Long Beach, CA, October 3-6, 1983, Proceedings (A84-29476 12-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1983, p. 191-193.
PY- 1983
PD- 198300
RN- SAE PAPER 831456
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8412
AB- The Ground Proximity Warning System (GPWS) is a single weapons

replaceable assembly (WRA) which, utilizing existing onboard sensors, provides a reliable integration means to warn the pilot of an impending Controlled Flight Into Terrain (CFIT) incident. In the five years prior to mandatory incorporation of GPWS, approximately 3,500 people lost their lives as a direct result of CFIT incidents. This type of accident has been reduced to virtually zero in the years after GPWS implementation. The present investigation is concerned with the studies and test programs which were conducted by the Navy in connection with efforts to bring GPWS technology into operational utilization. A description of planned test activities is also provided. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT INSTRUMENTS; *FLIGHT SAFETY;
*MILITARY AIRCRAFT; *WARNING SYSTEMS
DE- FLIGHT TESTS; HELICOPTERS; NAVY; PILOT PERFORMANCE; TERRAIN
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01475205
AN- <AEROSPACE> A84-29489
TI- HH-60D helmet mounted display formats - A pilot's view and a human factors view
AU- BARNEY, J. R.; KLIPPERT, R. H. (IBM Corp., Federal Systems Div., Owego, NY)
SO- IN: Aerospace Behavioral Engineering Technology Conference, 2nd, Long Beach, CA, October 3-6, 1983, Proceedings (A84-29476 12-54). Warrendale, PA, Society of Automotive Engineers, Inc., 1983, p. 111-153.
PY- 1983
PD- 198300
RN- SAE PAPER 831446
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8412
AB- This paper describes the integration of a helmet mounted display system into the multiple CRT 'glass cockpit' being developed for the Air Force HH-60D terrain following, night combat rescue helicopter. For orientation, the location of units comprising the helmet display system is described first. Then, since the helmet mounted display formats are common with those presented on the four Multi-Purpose Displays, the attributes of the formats are detailed by portraying a brief flight as seen through a sequence of those formats. (Author)
SF- AIAA
DE- <MAJOR> *CREW PROCEDURES (INFLIGHT); *HELICOPTER DESIGN; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- AIRCRAFT PILOTS; AVIONICS; MILITARY HELICOPTERS; NIGHT FLIGHTS (AIRCRAFT); RESCUE OPERATIONS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01475192
AN- <AEROSPACE> A84-29476
TI- Aerospace Behavioral Engineering Technology Conference, 2nd, Long Beach, CA, October 3-6, 1983, Proceedings
SO- Conference sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc. (SAE P-132), 1983, 503 p.
PY- 1983
PD- 198300
RN- SAE P-132
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8412
AB- The man/machine interaction and its functional relationship to present and future operational environments are addressed with regard to the critical automation workload technology issues facing the aerospace industry. Topics discussed include the role of aircraft recorders in human performance investigations; the dissociation of workload assessment metrics; operational aspects of the integrated vertical flight path and speed control system; man's role in a remote orbital servicing system; and information processing using helmet-mounted displays and voice interactive systems. Attention is also given to improving the operator interface through use of a touch interactive display; information interpretation through pictorial format; and the F-15 dual role fighter cockpit integration. Other areas of study include the airline pilot's perspective of the operating environment; the impact of technology on rotorcraft mission management; advanced flight deck information and display concepts for commercial transport; and behavioral aspects of interaction with high technology systems. For individual items see A84-29477 to A84-29525 (J.N.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENGINEERING; *CONFERENCES; *HUMAN FACTORS

ENGINEERING; *MAN MACHINE SYSTEMS; *OPERATOR PERFORMANCE
DE- AEROSPACE INDUSTRY; AIRCRAFT PERFORMANCE; CIVIL AVIATION; DISPLAY
DEVICES; FLIGHT CONTROL; HUMAN BEHAVIOR; PILOT PERFORMANCE; ROTARY WING
AIRCRAFT; SYSTEMS INTEGRATION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01473914
AN- <AEROSPACE> A84-28198
TI- A proposed whirl tower facility for the University of the Witwatersrand
AU- NURICK, A. (Witwatersrand, University, Johannesburg, Republic of South Africa)
SO- Aeronautical Society of South Africa and South African Institute of Aeronautical Engineers, Journal (ISSN 0250-3786), vol. 4, no. 1, 1983, p. 40-43.
PY- 1983
PD- 198300
RF- 6
SN- 0250-3786
LA- English
GL- South Africa
CP- South Africa
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8411
AB- The paper describes the research objectives and specifications and instrumentation of the University of Witwatersrand whirl tower, which is intended to perform tests on helicopter and other rotors as well as propellers. The whirl tower program (scheduled for completion in 1984) is divided into two parts. In the first part the whirl tower (comprising the drive, instrumented rotor bearing housing, rotor, rotor shaft, and structure) will be assembled together with the power supplies and strain gage bridge amplifiers; this will make it possible to measure the overall loads acting on the rotor. In the second stage the velocity field will be measured and analyzed. (B.J.)
SF- AIAA
DE- <MAJOR> *ROTARY WINGS; *ROTOR AERODYNAMICS; *SPIN TESTS; *TEST FACILITIES; *TOWERS; *WHIRL TOWERS
DE- ANGULAR VELOCITY; HELICOPTER DESIGN; LASER DOPPLER VELOCIMETERS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01472425
AN- <AEROSPACE> A84-26709
TI- Speech technology enhancements of automatic target recognition
AU- MOUNTFORD, S. J.; SCHWARTZ, J. (Honeywell Systems and Research Center, Minneapolis, MN)
SO- IN: Digital Avionics Systems Conference, 5th, Seattle, WA, October 31-November 3, 1983, Proceedings (A84-26701 11-06). New York, Institute of Electrical and Electronics Engineers, 1983, p. 3.6.1-3.6.8.
PY- 1983
PD- 198300
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8411
AB- Especially during critical flight phases, excessive demands are being placed upon visual perception and manual response capabilities of the pilot. This visual-manual workload would be further increased in case of an introduction of the Prototype Automatic Target Screener (PATS) on the basis of an employment of conventional visual-manual displays and controls. The excessive demands to which the pilot is subjected can have significant adverse effects on mission success and safety. Possibilities for alleviating the pilot's workload are, therefore, explored, taking into account the utility of speech technology for pilot-PATS task interactions. On the basis of the present investigation it is concluded that speech technology enhances simultaneous dual-axis tracking performance over visual-manual modalities. Speech technology offers both a viable and recommended technique of transacting with PATS. (G.R.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *DIGITAL SYSTEMS; *MILITARY HELICOPTERS; *SPEECH
RECOGNITION; *TARGET RECOGNITION; *VOICE CONTROL
DE- DISPLAY DEVICES; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING; INTERACTIVE CONTROL; PILOT PERFORMANCE; VOICE DATA PROCESSING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01472099
AN- <AEROSPACE> A84-26383

TI- Backache in Chetak crew and suggested ergonomic improvements in aircraft seat design
AU- SINGH, R. (Indian Air Force, Institute of Aviation Medicine, Bangalore, India)
SO- Aviation Medicine, vol. 27, Dec. 1983, p. 123-130.
PY- 1983
PD- 198312
RF- 9
LA- English
GL- India
CP- India
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8410
AB- A survey of helicopter seat comfort, conducted on the Indian Chetak crew, produced a modified seat design and recommendations for mainly minimizing backache. The seatback inclination angle was reduced from 106 deg to 96 deg, the accompanying cushion's height was increased by approximately 15 cm, and an adjustable lumbar pad was provided to prevent lower back pain. The seatpan cushion was redesigned so that its inclination (from the horizontal) was 8 deg instead of 16 deg, and an adjustable headrest was provided that does not interfere with the pilot's visibility. Recommendations for future designs include a helmet oxygen mask connector, relocation of hot air feed pipes, and spinal exercises to reduce backache. (C.M.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *BACK INJURIES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PAIN; *SEATS
DE- COCKPITS; DESIGN ANALYSIS; ETIOLOGY; INDIA; SPINE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01471116
AN- <AEROSPACE> A84-25400
TI- Helicopter warning signals - Comparative study of individual and group interviews
TI- <ORIGINAL> La signalisation des alarmes sur helicoptere - Etude comparative de l'entretien individuel et de l'entretien de groupe
AU- GANGLOFF, B.; PAPIN, J. P. (Centre d'Enseignement et de Recherches de Medecine Aeronautique, Paris, France)
SO- Ergonomics (ISSN 0014-0139), vol. 27, Jan. 1984, p. 81-87. In French.
PY- 1984
PD- 198401
RF- 13
SN- 0014-0139
LA- French
GL- France
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8410
AB- The effectiveness of group and individual interviewing techniques in the ergonomic evaluation of helicopter VDU warning systems is investigated. Six commanders, seven pilots, and seven flight engineers were interviewed individually for about 45 min; one three-member crew and one group comprising three commanders, three pilots, and two flight engineers were interviewed for about 2 h. Subjects discussed included the detection of the warning display (by whom and with what priorities), the presentation of the warning (location, lighting, size, audio signal, indication of procedure to be followed), and missing or defective warnings. Individual interviews are found to produce more complete information on VDU problems, while group interviews are more effective in identifying solutions. The use of complementary group and individual interviews is recommended. (T.K.)
SF- AIAA
DE- <MAJOR> *AUDITORY SIGNALS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *PSYCHOACOUSTICS; *VISUAL SIGNALS; *WARNING SYSTEMS
DE- HELICOPTER DESIGN; SIGNAL DETECTION; SURVEYS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01470726
AN- <AEROSPACE> A84-25010
TI- A comparison of visual and kinesthetic-tactual displays for compensatory tracking
AU- JAGACINSKI, R. J.; FLACH, J. M.; GILSON, R. D. (Ohio State University, Columbus, OH)
CS- Ohio State Univ., Columbus.
CS- <CODE> OM593208
SO- IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol. SMC-13, Nov.-Dec. 1983, p. 1103-1112. Army-sponsored research.
PY- 1983
PD- 198312
RF- 22
SN- 0018-9472
CN- NSG-2179

LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8410
AB- Recent research on manual tracking with a kinesthetic-tactual (KT) display suggests that under certain conditions it can be an effective alternative or supplement to visual displays. In order to understand better how KT tracking compares with visual tracking, both a critical tracking and stationary single-axis tracking tasks were conducted with and without velocity quickening. In the critical tracking task, the visual displays were superior, however, the quickened KT display was approximately equal to the unquickened visual display. In stationary tracking tasks, subjects adopted lag equalization with the quickened KT and visual displays, and mean-squared error scores were approximately equal. With the unquickened displays, subjects adopted lag-lead equalization, and the visual displays were superior. This superiority was partly due to the servomotor lag in the implementation of the KT display and partly due to modality differences. (Author)
SF- AIAA
DE- <MAJOR> *COMPENSATORY TRACKING; *DISPLAY DEVICES; *KINESTHESIA; *OPERATOR PERFORMANCE; *TACTILE DISCRIMINATION; *VISUAL PERCEPTION
DE- AIRCRAFT CONTROL; ERROR ANALYSIS; HELICOPTER CONTROL; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; MANUAL CONTROL; ROOT-MEAN-SQUARE ERRORS; TASK COMPLEXITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01465460
AN- <AEROSPACE> A84-19744
TI- Simulator investigations of side-stick controller/stability and control augmentation systems for night nap-of-earth flight
AU- LANDIS, K. H. (Boeing Vertol Co., Philadelphia, PA); AIKEN, E. W. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA)
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> BR870123
SO- American Helicopter Society, Journal (ISSN 0002-8711), vol. 29, Jan. 1984, p. 56-65.
PY- 1984
PD- 198401
RF- 5
SN- 0002-8711
CN- NAS2-10880
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8407
AB- Several night nap-of-the-earth mission tasks were evaluated using a helmet-mounted display which provided a limited field-of-view image with superimposed flight control symbology. A wide range of stability and control augmentation designs was investigated. Variations in controller force-deflection characteristics and the number of axes controlled through an integrated side-stick controller were studied. In general, a small displacement controller is preferred over a stiffstick controller particularly for maneuvering flight. Higher levels of stability augmentation were required for IMC tasks to provide handling qualities comparable to those achieved for the same tasks conducted under simulated visual flight conditions. Previously announced in STAR as N82-23216 (T.M.)
SF- AIAA
DE- <MAJOR> *CONTROLLABILITY; *CONTROLLERS; *FLIGHT CONTROL; *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *NIGHT FLIGHTS (AIRCRAFT); *STABILITY AUGMENTATION
DE- AIRCRAFT MANEUVERS; FLIGHT SIMULATION; HELMET MOUNTED DISPLAYS; MILITARY HELICOPTERS; NIGHT VISION; PILOT PERFORMANCE; VISUAL FLIGHT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01465363
AN- <AEROSPACE> A84-19647
TI- Army pilot ergonomics
AU- STEVENS, S. C. (U.S. Army, Aviation Research and Development Command, St. Louis, MO); STATLER, I. C. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA)
SO- Association Aeronautique et Astronautique de France, European Rotorcraft Forum, 8th, Aix-en-Provence, France, Aug. 31-Sept. 3, 1982, Paper. 13 p.
PY- 1982
PD- 198208
LA- English
GL- United States

CP- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8407
AB- As a result of technological developments and changes regarding the battlefield environment, new missions, tactics, and performance requirements have evolved for the helicopter. One example for a new tactic with very exacting requirements is the nap-of-the-earth (NOE) flight. However, the technological equipment which is to enable the helicopter to perform its tasks has frequently been designed without taking into account the human operator's role in the effectiveness of the man-machine system. One important problem is that the channel capacity of the human organism as a processor or receiver of information is limited. An analysis of the situation shows that the human controller might have become the limiting element in the man-machine system required to perform current Army helicopter missions. It is essential that the characteristics of human perception be factored into the cockpit design. There is a need for a system of information display laws similar, conceptually, to the flight control laws. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *MILITARY PSYCHOLOGY; *PILOT PERFORMANCE
DE- COGNITION; MILITARY HELICOPTERS; PERCEPTION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01465046
AN- <AEROSPACE> A84-19330
TI- Evaluation of speech technology for automatic target recognition
AU- MOUNTFORD, S. J.; SCHWARTZ, J.; GRAFFUNDER, K. (Honeywell Systems and Research Center, Minneapolis, MN)
SO- IN: Human Factors Society, Annual Meeting, 27th, Norfolk, VA, October 10-14, 1983, Proceedings. Volume 2 (A84-19276 06-54). Santa Monica, CA, Human Factors Society, 1983, p. 965-969; Abridged.
PY- 1983
PD- 198300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8406
AB- A speech-interactive system is integrated with a prototype automatic target recognizer. The situation simulated is that of an attack helicopter pop-up maneuver searching for several target types. The tasks during operational control of the target screener involve pilot entry of navigation coordinates, targeting mode, target type, target selection and weapon preparation. The sequence of tasks is evaluated experimentally with the aid of three different modalities of interaction, namely speech recognition and speech generation dialogue, speech recognition with visual prompting, and conventional visual-manual transactions. The results suggest significantly better flight control performance during simultaneous speech-interaction for the targeting tasks. The speech technology results indicate that there are selective performance benefits for the entire sequence of targeting tasks which are not apparent at the individual switch-closure level. (C.R.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *MILITARY TECHNOLOGY; *SPEECH RECOGNITION; *TARGET RECOGNITION
DE- DISPLAY DEVICES; ERRORS; MILITARY HELICOPTERS; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01464555
AN- <AEROSPACE> A84-18839
TI- Applied human factors and its impact on a helicopter night vision system configuration
AU- WALDROP, G. P.; MCDONALD, L. B. (McDonald and Associates, Inc., Orlando, FL); BREITMAIER, W. A. (U.S.Navy, Naval Air Development Center, Warminster, PA); MITCHELL, T. (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA)
SO- IN: Human Factors Society, Annual Meeting, 26th, Seattle, WA, October 25-29, 1982, Proceedings (A84-18776 06-54). Santa Monica, CA, Human Factors Society, 1982, p. 880-884.
PY- 1982
PD- 198200
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8406
AB- A description is given of the simulator, which is a CH-53 cockpit

mounted on a six-degrees-of-freedom motion base. A terrain model board and a camera probe are used to provide real-time simulation of an infrared image for night flight. The simulated infrared imagery is projected on panel-mounted displays and superimposed with electronic flight symbology. The simulation comprises four phases. The first simulation investigates whether the sensor should be fixed or gimballed and whether or not a Doppler navigation system should be employed. The second tests the sensor and field-of-view requirements. The third phase examines hover symbology and tests helmet vs panel-mounted displays. It also includes wide and narrow fields of view. The fourth phase considers the usefulness of the control and display unit as a navigation aid. (C.R.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *FLIR DETECTORS; *HELICOPTER PERFORMANCE;
*HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT)
DE- COCKPIT SIMULATORS; FIELD OF VIEW; INFRARED IMAGERY; NAVIGATION AIDS;
PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01464091
AN- <AEROSPACE> A84-18375
TI- Visual aids for future helicopters
AU- BOEHM, H.-D. V.; RETH, R.-D. V. (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany)
SO- Associazione Industrie Aerospaziali and Associazione Italiana di Aeronautica e Astronautica, European Rotorcraft Forum, 9th, Stresa, Italy, Sept. 13-15, 1983, Paper. 20 p.
PY- 1983
PD- 198309
RF- 11
LA- English
GL- Germany
CP- Italy
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8406
AB- The Pilot Visionics System (PVS) recently tested aboard an MBB-Bo 105 helicopter comprises a Helmet Mounted Sight/Display (HMS/D), a stabilized, steerable platform with a wide field-of-view Forward Looking IR (FLIR) sensor, and a Low Light Level TV (LLLTV) camera. These were compared with a Head-down Display system. The FLIR and LLLTV images could be alternately displayed to allow direct comparison during flight tests. More recently, the steerable platform FLIR system whose German designation is 'Piloten Infrarot Sicht-Anlage' (PISA) was tested. Attention is presently given to major results of the PVS and PISA flight trials. The FLIR is found to generally give a better image when directly compared with the LLLTV camera. The effectiveness of night vision goggles is confirmed, even by comparison with complex systems using FLIR, HMS/D, and separate display equipment. (O.C.)
SF- AIAA
DE- <MAJOR> *CAMERAS; *HELMET MOUNTED DISPLAYS; *INFRARED DETECTORS;
*MILITARY HELICOPTERS; *NIGHT VISION; *VISUAL AIDS
DE- AVIONICS; FLIGHT TESTS; FLIR DETECTORS; HUMAN FACTORS ENGINEERING;
NIGHT FLIGHTS (AIRCRAFT)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01463681
AN- <AEROSPACE> A84-17965
TI- An investigation of side-stick-controller/stability and control-augmentation system requirements for helicopter terrain flight under reduced visibility conditions
AU- LANDIS, K. H.; GLUSMAN, S. I. (Boeing Vertol Co., Philadelphia, PA); AIKEN, E. W.; HILBERT, K. B. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA)
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> BR870123
SO- American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 22nd, Reno, NV, Jan. 9-12, 1984. 22 p.
PY- 1984
PD- 198401
RF- 9
CN- NAS2-10880
RN- AIAA PAPER 84-0235
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8406
AB- Simulation of the reduced visibility tasks is effected by providing the pilot with a visually coupled, helmet-mounted display of flight-control

symbols superimposed upon terrain-board imagery. Forward-flight, low-speed, and precision-hover control modes are implemented, and a method is developed for the blending of control laws between each control mode. An investigation is made of the variations in the level of integration of primary control functions on a single side-stick controller. For most of the flight tasks investigated, separated controller configurations are preferred to a single, fully integrated side-stick device. Satisfactory handling qualities over all controller configurations are attained only for a precision-hover task conducted with a high level of stability and control augmentation. For most tasks flown with the helmet-mounted display significant degradation in handling qualities occurs relative to the identical tasks flown under visual flight conditions. (C.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *CONTROL STICKS; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *LOW VISIBILITY; *STABILITY AUGMENTATION
DE- EVALUATION; FLIGHT CONTROL; PILOT PERFORMANCE; TASKS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01462275
AN- <AEROSPACE> A84-16559
TI- Cockpit integration in the HH-60D Night Hawk helicopter
AU- RICHARDSON, C. (IBM, Federal Systems Div., Owego, NY); LAMBDIN, R. (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH)
SO- IN: NAECON 1983; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 17-19, 1983. Volume 1 (A84-16526 05-01). New York, Institute of Electrical and Electronics Engineers, 1983, p. 298-305.
PY- 1983
PD- 198300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8405
AB- The HH-60D Night Hawk is discussed with respect to mission, aircraft design, cockpit integration, controls and displays, and display formats and utilization. It is noted that the cockpit represents the latest in practical man-machine interfaces coupled with significant workload reduction features. This design is implemented with a dual redundant core avionics system architecture to prevent simplex failures from affecting pilot functions. (B.J.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *COCKPITS; *H-60 HELICOPTER; *HELICOPTER DESIGN; *MAN MACHINE SYSTEMS; *SYSTEMS INTEGRATION
DE- ALL-WEATHER AIR NAVIGATION; CONTROL EQUIPMENT; DISPLAY DEVICES; NIGHT FLIGHTS (AIRCRAFT); PILOT PERFORMANCE; RESCUE OPERATIONS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01462269
AN- <AEROSPACE> A84-16553
TI- A performance monitoring system for helicopters
AU- WALKER, G. F. (Marconi Avionics, Ltd., Rochester, Kent, England)
SO- IN: NAECON 1983; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 17-19, 1983. Volume 1 (A84-16526 05-01). New York, Institute of Electrical and Electronics Engineers, 1983, p. 260-265. Research supported by the Ministry of Defence /Procurement Executive/.
PY- 1983
PD- 198300
LA- English
GL- United Kingdom
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8405
AB- A system capable of providing helicopter pilots with a continuously updated display of performance capabilities both under existing atmospheric conditions, and for conditions at a remote site has been developed. In order to demonstrate this capability, the equipment has been adapted to monitor aircraft performance in such a way that degradation through flight in adverse enviroments, particularly icing, is detected and displayed. This paper describes the system and also discusses the type of performance models and monitoring methods upon which the system is based. Results of both bench and flight evaluations are presented, and future possibilities in this field of instrumentation are discussed. (Author)
SF- AIAA
DE- <MAJOR> *AVIONICS; *FLIGHT CONTROL; *HELICOPTER PERFORMANCE; *IN-FLIGHT MONITORING
DE- ICE FORMATION; MICROCOMPUTERS; PAYLOADS; TORQUE

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01462268
AN- <AEROSPACE> A84-16552
TI- Airspeed measurements
AU- GOLBERSTEIN, M.; DELUCA, G. M. (Rosemount, Inc., Eden Prairie, MN)
SO- IN: NAECON 1983; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 17-19, 1983. Volume 1 (A84-16526 05-01). New York, Institute of Electrical and Electronics Engineers, 1983, p. 254-259.
PY- 1983
PD- 198300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8405
AB- Reliable, accurate and cost effective pressure sensing instrumentation that provides airspeed measurements for operating ranges of 0 - 40 KTS is essential for air data and fire control systems of vertical flight aircraft. Rosemount's capacitive pressure sensing transducers provide air data system measurements of free and local stream airspeed up to three axes from a single sensor. The airspeed transducer senses differential pressures proportional to relative airflow in each of the longitudinal, lateral and vertical directions. The differential pressures are transmitted to air data modules containing pressure sensors and electronics, producing bidirectional outputs proportional to airspeed. For the sake of simplicity an orthogonal airspeed system is described. (Author)
SF- AIAA
DE- <MAJOR> *AIRSPEED; *PRESSURE SENSORS; *SPEED INDICATORS; *VELOCITY MEASUREMENT; *VERTICAL FLIGHT
DE- CAPACITANCE; COST EFFECTIVENESS; DIFFERENTIAL PRESSURE; PERFORMANCE TESTS; RELIABILITY ENGINEERING; SYSTEMS ENGINEERING; TRANSDUCERS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01459104
AN- <AEROSPACE> A84-13387
TI- Helicopter flight testing in natural snow and ice
AU- JONES, C.; BATTERSBY, M. G.; CURTIS, R. J. (Aeroplane and Armament Experimental Establishment, Salisbury, Wilts., England)
SO- AIAA, AHS, IES, SETP, SFTE, and DGLR, Flight Testing Conference, 2nd, Las Vegas, NV, Nov. 16-18, 1983. 10 p.
PY- 1983
PD- 198311
RN- AIAA PAPER 83-2786
LA- English
GL- United Kingdom
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8403
AB- The safe, effective testing of helicopters in natural icing and snow conditions requires knowledge of the test environment and measurement of the response of the aircraft and its systems to that environment. After considerable effort at organisations, Boscombe Down and others, a suite of instrumentation is now available which largely meets these requirements. This instrumentation and the techniques for its use are described, together with some results from recent flight trials on a helicopter with an unprotected main rotor. The additional instrumentation and test methods required to test helicopters with protected main rotors are also described. (Author)
SF- AIAA
DE- <MAJOR> *ENVIRONMENTAL TESTS; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *ICE ENVIRONMENTS; *SNOW
DE- FLIGHT SAFETY; ROTARY WINGS; ROTOR BLADES; SHEDDING; THERMAL PROTECTION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01458167
AN- <AEROSPACE> A84-12450
TI- Helicopter GPS navigation
AU- TILL, D. R. (FAA, Technical Center, Atlantic City, NJ)
SO- IN: PLANS '82 - Position Location and Navigation Symposium, Atlantic City, NJ, December 6-9, 1982, Record (A84-12426 02-04). New York, Institute of Electrical and Electronics Engineers, 1982, p. 206-213.
PY- 1982
PD- 198200
RF- 8
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8402
AB- This paper describes the instrumentation developed and rotary wing flight tests conducted to evaluate the operational suitability of the Navigation Satellite Time and Ranging Global Positioning System (NAVSTAR GPS) for civil aviation. The Z-set, a proof of concept GPS receiver was used in the tests. The Z-set developed by Magnavox during the phase I GPS development program was used because of the applicability of the Z-set's single channel, C/A code, sequential channel architecture to a low cost civil aviation receiver design. (Author)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *GLOBAL POSITIONING SYSTEM; *HELICOPTERS
DE- CIVIL AVIATION; COMPUTER PROGRAMS; FLIGHT TESTS; NAVSTAR SATELLITES;
RADIO RECEIVERS; VHF OMNIRANGE NAVIGATION
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01456777
AN- <AEROSPACE> A84-11060
TI- Display-oriented cockpit for low-level night flight (experimental program NSC)
TI- <ORIGINAL> Bildschirmorientiertes Cockpit fuer den Nachttiefflug (Experimentalprogramm NSC)
AU- WOLFF, P.; HAUCK, H. (Dornier System GmbH, Friedrichshafen, West Germany)
SO- IN: International Helicopter Forum, 14th, Bueckeburg and Hanover, West Germany, May 20, 21, 1982, Proceedings. Part 1 (A84-11051 01-01). Hanover, West Germany, Deutsche Messe- und Ausstellungs-AG, 1983, 29 p. In German.
PY- 1983
PD- 198300
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8401
AB- Presently, electronic systems and devices are still only little used in helicopter cockpits. However, in connection with rising demands concerning the employment of the helicopter in application areas which were up to now closed to it, it has to be expected that a development will take place which is at least comparable to that occurring in the case of other types of aircraft. The greatest challenge regarding the development of the helicopter cockpit of the future is related to the demand to achieve a night flight capability, taking into account the possibility of conducting low-level flights in the vicinity of obstacles. A necessary condition for the solution of the problems involved in providing this capability is the availabilty of efficient, economically priced night vision sensors. A crucial factor is the presentation of the relevant information and data to the pilot on appropriate display devices. Attention is given to details of data indication, the arrangement of the control elements, and military and technical requirements. (G.R.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *DISPLAY DEVICES; *LOW ALTITUDE; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT)
DE- ELECTRONIC EQUIPMENT; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS;
NIGHT VISION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01456436
AN- <AEROSPACE> A84-10719
TI- Heat stress related to the operation of Canadian forces aircraft - A historical review and possible solution
AU- BROOKS, C. J.; HYNES, A. G.; ALLIN, L. V.; KUEHN, L. A. (Defence and Civil Institute of Environmental Medicine, Toronto, Canada)
SO- IN: SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings (A84-10706 01-01). Van Nuys, CA, SAFE Association, 1983, p. 91-94.
PY- 1983
PD- 198300
RF- 6
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8401
AB- British and Canadian efforts in the development of liquid cooled garments (LCG) for military aircraft pilots are described. LCG development began in the U.K. in 1959 and consisted of tubes stitched into the fabric. Water was used as the heat transfer medium, and the

LCG units, attached to chipped ice cooling apparatus, were used in flights over Lybia, Cyprus, and the Far East in 1965, and variants were employed on the Apollo flights. Vest cooling was effected with the chiller unit based on a commercial design that produced ice cubes for the DC-10, 747, and A300 Airbus. Over 100 hr of successful flight time has been performed with the unit mounted in a Sea King helicopter. (D.H.K.)
SF- AIAA
DE- <MAJOR> *FLIGHT CLOTHING; *HEAT TOLERANCE; *HUMAN FACTORS ENGINEERING;
*PROTECTIVE CLOTHING; *THERMAL COMFORT
DE- LIQUID COOLING; MILITARY AIRCRAFT; TECHNOLOGY ASSESSMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01454695
AN- <AEROSPACE> N83-36023
TI- Sea King helicopter flight trials
AU- GUY, C. R.; WILLIAMS, M. J.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> AF441057
PY- 1983
PD- 198301
PG- 61P.
RN- ARL-AERO-NOTE-415; AR-002-938
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8324
AB- A program of flight trials carried out with a Sea King Mk. 50 helicopter is described. An outline is given of the aircraft instrumentation, the data acquisition system and the data analysis procedures. Results are presented for conditions of trimmed level flight together with typical examples of dynamic response tests, transition maneuvers and Doppler and cable hover tests. A summary of the flight test schedule and objectives is included to indicate the scope of the flight trials program. This program was designed to provide results for use in the validation of the Sea King Mk. 50 mathematical model and for more general use in helicopter behavior studies. (Author)
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *SH-3 HELICOPTER
DE- AERODYNAMIC BALANCE; AIRCRAFT INSTRUMENTS; DATA ACQUISITION; DOPPLER
RADAR; DYNAMIC RESPONSE; HOVERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01449054
AN- <AEROSPACE> N83-30357
TI- Ground/Flight Test Techniques and Correlation
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1983
PD- 198302
PG- 535P.
NT- Symp. held at Cesme, Turkey, 11-14 Oct. 1982
RN- AD-A129433; ISBN-92-835-0328-7; AGARD-CP-339
LA- MULTIPLE
LA- <NOTE> In ENGLISH; partly in FRENCH
GL- France
CP- International Organization
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A23/MF A03
JA- STAR8319
AB- Large advances in wind tunnel and flight test instrumentation and data processing have provided better confidence in the data and, consequently, improved comparison bases. Even larger advances were made in computational aerodynamics and this has provided the basis for an efficient design tool for transport aircraft. However, in spite of all these improvements there is still a problem in providing accurate and satisfactory performance predictions. Concern was also expressed that with the increasing sophistication of test and prediction techniques, engineers may lose ""track" of the physics of prediction and comparison. For individual titles, see N83-30358 through N83-30384.
DE- <MAJOR> *BOUNDARY LAYER TRANSITION; *COMPUTATIONAL FLUID DYNAMICS;
*CONFERENCES; *FLIGHT SIMULATION; *STRUCTURAL DESIGN CRITERIA; *WIND
TUNNEL TESTS
DE- AERODYNAMIC STABILITY; AEROELASTICITY; EXTERNAL STORE SEPARATION;
HELICOPTERS; PREDICTION ANALYSIS TECHNIQUES; SWEPT WINGS

SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01445210
AN- <AEROSPACE> N83-26468
TI- Physiological evaluation of thermal strain due to protective clothing: Application to helicopter pilots
AU- HENANE, R.; BITTEL, J.; GUILLERMIN, M.
CS- Centre de Recherches du Service de Sante des Armees, Lyons (France). Div. of Physiologie.
CS- <CODE> CK769633
PY- 1983
PD- 198301
NT- In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 151-159 (SEE N83-26454 15-54)
LA- English
GL- France
CP- Sweden
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A18/MF A03
JA- STAR8315
AB- Dry and humid heat exchanges occurring in helicopter pilots wearing protective suits were tested in a climatic chamber and in flight conditions on sunny and warm days. An index of water permeability (Iw) was derived: Iw = Ec1/Enu where Ec1 and Enu are steady state evaporative rate in clothed and nude conditions; Iw=1 for totally permeable clothing and Iw=0 for totally impermeable clothing. The absolute evaporation through clothing layers measured by weighing was compared to predicted evaporation. This index, combined with biophysical estimation of CLO and the permeability index Im, is proposed as a means of estimating physiological stress due to the thermal burden of clothing. (Author (ESA))
SF- ESA
DE- <MAJOR> *PHYSIOLOGICAL TESTS; *PROTECTIVE CLOTHING; *STRESS (PHYSIOLOGY); *THERMODYNAMIC PROPERTIES
DE- EVAPOTRANSPIRATION; FLIGHT TESTS; PERMEABILITY; PILOT PERFORMANCE; PREDICTION ANALYSIS TECHNIQUES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01444134
AN- <AEROSPACE> N83-25371
TI- Pilot selection criteria for the AH-64 helicopter
TI- <SUPPLEMENT> M.S. thesis
AU- DIAMOND, R.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> NS368219
PY- 1982
PD- 198212
PG- 72P.
RN- AD-A122495
LA- English
GL- United States
CP- United States
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8314
AB- This thesis uses statistical analysis methods and subjective decisions to determine the parameters necessary to establish crew selection criteria for the AH-64 attack helicopter. The purpose of establishing these parameters is to aid the Army in establishing pilot selection criteria for the AH-64. The techniques of simple linear regresssion and nonparametric statistics indicated that the greater the experience level the better performance level achieved. The analysis of crews determined that less experienced crews performed proportionately as well as the more experienced crews. Curiously, the amount of experience of the pilot is not a determining factor, whereas the copilot gunners experience is directly related to how well the crew performed. Crew selection for the AH-64 helicopter should be made from the existing AH-1 series community of aviators with the more experienced aviators performing duties as copilot gunner. (DTIC)
SF- DTIC
DE- <MAJOR> *AH-64 HELICOPTER; *AIRCRAFT PILOTS; *CRITERIA; *PILOT SELECTION
DE- DECISION MAKING; NONPARAMETRIC STATISTICS; PILOT PERFORMANCE; REGRESSION ANALYSIS
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01439624
AN- <AEROSPACE> N83-20831
TI- Ames Research Center overview
AU- SNYDER, C. T.
CS- National Aeronautics and Space Administration. Ames Research Center,

Moffett Field, CA.
CS- <CODE> NC473657
PY- 1983
PD- 198302
NT- In American Planning Association Proc. of the Monterey Conf. on Planning for Rotorcraft and Commuter Air Transportation p 17-21 (SEE N83-20830 10-85)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A01
JA- STAR8310
AB- The aeronautical research programs of the Ames Research Center are reviewed with particular emphasis on V/STOL aircraft development. Test facilities and simulation capabilities are briefly described. The Tilt Rotor Research Aircraft, X-Wing vehicle, Rotor Systems Research Aircraft, and the Quiet Short Haul Aircraft are discussed. (M.G.)
SF- NASA CASI
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *NASA PROGRAMS; *RESEARCH FACILITIES ; *V/STOL AIRCRAFT
DE- COMPUTERIZED SIMULATION; FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING; POWERED LIFT AIRCRAFT; SHORT HAUL AIRCRAFT; TILTING ROTORS; WIND TUNNELS
SH- <COSATI> 5A Administration & Management
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01439494
AN- <AEROSPACE> N83-20699
TI- Issues in the evaluation of 3-D display applications
AU- MERRIT, J. O.
CS- Perceptronics, Inc., Woodland Hills, CA.
CS- <CODE> PK261304
PY- 1982
PD- 198200
NT- In NAS-NRC Three-Dimensional Displays p 145-149 (SEE N83-20692 10-70)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A02
JA- STAR8310
AB- The potential benefits of 3-D or stereoscopic visual displays have not been fully appreciated in a number of important application areas. This may be due to problems in the way stereo systems have been evaluated with respect to non-stereo displays. Only a few experimental evaluations have shown performance advantages for stereoscopic displays, whereas most comparisons have shown little or no stereo benefit. In some cases, performance with stereo was worse than with a non-stereo system. Proper experimental evaluation of 3-D visual display systems requires attention to the following factors: Equal display quality in the stereo and non-stereo systems; performance measurement with tasks that realistically represent the perceptual complexity of the operational environment, and the learning, time constraints, and error penalties present in the real world; appreciation of the several side benefits obtained with stereoscopic visual displays, such as improved image interpretability and wider field of view, as well as better system reliability; reconsidering the practicality of stereoscopic techniques in applications where stereo has previously been through to be of little value, as in flight simulator displays. (L.F.M.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *RESEARCH; *STEREOSCOPIC VISION; *VISUAL PERCEPTION
DE- FLIGHT SIMULATION; HELICOPTERS; SPACE PERCEPTION; STEREOSCOPY; VISUAL AIDS; VISUAL DISCRIMINATION
SH- <COSATI> 20F Optics
SH- 7574 Optics (1975-)

AN- <DIALOG> 01438274
AN- <AEROSPACE> N83-19444
TI- Evaluation of the efficiency of helicopter anticrash seats using a horizontal acceleration bench and a simulated crash
TI- <ORIGINAL> EVALUATION SUR BANC D'ACCELERATION HORIZONTAL ET LORS D'UN CRASH SIMULE DE L'EFFICACITE DE SIEGES ANTICRASH D'HELICOPTERES
AU- VETTES, B.; BEZAMAT, G.
CS- Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge (France).

CS- <CODE> LB799994
PY- 1982
PD- 198210
NT- In AGARD Impact Injury Caused by Linear Acceleration: 17 p (SEE N83-19421 09-51)
LA- French
GL- France
CP- International Organization
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A21/MF A03
JA- STAR8309
AB- A horizontal acceleration bench and a simulated crash of the PUMA SA 330 helicopter were used to qualify a pilot seat, a three-man seat for flying personnel, and a joined seat for passengers, all with disposible energy absorbers. An automatic method for analyzing and interpreting accelerations on the dummy and seat was used to evaluate the intensity, the duration of acceleration, the jolt, and the elastic response of the different corporal masses of the dummy (pelvis-thorax-head). Tests on the horizontal acceleration bench were conducted in the unitary vertical, unitary horizontal, and in combined directions. Despite their severity, the tests verified the good functioning of the energy absorber systems and the attenuation of accelerations transmitted to the dummies. The crash test confirmed that occupants of these such apparatus would be reasonably safe; however, there does exist risk of more or less serious injuries (shock, fracture, confusion) especially in the lower cervical region (C5 to C7). (Transl. by A.R.H.)
DE- <MAJOR> *ACCELERATION TOLERANCE; *CRASH INJURIES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *SEATS; *SHOCK ABSORBERS
DE- AEROSPACE MEDICINE; CRASHWORTHINESS; DUMMIES; SIMULATION; SPINE
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01437604
AN- <AEROSPACE> N83-18772
TI- Pursuit rotor tracking performance in conjunction with extended flight operations in a helicopter simulator
TI- <SUPPLEMENT> Final Report
AU- STONE, L. W.; KRUEGER, G. P.; HOLT, W. R.
CS- Army Aeromedical Research Unit, Fort Rucker, AL. Biomedical Applications Research Div.
CS- <CODE> AY832881
PY- 1982
PD- 198208
PG- 42P.
CN- DA PROJ. 3E1-62777-A-879; DA PROJ. 3E1-62773-A-819
RN- AD-A119237; USAARL-82-6
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8309
AB- Six US Army Initial Entry Rotary Wing School graduates participated as subjects in a week-long study to examine the effects of extended simulated helicopter operations on pursuit tracking skills. Using a photoelectric rotary pursuit device, three fixed patterns (a square, a circle, and a triangle) were presented to each subject three times daily for 5 days. An analysis of the results revealed a significant difference in subject performance between patterns. It also revealed a statistically significant difference in performance over days on one of the patterns--the triangle. The thread woven through these results seemed to be one of the relative complexity. It suggested that the effects of sustained operations interfered with the aviator's ability to fully integrate his mental and psychomotor skills in order to meet the requirements of a more complex task. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT SIMULATION; *HELICOPTERS; *PILOT PERFORMANCE; *TRACKING (POSITION)
DE- CIRCLES (GEOMETRY); FATIGUE (BIOLOGY); PSYCHOMOTOR PERFORMANCE; SQUARES (MATHEMATICS); STATISTICAL ANALYSIS; TRIANGLES
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01437123
AN- <AEROSPACE> N83-18274
TI- Communications management: A vital link
AU- BRIERLEY, W. E.
CS- Marconi Co. Ltd., Basildon (England). Airadio Products Div.
CS- <CODE> MF775622
PY- 1982
PD- 198207

NT- In AGARD Advan. Avionics and the Mil. Aircraft Man/Machine Interface
19 p (SEE N83-18257 08-54)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8308
AB- A method by which additional radio equipment can be fitted to light helicopters, preferably by reduction in the already allocated panel area, together with increased control facilities is investigated. A unit is being designed which will provide the required facilities within a panel area only 35% of that required for the controllers it replaces, whilst still providing all the functions required. The proposed Communications Management System control panel provides in one unit the facilities for two pilots to: select control, and display any one of six transmitter-receivers; monitor and/or independently change the frequency or pre-set channel of the selected radio; transmit/receive on the selected radio; select and adjust any or all in any combination eight radio receiver outputs and other audios; monitor and adjust pre-set channels on the left hand display whilst maintaining normal opertion on the right hand station; and direct emergency selection of guard channels for UHF, VHF, TAC VHF in the event of system failure. The system is organised to ensure that when a radio is selected, the only frequencies that can be selected are within the particular radio band, or if a pre-set channel is selected, only channels applicable to the selected radio are available. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *AVIONICS; *CONTROL BOARDS; *HELICOPTER CONTROL; *RADIO COMMUNICATION; *RADIO EQUIPMENT
DE- DISPLAY DEVICES; ENGINE NOISE; HELICOPTERS; HUMAN FACTORS ENGINEERING;
LIGHT HELICOPTERS; MAN MACHINE SYSTEMS; SPEECH RECOGNITION; SYSTEMS
ENGINEERING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01437120
AN- <AEROSPACE> N83-18271
TI- Voice Interactive Systems Technology Avionics (VISTA) program
AU- REED, L. W.
CS- Army Avionics Research and Development Activity, Fort Monmouth, NJ.
CS- <CODE> AZ170933
PY- 1982
PD- 198207
NT- In AGARD Advan. Avionics and the Mil. Aircraft Man/Machine Interface
14 p (SEE N83-18257 08-54)
NT- Presented at the Army Sci. Conf., 15-18 Jun. 1982
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR8308
AB- The Avionics Research and Development Activity's (AVRADA) program to introduce voice recognition and response into the Army aircraft environment is discussed. Program structure and preliminary testing results are discussed. Software development, computer installation, algorithm development, and voice recognizer testing techniques are discussed. The signal-to-noise ratio was found to be a key factor in recognition accuracy. Another problem arises because of the automatic gain controls (AGC) found in most aircraft intercom systems. When there is no voicing for a period of time, the AGC increases the intercom sensitivity. If the first utterance spoken is intended for the recognizer it will likely be rejected because of the distortion caused by the AGC adjusting the gain during the utterance. This is demonstrated in the test results of all test subjects. No attempt was made to set the AGC before beginning the test; as a result, 90% of the first utterances were rejected which resulted in the lowering of the accuracy score by approximately 4%. The AGC has a release time of 10 seconds and the prompts are issued every second; therefore, after the first utterance the AGC has little effect. Some side tests were performed by making an utterance before signaling the computer to begin the test, and in each case the accuracy of the first test word increased to a point comparable to the other vocabulary words. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *AVIONICS; *HELICOPTER CONTROL; *SPEECH RECOGNITION; *VOICE
COMMUNICATION; *VOICE DATA PROCESSING
DE- ALGORITHMS; AUTOMATIC GAIN CONTROL; COMPUTER PROGRAMS; ENGINE NOISE;
FLIGHT SIMULATION; HELICOPTERS; MAN MACHINE SYSTEMS; NOISE REDUCTION;
PILOT PERFORMANCE; SIGNAL TO NOISE RATIOS; WORDS (LANGUAGE)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01431976
AN- <AEROSPACE> N83-13059
TI- Aeronautics research and technology program and specific objectives
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1981
PD- 198100
PG- 189P.
RN- NASA-TM-85163; NAS 1.15:85163
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A01
JA- STAR8304
AB- Aeronautics research and technology program objectives in fluid and thermal physics, materials and structures, controls and guidance, human factors, multidisciplinary activities, computer science and applications, propulsion, rotorcraft, high speed aircraft, subsonic aircraft, and rotorcraft and high speed aircraft systems technology are addressed. (N.W.)
SF- NASA CASI
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *APPLICATIONS PROGRAMS (COMPUTERS); *CERAMICS; *COMPUTER SYSTEMS PROGRAMS; *FLIGHT CONTROL; *FLUID MECHANICS; *GUIDANCE (MOTION); *HUMAN FACTORS ENGINEERING; *POLYMER PHYSICS; *PROPULSION SYSTEM CONFIGURATIONS; *PROPULSION SYSTEM PERFORMANCE; *ROTARY WING AIRCRAFT; *STRUCTURAL ANALYSIS; *SUPERSONIC AIRCRAFT; *THERMODYNAMICS
SH- <COSATI> 1B Aeronautics
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01430685
AN- <AEROSPACE> N83-11739
TI- Human factors affecting pilot performance in vertical and transitional instrument flight
TI- <SUPPLEMENT> Interim Scientific Report, 15 Mar. - 31 Dec. 1981
AU- ROSCOE, S. N.; HULL, J. C.; SIMON, P. M.; CORL, L.
CS- New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
CS- <CODE> NX736581
PY- 1981
PD- 198112
PG- 66P.
CN- N00014-81-K-0439; NR PROJ. 196-170
RN- AD-A118345; BEL-81-1/ONR-81-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8302
AB- A conceptual analysis and review of human factors problems in piloting VTOL aircraft including helicopters is presented. VTOL mission and flight requirements are contrasted with those of CTOLs. Deficiencies in present VTOL flight instrumentation are detailed. The requirement that information regarding ground-referenced and airmass-referenced position in all six degrees of freedom be presented to the VTOL pilot and/or incorporated into positional control stabilization is stated. (Author (GRA))
SF- DTIC
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- COCKPITS; COMPUTER GRAPHICS; DISPLAY DEVICES; FLIGHT CONTROL; HELICOPTERS; INFORMATION SYSTEMS; STABILIZATION; VERTICAL ORIENTATION
SH- <COSATI> 5E Human Factors Engineering
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01429018
AN- <AEROSPACE> N83-10067
TI- Operational criteria for the handling qualities of combat helicopters
AU- STEWARD, W.
CS- Army Air Corps, Stockbridge (England).
CS- <CODE> AY878010
PY- 1982
PD- 198206
RF- 1
NT- In AGARD Criteria for Handling Qualities of Mil. Aircraft 5 p (SEE N83-10054 01-08)

LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A02
JA- STAR8301
AB- To minimize the threat from air and ground based weapon systems, combat helicopter operations require the use of concealed low level flight. The tasks facing the combat helicopter pilot during a typical antiarmor mission are discussed. Primary consideration is given to daylight operations in VMC, but the requirements for missions at night and in adverse weather, and for training are also addressed, together with the implications for handling qualities posed by the threat of armed helicopters in the air to air role. It is concluded that, by reducing the flying workload, assisting in the exploitation of maximum aircraft performance, and enhancing control accuracy, better handling qualities can contribute to improved operational effectiveness. (E.A.K.)
SF- NASA CASI
DE- <MAJOR> *CONTROLLABILITY; *HUMAN FACTORS ENGINEERING; *MANEUVERABILITY; *MILITARY HELICOPTERS; *TERRAIN FOLLOWING AIRCRAFT; *WEAPON SYSTEMS
DE- ANTIAIRCRAFT MISSILES; COMBAT; MILITARY OPERATIONS; NAP-OF-THE-EARTH NAVIGATION; PILOTS (PERSONNEL)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01428993
AN- <AEROSPACE> N83-10042
TI- Evaluation of new Iroquois torquemeter PN 73-30-1
AU- WARD, L. R.
CS- Royal Australian Air Force, Edinburgh. Aircraft Research and Development Unit.
CS- <CODE> R3714810
PY- 1982
PD- 198206
PG- 32P.
RN- AD-A117747; ARDU-TI-778; AR-002-491
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8301
AB- The purpose of this investigation was to supervise the installation of a prototype torquemeter in an Iroquois UH-1H and to evaluate the accuracy, damping, drift and ergonomic aspects of the new torquemeter. Tests showed that torquemeter accuracy was unacceptable and the indicating system was prone to significant drift. Tradesmen found adjustment of the "zero set' difficult to perform due to poor access to the adjustment screw. Instrument markings in the range greater than 30 psi were obscured when viewed from the co-pilot's seat. The night-lighting of the instrument and the reflection characteristics of the glass cover were also unsatisfactory. The procedure for torquemeter adjustment for installed engine Data Plate Torque was found to be in error and a revised procedure is proposed. Several modifications to the instrument are recommended to be made before fleet-wide installation. A limited number of flight tests should be made to check that the production torquemeter and the new performance calculator are compatible. If significant delays occur before introduction of a suitable production torquemeter, an interim method of displaying maximum permissible torque is proposed. (DTIC)
SF- DTIC
DE- <MAJOR> *DAMPING; *FLIGHT TESTS; *PROTOTYPES; *TORQUEMETERS; *UH-1 HELICOPTER
DE- DRIFT (INSTRUMENTATION); HELICOPTERS; HUMAN FACTORS ENGINEERING; PERFORMANCE TESTS; TORQUE; TORQUE CONVERTERS
SH- <COSATI> 1C Aircraft
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01426535
AN- <AEROSPACE> N82-31900
TI- Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift
AU- KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198208
NT- In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) p 42-45 (SEE N82-31892 22-51)
NT- Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 30-32

LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity
JA- STAR8222
AB- Before and after flights about 300 crewmembers of heavy transport helicopters were examined, using psychophysiological and integral methods. During a flight shift the health state of helicopter pilots varies via three stages: habituation, initial decline, and distinct lassitude, with the latter developing after a five hour flight load. In order to increase human reliability in the pilot-helicopter system, it is advisable to allow four hours flight time during a flight shift onboard helicopters of the above type. In this case the pilot exposure to vibration effects will also be limited. The paper describes a maximally permissible spectrum of vibration velocity for a four hour exposure. (Author)
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *FLIGHT TIME; *PILOT PERFORMANCE;
*VIBRATION EFFECTS
DE- HELICOPTERS; MAN MACHINE SYSTEMS; TRANSPORT AIRCRAFT; VIBRATIONAL
STRESS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01423678
AN- <AEROSPACE> N82-28976
TI- Vibration and assessment of this flight factor by pilots
AU- KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198207
NT- In its USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) p 147-151 (SEE N82-28949 19-51)
NT- Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 94-96
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08
JA- STAR8219
AB- Vibration on active factors in the pilot-helicoper environment system is discussed. The effect of this factor on pilot performance and its source of information on the status of the helicoper and its systems is emphasized. The role of noninstrument information (angular and longitudinal accelerations, vibration, noise) in piloting an aircraft (higher precision of control, recognition of emergency situations) is confirmed. Special purpose pilot training in the use of such negative flight factors as vibration, buffeting as information about the status of the vehicle to be controlled is recommended standardized and their practical use are considered. (E.A.K.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE;
*PILOT TRAINING; *SENSORY PERCEPTION; *VIBRATION EFFECTS
DE- AERODYNAMIC NOISE; AEROSPACE MEDICINE; MAN MACHINE SYSTEMS; NOISE
(SOUND); OPERATOR PERFORMANCE; PILOTS (PERSONNEL); VIBRATIONAL STRESS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01422529
AN- <AEROSPACE> N82-27810
TI- NURE aerial gamma-ray and magnetic reconnaissance survey of portions of New Mexico, Arizona and Texas. Volume 2: New Mexico-Carlsbad Quadrangle
TI- <SUPPLEMENT> Final Report
CS- Carson Helicopters, Inc., Perkasie, PA.
CS- <CODE> CH362277
PY- 1981
PD- 198109
PG- 184P.
NT- Prepared for Bendix Field Engineering Corp.
CN- DE-AC13-76GJ-01664
RN- DE82-005527; GJBX-412-81-VOL-2C
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> NTIS HC A09/MF A01
JA- STAR8218
AB- A rotary wing high sensitivity radiometric and magnetic survey was flown covering the Carlsbad Quadrangle of the State of New Mexico. The survey was flown with a Sikorsky SS8T helicopter equipped with a high sensitivity gamma ray spectrometer and the dynamic test range at Lake Mead, Arizona. Instrumentation and data reduction methods are presented in Volume I of this report. The reduced data is presented in the form of stacked profiles, standard deviation anomaly plots, histogram plots and microfiche listings. The results of the geologic interpretation of the radiometric data together with the profiles, anomaly maps and histograms are presented in this Volume II final report. (DOE)
SF- DOE
DE- <MAJOR> *ARIZONA; *GAMMA RAY SPECTROMETERS; *GEOPHYSICS; *MAGNETIC SURVEYS; *MINERAL DEPOSITS; *NEW MEXICO
DE- ALKALI METALS; EARTH RESOURCES; GEOLOGICAL SURVEYS; INFORMATION DISSEMINATION; NUMERICAL ANALYSIS; RADIOMETERS; THORIUM ISOTOPES
SH- 7543 Earth Resources (1975-)

AN- <DIALOG> 01421054
AN- <AEROSPACE> N82-26292
TI- Helicopter night vision system simulation evaluation
TI- <SUPPLEMENT> Final Report
CS- Martin Marietta Aerospace, Orlando, FL.
CS- <CODE> MI420175
PY- 1981
PD- 198112
PG- 138P.
CN- N6D2269-80-C-0346
RN- AD-A110505; OR-16551
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8217
AB- Simulation experiments demonstrated the ability of the pilot and copilot to fly a night mission at low altitudes, ranging from 50 to 150 feet AGL, in a CH-53D simulation with the night visionics equipment package described previously. Phases I and II HNVS simulation studies indicated that enroute flight profiles over the simulator's rolling terrain can be accomplished at airspeeds ranging from 60 to 80 knots with clearance altitudes averaging 100 feet. This study was conducted with a revised terrain model with improved altitude feedback cues that produced higher clearance altitudes and somewhat lower airspeeds than the prior simulations. The actual speeds and altitudes will be verified in the planned HNVS flight tests. The simulation confirmed the minimum system requirement of a gimballed FLIR with a navigation system and with ancillary hardware such as a symbol generator. Although this experiment required no data be generated on dead reckoning versus navigation system requirements, both pilot performance and opinion data reiterated the reduced crew station workload with Doppler command steering information. Incorporation of the navigation capability of the Control Display Unit also was instrumental in further reducing the navigation workload. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIR DETECTORS; *HELICOPTERS; *NIGHT VISION
DE- DISPLAY DEVICES; FLIGHT SIMULATORS; HELMET MOUNTED DISPLAYS
SH- <COSATI> 1C Aircraft
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01418992
AN- <AEROSPACE> N82-24197
TI- V/STOL tilt rotor research aircraft. Volume 4: CFE technical data
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> TV739419
PY- 1980
PD- 198010
PG- 319P.
NT- Sponsored by NASA
RN- NASA-CR-166350; NAS 1.26:166350
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A02
JA- STAR8215
AB- Manufacturer drawings and specifications for contractor furnished transducers and related equipment for the XV-15 aircraft research instrumentation and data acquisition system are given. (R.J.F.)
SF- NASA CASI

DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DATA ACQUISITION; *DRAWINGS; *EQUIPMENT
SPECIFICATIONS; *TILT ROTOR RESEARCH AIRCRAFT PROGRAM; *XV-15 AIRCRAFT
DE- BLOCK DIAGRAMS; CODERS; ELECTRIC CONNECTORS; ELECTRONIC TRANSDUCERS;
MAINTENANCE; MANUALS; VOLTAGE CONVERTERS (DC TO DC)
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01418991
AN- <AEROSPACE> N82-24196
TI- V/STOL tilt rotor research aircraft. Volume 3: Ship 2 instrumentation
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> TV739419
PY- 1978
PD- 197808
PG- 579P.
VO- 4
NT- Sponsored by NASA
RN- NASA-CR-166349; NAS 1.26:166349
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A25/MF A03
JA- STAR8215
AB- Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 2 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness, instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement data codes to J-box locations is given in a table. Cross references are given. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DATA ACQUISITION; *TILT ROTOR RESEARCH
AIRCRAFT PROGRAM; *XV-15 AIRCRAFT
DE- CALIBRATING; COMMUNICATION CABLES; ELECTRIC CONNECTORS; INSTALLING;
POWER LINES; TABLES (DATA); TEMPERATURE MEASURING INSTRUMENTS; WIRING
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01418990
AN- <AEROSPACE> N82-24195
TI- V/STOL tilt rotor research aircraft. Volume 2: Ship 1 instrumentation
CS- Textron Bell Helicopter, Fort Worth, TX.
CS- <CODE> TV739419
PY- 1978
PD- 197808
PG- 456P.
VO- 4
RN- NASA-CR-166348; NAS 1.26:166348
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A20/MF A03
JA- STAR8215
AB- Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 1 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement item codes to J-box locations is given in a table. Cross references are given. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DATA ACQUISITION; *TILT ROTOR RESEARCH
AIRCRAFT PROGRAM; *XV-15 AIRCRAFT
DE- CALIBRATING; COMMUNICATION CABLES; ELECTRIC CONNECTORS; INSTALLING;
MANUALS; POWER LINES; TABLES (DATA); WIRING
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01418028
AN- <AEROSPACE> N82-23229
TI- A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers
AU- HEFFLEY, R. K.

CS- Systems Technology, Inc., Mountain View, CA.
CS- <CODE> S9813870
PY- 1982
PD- 198204
NT- In NASA. Ames Research Center Helicopter Handling Qualities p 221-232 (SEE N82-23208 14-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR8214
AB- Helicopter flight acceleration/deceleration maneuvers are quantified and put to use in the fields of handling qualities, flight training and evaluation of simulator fidelity. The three specific cases include the normal speed change maneuver, the nap-of-the-Earth dash/quickstop, and the decelerating approach to hover. All of these maneuvers share common generic features in terms of pilot adaptation and mathematical description; yet each differs in terms of the essential feedback loop structure, implications for handling qualities requirements, and simulator fidelity criteria. (Author)
DE- <MAJOR> *ACCELERATION (PHYSICS); *FLIGHT SIMULATION; *FLIGHT TRAINING; *HELICOPTER PERFORMANCE
DE- AIRCRAFT MANEUVERS; HOVERING STABILITY; NAP-OF-THE-EARTH NAVIGATION; PILOT PERFORMANCE
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01418026
AN- <AEROSPACE> N82-23227
TI- Helicopter simulation technology: An Ames Research Center perspective
AU- BRAY, R. S.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1982
PD- 198204
NT- In its Helicopter Handling Qualities p 199-208 (SEE N82-23208 14-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR8214
AB- The total experience for evidence regarding the levels of motion and visual cueing fidelity required for handling-qualities research in ground-based simulators is reviewed. Positive contributions of cockpit motion were identified, but much remains to be learned regarding the sensitivities of individual control modes to cueing attenuation. A firmer understanding of the pilot's utilization of visual and motion cues is the key to more efficient use of simulation in helicopter control-systems research. (Author)
DE- <MAJOR> *COCKPITS; *CUES; *FLIGHT SIMULATION; *GROUND BASED CONTROL; *HELICOPTER CONTROL
DE- MOTION SIMULATORS; PILOT PERFORMANCE; SYSTEMS ENGINEERING; VISUAL CONTROL
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01418023
AN- <AEROSPACE> N82-23224
TI- Cockpit integration from a pilot's point of view
AU- GREEN, D. L.
CS- Pacer Systems, Inc., Arlington, VA.
CS- <CODE> PA235480
PY- 1982
PD- 198204
NT- In NASA. Ames Research Center Helicopter Handling Qualities p 171-181 (SEE N82-23208 14-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR8214
AB- Extensive experience in both operational and engineering test flight was used to suggest straightforward changes to helicopter cockpit and control system design that would improve pilot performance in marginal and instrument flight conditions. Needed control system improvements

considered include: (1) separation of yaw from cyclic force trim; (2) pedal force proportional to displacement rate; and (3) integration of engine controls in collective stick. Display improvements needed include: (1) natural cuing of yaw rate in attitude indicator; (2) collective position indication and radar altimeter placed within primary scan; and (3) omnidirectional display of full range airspeed data. (M.D.K.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT CONTROL; *COCKPITS; *DISPLAY DEVICES; *HELICOPTER
DESIGN; *MILITARY HELICOPTERS
DE- AIRCRAFT INSTRUMENTS; ALTIMETERS; CONTROL; DIRECTIONAL CONTROL; FLIGHT
CONTROL; HUMAN FACTORS ENGINEERING; YAW
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01418016
AN- <AEROSPACE> N82-23217
TI- Definition of display/control requirements for assault transport night/adverse weather capability
AU- MILELLI, R. J.; MOWERY, G. W.; PONTELANDOLFO, C. (Naval Air Development Center, Warminister, Pa.)
CS- Martin Marietta Corp., Orlando, FL.
CS- <CODE> MI460165
PY- 1982
PD- 198204
NT- In NASA. Ames Research Center Helicopter Handling Qualities p 97-107 (SEE N82-23208 14-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR8214
AB- A Helicopter Night Vision System was developed to improve low-altitude night and/or adverse weather assult transport capabilities. Man-in-the-loop simulation experiments were performed to define the minimum display and control requirements for the assult transport mission and investigate forward looking infrared sensor requirements, along with alternative displays such as panel mounted displays (PMD) helmet mounted displays (HMD), and integrated control display units. Also explored were navigation requirements, pilot/copilot interaction, and overall cockpit arrangement. Pilot use of an HMD and copilot use of a PMD appear as both the preferred and most effective night navigation combination. (M.D.K.)
SF- NASA CASI
DE- <MAJOR> *FLIR DETECTORS; *HEAD-UP DISPLAYS; *HELMET MOUNTED DISPLAYS;
*MILITARY HELICOPTERS; *NIGHT VISION; *TRANSPORT AIRCRAFT
DE- COCKPITS; CONTROL; DISPLAY DEVICES; FLIGHT SIMULATION; LOW ALTITUDE;
NAVIGATION AIDS; PILOT PERFORMANCE; TRADEOFFS
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01418015
AN- <AEROSPACE> N82-23216
TI- An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
AU- LANDIS, K. H.; AIKEN, E. W. (Army Research and Technology Labs., Moffett Field, Calif.)
CS- Boeing Vertol Co., Philadelphia, PA.
CS- <CODE> BR870123
PY- 1982
PD- 198204
NT- In NASA. Ames Research Center Helicopter Handling Qualities p 75-96 (SEE N82-23208 14-03)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR8214
AB- Several night nap-of-the-earth mission tasks were evaluated using a helmet-mounted display which provided a limited field-of-view image with superimposed flight control symbology. A wide range of stability and control augmentation designs was investigated. Variations in controller force-deflection characteristics and the number of axes controlled through an integrated side-stick controller were studied. In general, a small displacement controller is preferred over a stiffstick controller particularly for maneuvering flight. Higher levels of stability augmentation were required for IMC tasks to provide handling

qualities comparable to those achieved for the same tasks conducted under simulated visual flight conditions. (T.M.)
SF- NASA CASI
DE- <MAJOR> *CONTROLLABILITY; *CONTROLLERS; *FLIGHT CONTROL; *HELICOPTER CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *NIGHT FLIGHTS (AIRCRAFT); *STABILITY AUGMENTATION
DE- AIRCRAFT MANEUVERS; FLIGHT SIMULATION; HELMET MOUNTED DISPLAYS; MILITARY HELICOPTERS; NIGHT VISION; PILOT PERFORMANCE; VISUAL FLIGHT
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01416955
AN- <AEROSPACE> N82-22145
TI- La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981
TI- <EXTENSION> aerospace R and D methodology and instrumentation
AU- SEVESTRE, C., ed.
CS- Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
CS- <CODE> OF368396
PU- <PUBLISHER> ESA
PY- 1982
PD- 198202
PG- 63P.
NT- Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-5, Sep. - Oct. 1981
NT- Sponsored by ESA
RN- ESA-TT-725
LA- English
GL- France
CP- International Organization
DT- JOURNAL ISSUE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45
JA- STAR8213
AB- Advances in aerospace engineering are reviewed. Flow theory and computation are considered. Signal processing algorithms are presented. Structural analysis of composite materials is discussed. Two wind tunnel investigations, helicopter rotor performance measurement and testing a digital filtering system, are also described. For individual titles, see N82-22146 through N82-22152.
DE- <MAJOR> *COMPOSITE STRUCTURES; *DIGITAL FILTERS; *ROTARY WINGS; *SIGNAL PROCESSING; *TURBULENT BOUNDARY LAYER; *VORTEX BREAKDOWN
DE- BLADE TIPS; BUCKLING; COMPUTATIONAL FLUID DYNAMICS; FOURIER-BESSEL TRANSFORMATIONS; REAL TIME OPERATION; THREE DIMENSIONAL BOUNDARY LAYER
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01415665
AN- <AEROSPACE> N82-20848
TI- Physiological and hygienic rating of transport helicopter vibration damper
AU- MATVEYEV, Y. G.; KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198203
NT- In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) p 82-86 (SEE N82-20834 11-51)
NT- Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 59-61
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8211
AB- The vibration damper reduces vibrations in the helicopter cockpit two to three-fold during horizontal flight and four to five-fold at the braking stage. The use of the vibration damper improves reception of the panel information and helicopter control, improves the working conditions, and maintains the high performance of the crewmembers during the flying shift. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTERS; *PILOT PERFORMANCE; *VIBRATION; *VIBRATION DAMPING
DE- AIRCRAFT CONTROL; AIRCRAFT INSTRUMENTS; BRAKING; COCKPITS; HARMONICS;

HORIZONTAL FLIGHT; PHYSIOLOGICAL FACTORS; PSYCHOMOTOR PERFORMANCE;
PSYCHOPHYSIOLOGY; VIBRATION MEASUREMENT; VIBRATIONAL SPECTRA
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01415664
AN- <AEROSPACE> N82-20847
TI- Some features of evaluation of work capacity and fatigue in helicopter pilots
AU- KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198203
NT- In its USSR Rept: Space Biol. and Aerospace Med., Vol. 16, No. 1, Jan. - Feb. 1981 (JPRS-80323) p 77-81 (SEE N82-20834 11-51)
NT- Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 55-58
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8211
AB- In helicopter pilots the direct index of their work capacity increased while indirect indices decreased in the course of the flying shift. The peak of their professional performance occurred at the end of the flying shift coinciding with the expressed feeling of fatigue. Evaluation of professional work capacity using direct methods does not yield adequate information about the state of pilots, making them unsuitable to diagnose fatigue and to measure permissible work load. Proper diagnostics of fatigue does not necessarily require examinations of the pilot's state inflight. Adequate information can be obtained on the ground during the flying shift. (Author)
DE- <MAJOR> *FLIGHT FATIGUE; *HELICOPTERS; *PILOT PERFORMANCE; *WORK CAPACITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AEROSPACE MEDICINE; DIAGNOSIS; FLIGHT CHARACTERISTICS; PHYSIOLOGICAL
FACTORS; PSYCHOLOGICAL FACTORS; ROTOR SPEED
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01415651
AN- <AEROSPACE> N82-20834
TI- USSR Report: Space biology and aerospace medicine, volume 16, no. 1, January - February 1982
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198203
PG- 148P.
NT- Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982
RN- JPRS-80323
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ISSUE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8211
AB- Articles addressing various aspects of aerospace medicine and space biology are presented. Physiological responses to space flight are emphasized along with problems relating to aircraft pilot performance. &For individual titles, see N82-20835 through N82-20859.
DE- <MAJOR> *AEROSPACE MEDICINE; *BIOASTRONAUTICS; *PILOT PERFORMANCE;
*SPACE FLIGHT STRESS; *SPACEBORNE EXPERIMENTS
DE- ACCELERATION STRESSES (PHYSIOLOGY); ANTIRADIATION DRUGS; CEREBRAL
CORTEX; EJECTION INJURIES; EYE MOVEMENTS; HELICOPTERS; HEMODYNAMICS;
IMMUNITY; LONG DURATION SPACE FLIGHT; METABOLISM; MOTION SICKNESS; RENAL FUNCTION; SOLAR ACTIVITY EFFECTS; TOLERANCES (PHYSIOLOGY); VESTIBULAR TESTS; WEIGHTLESSNESS
SH- 7551 Life Sciences--General (1975-)

AN- <DIALOG> 01414008
AN- <AEROSPACE> N82-19173
TI- NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981

PY- 1980
PD- 198012
PG- 149P.
NT- Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
RN- NASA-TM-84146
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8210
AB- Helicopter user needs, technology requirements and status, and proposed research and development action are summarized. It is divided into three sections: flight dynamics and control; all weather operations; and human factors. (L.F.M.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTER DESIGN; *HELICOPTER ENGINES; *HELICOPTER PERFORMANCE; *HELICOPTERS; *SHORT TAKEOFF AIRCRAFT; *TECHNOLOGY ASSESSMENT; *USER REQUIREMENTS
DE- CONFERENCES; PAPERS; RESEARCH; ROTARY WING AIRCRAFT; TILTING ROTORS
SH- <COSATI> 1A Aerodynamics
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 01413009
AN- <AEROSPACE> N82-18168
TI- Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
AU- BEYER, R.; DANNEBERG, E.; KOHNEN, E.; STEIN, H.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugfuehrung.
CS- <CODE> DO696666
PY- 1981
PD- 198100
NT- In DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 15 p (SEE N82-18119 09-01)
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF E09
JA- STAR8209
AB- The potential and the limitations of advanced display systems for visual aids in helicopters were investigated. A combination of the sensor image and computer generated instrument displays in a head-down display, helmet mounted sight/display and night goggles, were evaluated. The layout of the instrument display is considered assuming transport mission and various display modes are implemented. The visual aids were flight tested in Bo 105 and Bell UH-1D helicopters with particular emphasis on the usefulness of the display modes on flight performance and low level flight performance. (T.M.)
SF- NASA CASI
DE- <MAJOR> *GOGGLES; *HELICOPTERS; *HELMET MOUNTED DISPLAYS; *NIGHT FLIGHTS (AIRCRAFT); *VISUAL AIDS
DE- AIRCRAFT INSTRUMENTS; AVIONICS; COMPUTER GRAPHICS; CONTROL BOARDS; HUMAN FACTORS ENGINEERING; IMAGE INTENSIFIERS; NIGHT VISION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01412981
AN- <AEROSPACE> N82-18140
TI- Design philosophy of the Hughes model 600 helicopter
AU- TAYLOR, R. S.
CS- Hughes Helicopters, Culver City, CA.
CS- <CODE> H5785201
PY- 1981
PD- 198100
NT- In DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 16 p (SEE N82-18119 09-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF E09
JA- STAR8209
AB- The design philosophy of a new model helicopter, the Hughes model 600X, which took into consideration a number of factors is discussed. The following subjects are discussed and a rationale for the selected approach is given: (1) whether to grow or develop a totally new configuration. To be cost effective, a growth helicopter would need to produce significant additional advantages which would be offset by the ever present compromises of the old design; (2) how to grow an 'egg', especially one with internal structure; (3) how to replace the old

model or is the new model to be produced in addition to the old one; and (4) how is the market potential to be assessed. Details of approaches are presented with reasons for accepting or rejecting each one. Results of market analysis and response of the helicopter public is presented to show the viability of the selected configuration. (M.D.K.)
SF- NASA CASI
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *DESIGN ANALYSIS; *HELICOPTER DESIGN; *STRUCTURAL DESIGN CRITERIA
DE- AIRCRAFT RELIABILITY; EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; MANUFACTURING; PAYLOADS; PRODUCTION COSTS; STRUCTURAL WEIGHT; SURVEYS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01412979
AN- <AEROSPACE> N82-18138
TI- Military requirements: Too little or too much
AU- VALENTE, E.
CS- Italian Army General Staff, Rome.
CS- <CODE> I7398633
PY- 1981
PD- 198100
NT- In DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 18 p (SEE N82-18119 09-01)
LA- English
GL- Italy
CP- Italy
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF E09
JA- STAR8209
AB- Concepts useful for a better understanding of the military requirements, operational requirements for helicopters are discussed. The need for an understanding between military operators of rotary-wing aircraft, helicopter designers, and manufacturers is considered. Two viewpoints are summarized: (1) The helicopter is a weapon system featuring the same indispensability level of all other systems required to integrate the battlefield. (2) The helicopter must be designed to reflect military requirements which cover all those elements likely to condition its operation, this is to say: operational environment, human factor, and economical aspects. The following considerations are recommended for further investigation: (1) whether commercial operators are really affected and (2) whether solutions can be found which in the end prove to be a saving rather than a deterioration in cost, weight and complexity. (M.D.K.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTER DESIGN; *MILITARY OPERATIONS; *MILITARY TECHNOLOGY; *USER REQUIREMENTS
DE- AIRCRAFT SPECIFICATIONS; DESIGN ANALYSIS; HUMAN FACTORS ENGINEERING; OPERATING COSTS; RELIABILITY
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01412978
AN- <AEROSPACE> N82-18137
TI- Point of view of a helicopter manufacturer on airworthiness regulations
AU- BOULET, J.
CS- Societe Nationale Industrielle Aerospatiale, Marignane (France). Helicopter Div.
CS- <CODE> SQ446513
PY- 1981
PD- 198100
NT- In DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 5 p (SEE N82-18119 09-01)
LA- English
GL- France
CP- France
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF E09
JA- STAR8209
AB- Helicopter airworthiness regulations are discussed. The need for airworthiness regulations to be drafted and modified through a process of constant consultation between Civil Aviation Authorities and manufacturers is discussed. The need to introduce the concept of probability to be able to come closer to the actual risks and to avoid penalizing aircraft with useless systems and demonstration requirements is also considered. It is suggested that these regulations tend toward one single international set of regulations and one single demonstration of compliance with the regulations. The possibility of reconciling a continuously improved safety level and a progressive reduction in helicopter costs is also considered. (M.D.K.)
SF- NASA CASI

DE- <MAJOR> *AIRCRAFT RELIABILITY; *AIRCRAFT SAFETY; *AIRCRAFT SPECIFICATIONS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *MANUFACTURING; *REGULATIONS
DE- AIRCRAFT ACCIDENTS; EQUIPMENT SPECIFICATIONS; FAILURE ANALYSIS; PRODUCT DEVELOPMENT; STANDARDS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01411552
AN- <AEROSPACE> N82-16708
TI- Causes of fatigue among crews of civil aviation helicopters
AU- KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1982
PD- 198201
NT- In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 6, Nov. - Dec. 1981 (JPRS-79849) p 24-27 (SEE N82-16704 07-51)
NT- Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 6, Nov. - Dec. 1981 p 19-22
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08/MF A01
JA- STAR8207
AB- The role of vibration and noise in the development of fatigue in helicopter crews was assessed. The exposure to these factors during the flying shift results in an early and marked fatigue of pilots the level of which depends on the vibration effects to a larger extent than on the noise effects. The fatigue is followed by a decline of the psychophysiological parameters characterizing the visual and motor functions as well as the ratio of the basic processes in the central nervous system. (M.G.)
SF- NASA CASI
DE- <MAJOR> *CIVIL AVIATION; *FLIGHT CREWS; *FLIGHT FATIGUE; *HELICOPTERS; *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE
DE- AIRCRAFT NOISE; FLIGHT STRESS (BIOLOGY); MUSCULAR TONUS; VIBRATION EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01407914
AN- <AEROSPACE> N82-13060
TI- Experimental investigation of a helmet mounted sight/display for helicopter
AU- BEYER, R.; DANNEBERG, E.; KOHNEN, E.; STEIN, H.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugfuehrung.
CS- <CODE> DO696666
PY- 1981
PD- 198108
NT- In AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design 11 p (SEE N82-13048 04-01)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8204
AB- A helmet mounted sight/display (HMS/D) combined with an infrared camera and electronic instrument displays was investigated as a guidance aid for the low level flight of helicopters at night. The static and dynamic accuracy of the tracking mechanism which aligns the lines of sight of both the pilot and the camera was determined by means of a target and motion simulator. System performance was checked with a Bo 105 helicopter in low level flight at night. From the results obtained the importance of the HMS/D as an guidance aid becomes evident relative to other night vision/display systems. (Author)
DE- <MAJOR> *HELICOPTERS; *HELMET MOUNTED DISPLAYS; *HUMAN FACTORS ENGINEERING; *LINE OF SIGHT; *NIGHT VISION; *OPTICAL TRACKING
DE- ALIGNMENT; FLIGHT SIMULATORS; ILLUMINATION; INFRARED PHOTOGRAPHY; MOTION SIMULATORS; NIGHT FLIGHTS (AIRCRAFT)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01407913
AN- <AEROSPACE> N82-13059
TI- Monocular vision and tactical flight on the helicopter
TI- <ORIGINAL> VISION MONOCULAIRE ET VOL TACTIQUE SUR HELICOPTERE
AU- PAPIN, J. P.; MENU, J. P.; SANTUCCI, G.

CS- Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).
CS- <CODE> CK538079
PY- 1981
PD- 198108
NT- In AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design 14 p (SEE N82-13048 04-01)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8204
AB- The direction of eye movement of 7 pilots and 3 navigators was recorded in 8 hour helicopter flight during flight with obstacle missions. Each subject performed the mission while having variable conditions of monocular or binocular vision, with normal visual field or with the field reduced from 60 deg to 40 deg. Analysis of visual behavior concentrated on localization of viewing in relation to the cockpit and the object looked at. The localizations were analyzed in terms of passage from one object to another or m one zone to another in terms of the number of stops in different localizations and in terms of the total duration or method of the stops. Results show that (1) for a given condition, the subjects reacted in a relatively similar manner; (2) behavior was modified according to condition of vision: the more the field was reduced, the more the pilot increased his field of exploration and looked closer to the apparatus and to the instruments; (3) during stationary flights the behavior modification became amplified; and (4) monocular vision is more degrading of behavior reduction of the visual field. (Transl. by A.R.H.)
DE- <MAJOR> *AEROSPACE MEDICINE; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MONOCULAR VISION; *PILOT PERFORMANCE; *VISUAL FIELDS
DE- AIR NAVIGATION; EYE MOVEMENTS; HELMET MOUNTED DISPLAYS; OCULOMETERS; VISUAL ACUITY
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01407903
AN- <AEROSPACE> N82-13049
TI- How the helicopter cockpit designer uses digital avionics
AU- EMERY, J. H.
CS- Textron Bell Helicopter, Fort Worth, TX. Human Factors and Cockpit Arrangement Group.
CS- <CODE> TV739419
PY- 1981
PD- 198108
RF- 1
NT- In AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design 13 p (SEE N82-13048 04-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8204
AB- An overview of the approaches to helicopter cockpit design made possilbe through the application of advanced multiplex technology to cockpit displays and controls is presented. This technology enables the pilot to have more information available while, at the same time, reducing his workload, and provides for substantially improved cockpit management. One of the major research programs through which this technology was tailored for military helicopters is ADAS (Army Digital Avionics System). This program is discussed, along with Bell helicopter cockpit designs. (T.M.)
SF- NASA CASI
DE- <MAJOR> *AVIONICS; *COCKPITS; *DIGITAL SYSTEMS; *HELICOPTER DESIGN
DE- AIRCRAFT PILOTS; CONTROL BOARDS; DISPLAY DEVICES; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01406933
AN- <AEROSPACE> N82-12067
TI- Electronic Master Monitor and Advisory Display System (EMMADS)
TI- <SUPPLEMENT> Final Report, Jun. 1977 - Jun. 1981
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.
CS- <CODE> GF677788
SP- AZ170933
PY- 1981
PD- 198106
PG- 38P.
CN- DAAK80-79-C-0270; DA PROJ. 1L2-62202-AH-85

RN- AD-A105082; ACS-12386; USAAVRADCOM-TR-79-F-270
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8203
AB- The design and fabrication of a programmable feasibility model of an electronic master monitor and advisory display system for helicopters is described. Functional requirements and system interfaces for signal analysis were determined for the helicopters studied. Human factors studies developed formats for reducing crew workloads and maximizing crew performance. Methods of data transfer from sensors to the monitor system were analyzed and appropriate interfaces and data transmission media were recommended. The programmable feasibility model is discussed. (R.J.F.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *HELICOPTERS; *IN-FLIGHT MONITORING; *MONITORS
DE- CREW PROCEDURES (INFLIGHT); DATA PROCESSING; DATA TRANSFER (COMPUTERS); DATA TRANSMISSION; HUMAN FACTORS ENGINEERING; MODELS; SIGNAL ANALYSIS; SYSTEMS ANALYSIS; SYSTEMS ENGINEERING
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01405942
AN- <AEROSPACE> N82-11065
TI- Electronic master monitor and advisory display system, human engineering summary report
TI- <SUPPLEMENT> Interim Report, Jun. 1979 - Jun. 1981
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.
CS- <CODE> GF677788
SP- AZ170933
PY- 1981
PD- 198106
PG- 227P.
CN- DAAK80-79-C-0270; DA PROJ. 1L2-62202-AH-85
RN- AD-A104244; ACS-12385; USAAVRADCOM-TR-79-0270-3; IR-3
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8202
AB- Information requirements, information handling formats, and the necessary display/control design criteria are discussed for a system being developed to integrate and display nonmission related information on the status of various subsystems on rotary wing aircraft. (DTIC)
SF- DTIC
DE- <MAJOR> *CONTROL BOARDS; *DISPLAY DEVICES; *FLIGHT CONTROL; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *IN-FLIGHT MONITORING
DE- BUS CONDUCTORS; ELECTRO-OPTICS; ELECTROLUMINESCENCE; WARNING SYSTEMS
SH- <COSATI> 17B Communications
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01405941
AN- <AEROSPACE> N82-11064
TI- Electronic master monitor and advisory display system, data transmission study
TI- <SUPPLEMENT> Interim Report, Jun. 1979 - Aug. 1980
CS- General Electric Co., Binghamton, NY. Aircraft Equipment Div.
CS- <CODE> GF677788
SP- AZ170933
PY- 1980
PD- 198008
PG- 57P.
CN- DAAK80-79-C-0270; DA PROJ. 1L2-62202-AH-85
RN- AD-A104243; ACS-12177; USAAVRADCOM-TR-79-0270-1; IR-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8202
AB- The development of nonmission related status information is one area of rotary wing instrumentation which has not kept pace with the state of art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. The objective of this report is to define an

efficient and cost effective data transmission method for an electronic master monitor and advisory display system (EMMADS). Several current standard and nonstandard data bus specifications which are applicable to the EMMADS system are introduced. Their tradeoff in terms of hardware, software and system considerations are compared. It should be noted that a typical standard bus specs addresses only the protocol and message formats, not the mechanization of the control algorithm. Hence there is a considerable variation in implementation and cost even for the same bus standard. The materials represent a snapshot of the current state of the art technology. The use of optical fiber instead of conventional electrical cable (such as coaxial) as the transmission medium is also investigated based on the current technical reports. The problems of electromagnetic interference (EMI), and rejection techniques are mentioned. (DTIC)
SF- DTIC
DE- <MAJOR> *AVIONICS; *DATA TRANSMISSION; *DISPLAY DEVICES; *FIBER OPTICS;
*HELICOPTER CONTROL; *IN-FLIGHT MONITORING
DE- BUS CONDUCTORS; COMMUNICATION NETWORKS; ELECTROMAGNETIC INTERFERENCE;
MULTIPLEXING; NONDESTRUCTIVE TESTS
SH- <COSATI> 17B Communications
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01405935
AN- <AEROSPACE> N82-11058
TI- Technology base for icing instrumentation and mathematical modelling
CS- Advisory Group for Aerospace Research and Development,
Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1981
PD- 198108
NT- In its Rotorcraft Icing p 14-33 (SEE N82-11056 02-05)
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR8202
AB- The fundamental mechanisms of ice accretion and shedding from rotor airfoils are considered. It is felt that an opportunity exists to exploit a combination of two-dimensional model and three-dimensional model scale testing, measurement of ice release mechanisms, inclusion of heat transfer models, and consideration of icing simulation. These efforts should be aimed at development of analytical models verified by both laboratory and full-scale data which then can be used to better predict performance of rotors in icing conditions. Only with the above analytical basis can ice accretion and shedding characteristics become sufficiently predictable to permit the determination of what type of ice protection is necessary or, conversely, what degree of flight envelope release might be permitted with a given level of ice protection. Further improvement in research and development of operational icing sensors is recommended. (J.D.H.)
SF- NASA CASI
DE- <MAJOR> *ICE FORMATION; *MATHEMATICAL MODELS; *MEASURING INSTRUMENTS;
*ROTARY WINGS
DE- FLIGHT ENVELOPES; HELICOPTER PERFORMANCE; METEOROLOGICAL PARAMETERS;
THREE DIMENSIONAL MODELS; TWO DIMENSIONAL MODELS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01399369
AN- <AEROSPACE> A83-44689
TI- Four-dimensional flight management using colour CRT displays
AU- LEFFLER, M. F.; HEIMBOLD, R. M. (Lockheed-California Co., Burbank, CA)
SO- Displays (ISSN 0141-9382), vol. 4, April 1983, p. 83-87.
PY- 1983
PD- 198304
SN- 0141-9382
LA- English
GL- United States
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8321
AB- The development considered in the present investigation represents an extension of the existing L-1011 Tristar flight management system (FMS). The historical background of the flight management system is briefly examined. In 1972, an American aircraft manufacturer achieved certification for a development, called area navigation (RNAV), which improved two-dimensional flight. In 1977, a three-dimensional system was developed. In addition to the two-dimensional features, the vertical flight profile was introduced to conduct a flight with a minimum expenditure of fuel. The next step was a four-dimensional FMS

to eliminate terminal area delays, the fourth dimension being time. Attention is given to details regarding the four-dimensional FMS, aspects of CRT instrumentation, alerting systems, and future flight stations. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AUTOMATIC FLIGHT CONTROL; *CATHODE RAY
TUBES; *DISPLAY DEVICES; *FLIGHT CONDITIONS; *L-1011 AIRCRAFT
DE- AIR TRAFFIC CONTROL; AREA NAVIGATION; COCKPITS; COLOR; FLIGHT SAFETY;
FUEL CONSUMPTION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01396612
AN- <AEROSPACE> A83-41932
TI- Status of the development of handling criteria for VSTOL transition
AU- HOH, R. H.; TISCHLER, M. B. (Systems Technology, Inc., Hawthorne, CA)
SO- American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, Gatlinburg, TN, Aug. 15-17, 1983. 8 p.
PY- 1983
PD- 198308
RF- 5
RN- AIAA PAPER 83-2103
LA- English
GL- United States
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8319
AB- A fixed base piloted simulation was performed to identify potential handling quality-related problems for VSTOL transition from wing-borne to thrust supported flight. Attention was given to control system blending, coupling between pitch attitude and the transition controller, the effect of pitch attitude bandwidth, and the effect of transient instabilities during transition. It was found that the pilot technique during transition to hover involved controlling the altitude with the throttle and the closure rate with the nozzle angle. The significance of the control of the closure rate increased toward the end of transition. The pitch atitude bandwidth and the coupling between the transition controller and the pitch attitude were the critical transition factors because of the high sensitivity of the vertical rate to attitude changes. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *CONTROLLABILITY; *FLIGHT SIMULATION; *HOVERING; *V/STOL AIRCRAFT
DE- AERODYNAMIC STABILITY; LONGITUDINAL CONTROL; PILOT PERFORMANCE; THRUST
VECTOR CONTROL
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01396211
AN- <AEROSPACE> A83-41531
TI- Advanced helicopter avionics
AU- LEWIS, R. B., II (U.S. Army, Aviation Research and Development Command, St. Louis, MO)
SO- Vertiflite (ISSN 0042-4455), vol. 29, July-Aug. 1983, p. 22-25.
PY- 1983
PD- 198308
SN- 0042-4455
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8319
AB- A discussion is presented of the programs undertaken by the U.S. military to develop integrated avionics systems for military helicopters. The current situation of avionics in military helicopters is discussed, focusing on the limitations imposed on the pilots by outdated and inefficient equipment. The development program conducted by the U.S. Army Aviation Research and Development Command for defining the aviation systems that will be needed in the future and what components and subsystems are necessary to make them affordable, efficient, and survivable is examined in relation to digital systems integration. Two key facilities designed to insure the U.S. Army's ability to demand and successfully integrate these planned modern avionics configurations (Tactical Avionics Systems Simulator and the Systems Test Bed for Avionics Research) are examined. Also discussed is the Army Helicopter Improvement Program to develop an integrated cockpit. In addition, the projected family of light helicopters is examined, focusing on the improvements in electronic circuitry which will reduce crew workload through higher levels of automation. (N.B.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *MILITARY HELICOPTERS; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DIGITAL SYSTEMS; ELECTRONIC EQUIPMENT; LIGHT AIRCRAFT; LIGHT

HELICOPTERS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01395722
AN- <AEROSPACE> A83-41042
TI- Helicopter IFR approaches into major terminals using RNAV, MLS, and CDTI
AU- TOBIAS, L.; LEE, H. Q.; PEACH, L. L. (NASA, Ames Research Center, Moffett Field, CA); WILLETT, F. M., JR.; OBRIEN, P. J. (FAA Technical Center, Atlantic City, NJ)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- (American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, AIAA Paper 82-0260) Journal of Aircraft (ISSN 0021-8669), vol. 20, Aug. 1983, p. 666-673.
PY- 1983
PD- 198308
RF- 11
SN- 0021-8669
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8319
AB- Previously cited in issue 06, p. 806, Accession no. A82-17868
SF- AIAA
DE- <MAJOR> *AIR TRAFFIC CONTROL; *CONTROL SIMULATION; *HELICOPTER CONTROL; *INSTRUMENT APPROACH; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- AIRPORT PLANNING; APPROACH CONTROL; AREA NAVIGATION; COCKPITS; DISPLAY DEVICES; FIXED WINGS; HUMAN FACTORS ENGINEERING; MICROWAVE LANDING SYSTEMS; POSITION ERRORS; TERMINAL FACILITIES
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01390884
AN- <AEROSPACE> A83-36203
TI- Flight Simulation Technologies Conference, Niagara Falls, NY, June 13-15, 1983, Collection of Technical Papers
SO- Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, 1983, 174 p.
PY- 1983
PD- 198300
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8316
AB- The present conference on flight simulation technologies considers the indoctrination of U.S. Navy test pilots in vectored thrust practices by means of the X-22A in-flight simulator, the improvement of flight performance simulator fidelity in the B-52H WST flight station simulator, advanced display techniques for the training of multimember tactical air crews, a visual cueing model for terrain following applications, and the spectral decontamination of real time helicopter simulations. Also discussed are benchmarks for a computer system for NASA's Space Shuttle Procedures Simulator, error sources in hybrid computer-based flight simulation, simulator performance definition by cue synchronization analysis, NASA's new Man-Vehicle Systems Research Facility, and the application of experimentally derived pilot perceptual angular response transfer functions. For individual items see A83-36204 to A83-36222 (O.C.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT SIMULATION; *TECHNOLOGY ASSESSMENT
DE- AVIONICS; COMPUTERIZED SIMULATION; DATA BASES; FLIGHT TRAINING; PILOT PERFORMANCE; REAL TIME OPERATION; RESEARCH FACILITIES; TERRAIN FOLLOWING AIRCRAFT; TEST PILOTS; THRUST VECTOR CONTROL; TRANSFER FUNCTIONS; WEAPON SYSTEMS
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01390271
AN- <AEROSPACE> A83-35586
TI- A description of an experimental protocol for the study of the seat comfort of an aircraft pilot
TI- <ORIGINAL> Description d'un protocole experimental pour l'etude du confort du siege du pilote d'aeronef
AU- POIRIER, J. L.; AUFFRET, R. (Centre d'Essais en Vol, Bretigny-sur-Orge, Essonne, France); DELAHAYE, R. P. (Service de Santedes Armees de l'Air, France); METGES, P. J. (Hopital d'Instruction des Armees Begin,

Saint-Mande, Val-de-Marne, France); GESNOT, B.; DELAVIS, C. (Establissement Central d'Electroradiologie des Armees, Orleans, France)
SO- Medecine Aeronautique et Spatiale, vol. 22, 2nd Quarter, 1983, p. 171-175. In French.
PY- 1983
PD- 198306
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8316
AB- A method is developed for determining the characteristics of the seat position in an aircraft which provides the maximum comfort for the pilot's spine during flight. The tests are conducted using mannequins and human subjects, and they are designed to consider the angular constraints during ejection in combat aircraft, the manipulation of different controls in helicopters, and the maintenance of a nonfatiguing position during the long hours of flight in transport aircraft. The cabin environments of the different types of aircraft are modelled using an adjustable framework and X-rays are taken of the seated figure to determine the position of the pilot's spine. The X-ray devices are placed in the same geometrical position for each experiment which provides for reproducibility and comparisons between the different values obtained in a series of tests. This method has been employed in tests of the seat position for combat aircraft (ejectable seat), helicopters, and transport aircraft. (N.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *COMFORT; *MAN MACHINE SYSTEMS; *RIDING QUALITY; *SEATS
DE- DUMMIES; EXPERIMENT DESIGN; HUMAN FACTORS ENGINEERING; RADIOLOGY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01390268
AN- <AEROSPACE> A83-35583
TI- The pilot seat and the vertebral column
TI- <ORIGINAL> Le siege du personnel navigant et la colonne vertebrale
AU- POIRIER, J. L.; METGES, P. J.; PLANTUREUX, G.; AUFFRET, R.; DELAHAYE, R. P.
SO- Medecine Aeronautique et Spatiale, vol. 22, 2nd Quarter, 1983, p. 153-157. In French.
PY- 1983
PD- 198306
RF- 6
LA- French
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8316
AB- The results of radiological examinations of pilots of various types of aircraft to improve the pilot seat design are discussed. Particular attention was given to the spinal column, its support in a seat, and potential injuries, as well as the causes of recurring aches reported after sustained flight duty, particularly in helicopters. Radiological surveys were performed of subjects seated in chairs which could be reconfigured to emulate the seats in commercial and military aircraft. The goal was to ensure equal distribution of the loads on the spine, permit equivalent functioning of the body parts, to maintain support levels evenly distributed with any seat inclination, and to employ an adjustable lumbar cushion in all seats. No seat configuration was found that was suitable for all aircraft. A minimum set of seat design requirements was defined, including the outfitting of all seats with the capability of adjustments in the three spatial planes, and that the seat back be adjustable independently from the seat itself. Finally, particular attention is recommended to lumbar and dorsal support. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *HUMAN FACTORS ENGINEERING; *SEATS; *SPINE
DE- DOSIMETERS; EJECTION SEATS; HELICOPTERS; LIGHT AIRCRAFT; RADIOGRAPHY; TRANSPORT AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <AEROSPACE> A83-35582
TI- The spine and the helicopter
TI- <ORIGINAL> Rachis et helicoptere
AU- METGES, P. J.; POIRIER, J. L.; VIEILLEFOND, H.; DELAHAYE, R. P. (Hopital d'Instruction des Armees Begin, Saint-Mande, Val-de-Marne; Centre d'Essais en Vol Bretigny-sur-Orge, Essonne, France)
SO- Medecine Aeronautique et Spatiale, vol. 22, 2nd Quarter, 1983, p. 148-152. In French.
PY- 1983
PD- 198306

RF- 44
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8316
AB- The causes and protective measures for chronic back pain incurred by helicopter pilots after prolonged flight duty are discussed. The pain is generally felt in the lumbar region. Acute onset can lead to detection of a herniated disk, or an origin in the ligaments, articulations, or muscles, while the problem can evolve over an extended period into a chronic ailment. Causative factors have been identified as an asymmetric position in the seat, an ill-fitting seat that is designed neither for the pilot nor the aircraft, and mechanical vibrations, which oscillate different parts of the pilot's body at different frequencies. It is recommended that the seat be designed to equalize weight distribution, to accommodate the various pilot functions, to fit the posture of a pilot, and to cushion the lumbar region. Pilot selection procedures should include a criterion of good perivertebral and abdominal muscle development. Finally, ergonomically designed controls are indicated. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *SPINE
DE- AIRCRAFT INSTRUMENTS; PATHOGENESIS; PILOT SELECTION; SEATS; VIBRATION ISOLATORS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01390261
AN- <AEROSPACE> A83-35576
TI- Relief vision and piloting
TI- <ORIGINAL> Vision du relief et pilotage
AU- MANENT, P. J. (Centre Principal d'Expertise Medicale du Personnel Navigant de l'Aeronautique, Paris, France)
SO- Medecine Aeronautique et Spatiale, vol. 22, 2nd Quarter, 1983, p. 124-127. In French.
PY- 1983
PD- 198306
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8316
AB- The factors involved in pilot depth perception, particularly over terrain featuring varying degrees of relief, are discussed. Depth perception during take-off is a significant factor only when towing an aircraft or during the take-offs of a large number of patrol aircraft. The faculty is critical in level flight when turbulence is present and the terrain is very uneven. Helicopter pilots in hover or flight at low altitudes depend on depth perception, to judge the distance to the ground when the downwash vortices cause clouds of obscuring debris. Continual shifting of vision from the cockpit displays to external points is required for safe aircraft landings. In-flight, the visual cues are clarity, brightness, and the color of the objects. Objects farther away are blurred, indistinct, and when nearer offer contrasting planes. The size of the image on the retina and parallax movements also provide depth information. Stereograms and stereometry have been used to study spatial perception, which is affected by the ground configuration, the airspeed (particularly at low altitude), and the ambient light, as well as organic dysfunctions and health. (M.S.K.)
SF- AIAA
DE- <MAJOR> *PILOT PERFORMANCE; *SPACE PERCEPTION; *STEREOSCOPIC VISION; *TOPOGRAPHY; *VISUAL ACUITY
DE- ATMOSPHERIC EFFECTS; BINOCULAR VISION; CIVIL AVIATION; EYE EXAMINATIONS ; MILITARY AVIATION; PARALLAX; PSYCHOPHYSIOLOGY; TERRAIN
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01389670
AN- <AEROSPACE> A83-34985
TI- Naval aviation mishaps and fatigue
AU- BOROWSKY, M. S.; WALL, R. (U.S. Navy, Naval Safety Center, Norfolk, VA)
SO- Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 535-538.
PY- 1983
PD- 198306
SN- 0095-0562
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8315
AB- Naval aircraft mishap data were analyzed to determine if statistical relationships among variables generally associated with fatigue and mishap liability exist. Pilots in mishaps were divided into two groups: those who were causally involved and those who were not. The results demonstrated that fighter and helicopter pilots who had worked at least 10 h in the previous 24 were significantly more likely to fall in the causally involved group. Variables related to sleep, continuous duty, missions performed, and hours flown in the immediate past, however, showed no significant relationships with mishap liability. Analysis of mishap rates as a function of time of departure, however, indicated that rates tended to be lowest for flights originating between 0900 and 1800, a result that possibly supports the hypothesis that 'circadian desynchronization' contributes to mishaps. (Author)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *ATTACK AIRCRAFT; *FLIGHT FATIGUE; *PILOT PERFORMANCE; *STATISTICAL CORRELATION
DE- AEROSPACE MEDICINE; ARMED FORCES (UNITED STATES); CIRCADIAN RHYTHMS; FLIGHT TIME; HELICOPTER CONTROL; SLEEP DEPRIVATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01388010
AN- <AEROSPACE> A83-33325
TI- A physiological and hygienic evaluation of vibration in the cabin of the Mi-4 helicopter
TI- <ORIGINAL> Fiziologo-gigienicheskaia otsenka vibratsii v kabine ekipazha vertoleta MI-4
AU- KAMENSKII, IU. N. (Institut Grazhdanskoi Aviatsii, Moscow, USSR)
SO- Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1982, p. 53-55. In Russian.
PY- 1982
PD- 198211
RF- 14
LA- Russian
GL- U.S.S.R.
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8314
AB- The vibration in the cabin of the Mi-4 helicopter is investigated and its effects on the functional condition of pilots during routine flight are examined. Results show that the vibration spectrum in the cabin of the helicopter covers a frequency range from 2-125 Hz with average values of vibration speed of 110 + or - 6 dB at a set frequency of 16 Hz. The effect of vibration on the pilots in flight is accompanied by changes in the psychophysiological indicators, and after 60-75 min of flight the pilots show signs of fatigue. During a flight shift, pilots developed pronounced fatigue after 6 hr of flight. The level of vibration speed for vibration in the cabin area of the Mi-4 helicopter is recommended to be 100 dB during flights of 5 hr. (N.B.)
SF- AIAA
DE- <MAJOR> *CABIN ATMOSPHERES; *FLIGHT FATIGUE; *HELICOPTERS; *PILOT PERFORMANCE; *VIBRATION EFFECTS; *VIBRATION PERCEPTION
DE- AEROSPACE MEDICINE; AIRCRAFT NOISE; FLIGHT STRESS (BIOLOGY); PSYCHOPHYSIOLOGY; SENSORIMOTOR PERFORMANCE; VIBRATION MODE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01381002
AN- <AEROSPACE> A83-26316
TI- How to get a grip on TADS/PNVS
TI- <EXTENSION> Target Acquisition Detection System/Pilot's Night Vision System
AU- TRABOLD, F. W., JR.; HOUSMAN, M. T. (Martin Marietta Aerospace, Orlando, FL)
SO- In: Human Factors Society, Annual Meeting, 25th, Rochester, NY, October 12-16, 1981, Proceedings. (A83-26301 10-53) Santa Monica, CA, Human Factors Society, 1981, p. 250-253.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8310
AB- Human factors trade-off studies in the design of multifunction handgrips for modern military helicopters are described and discussed. The design criteria were defined as maximum comfort and minimum fatigue, no sharp edges, accommodation of the 5th-95th percentile sized hand and arm reach, critical controls assigned to thumb and forefinger, and no use of the little finger. Noncritical pushbuttons were assigned to the middle and ring finger, simultaneously operated controls were placed on opposite handgrips, and loads were balanced between handgrips. Pistol grips were required, as well as minimized obscuration

of instrumentation, palm rests were provided, and the handgrips were fixed. The actual angular positioning of the handgrips are discussed, together with the results of a handgrip rotation experiment. The controls which needed the highest dexterity to manipulate were assigned to the right thumb. (M.S.K.)
SF- AIAA
DE- <MAJOR> *HANDLES; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *NIGHT VISION; *TARGET ACQUISITION; *TARGET RECOGNITION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DESIGN ANALYSIS; MAN MACHINE SYSTEMS; MILITARY AIRCRAFT; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01379018
AN- <AEROSPACE> A83-24332
TI- ONERA test facilities for propellers and rotors
TI- <ORIGINAL> Moyens d'essais d'helices et de rotors de l'ONERA
AU- LECLERE, G.; RAMANDET, J. N. (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France)
SO- (Association Aeronautique et Astronautique de France, Colloque d'Aerodynamique Appliquee, 19th, Marseille, France, Nov. 8-10, 1982.) ONERA, TP no. 1982-121, 1982. 50 p. In French.
PY- 1982
PD- 198200
RN- ONERA, TP NO. 1982-121
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8309
AB- Test equipment at ONERA installations for verifying analytical models for the performance of helicopter rotors and propeller designs is described. The Modane S1 wind tunnel is the only facility available for trials involving large models, transonic Mach numbers, and high Re flows. The S1 dimensions, model mounts, power systems, and operational envelopes are outlined. Attention is given to the dynamometry capability and instrumentation for measuring drag, axial speed, vibrations, and deformations. Helicopter rotors are also tested at the Chalais-Meudon Center, where data on drag, lift, pitch, roll, and yaw performance are run. Safety measures are described, together with several blade and rotor tests completed and the features of planned installations. (M.S.K.)
SF- AIAA
DE- <MAJOR> *PROPELLER EFFICIENCY; *PROPELLERS; *ROTARY WINGS; *ROTOR AERODYNAMICS; *WIND TUNNEL TESTS
DE- COST REDUCTION; ELECTRIC MOTORS; NOISE MEASUREMENT; SAFETY FACTORS; STIFFNESS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01378844
AN- <AEROSPACE> A83-24158
TI- Noise-reducing takeoff and landing procedures and the potential for their operational use in the Airbus A300
TI- <ORIGINAL> Laermmindernde Start- und Landeverfahren und ihre operationellen Einsatzmoeglichkeiten am Beispiel des Airbus A300
AU- FRIEDEL, R.; HEEGE, K. (Darmstadt, Technische Hochschule, Darmstadt, West Germany)
SO- Deutsche Gesellschaft fuer Luft- und Raumfahrt, Jahrestagung, Stuttgart, West Germany, Oct. 5-7, 1982, 32 p. In German. Research supported by the Deutsche Forschungsgemeinschaft.
PY- 1982
PD- 198210
RF- 6
RN- DGLR PAPER 82-032
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8309
AB- Research on developing noise-reducing takeoff and landing procedures, taking into account pilot load and flight safety are reported using the Airbus A300 as an example. Aircraft guidance for the vertical flight path only is considered. Results of noise calculations based on flight data obtained in a simulator show that considerable improvements in noise load in the near-airport areas are possible when compared with the takeoff and landing procedures preferred today. At takeoff the improvement is accomplished by reducing thrust, while on landing it is done by increasing the glide path angle. (C.D.)
SF- AIAA
DE- <MAJOR> *A-300 AIRCRAFT; *AIRCRAFT LANDING; *AIRCRAFT NOISE; *FLIGHT OPERATIONS; *NOISE REDUCTION; *TAKEOFF

DE- AIRCRAFT GUIDANCE; FLIGHT PATHS; FLIGHT SAFETY; FLIGHT SIMULATORS; PILOT PERFORMANCE; RESEARCH AND DEVELOPMENT; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01374463
AN- <AEROSPACE> A83-19777
TI- Fixed wing and rotary wing flight testing of Navstar GPS as a civilian navigation system
AU- CONNOR, J. T.; SAWTELLE, E. M.; TILL, R. D. (FAA, Technical Center, Atlantic City, NJ)
SO- In: NTC '81; National Telecommunications Conference, New Orleans, LA, November 29-December 3, 1981, Record. Volume 3. (A83-19676 07-32) New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. F9.1.1-F9.1.8.
PY- 1981
PD- 198100
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8307
AB- Initial test results from FAA trials to determine the suitability of low cost Navstar receivers on board civilian rotary and fixed wing aircraft are reported. Using a Magnavox Z set furnished by the Navstar Program office, interfaces between the set and an airborne data collection computer, between the computer and a course deviation detector, between the set and a tape recorder, and data software were investigated on a CH-53 helicopter. A ground base data collection and an airborne instrumentation system were assembled for a fixed-wing aircraft, a G-159 Gulfstream. Details of the test paths to be followed in both aircraft are outlined. Tests were performed to verify the ground-based software and data analysis routines. Readings within an earth-centered, earth-fixed coordinate system showed errors of less than 15 m in static readings, with some increase while in the navigational mode. (M.S.K.)
SF- AIAA
DE- <MAJOR> *CIVIL AVIATION; *FIXED WINGS; *FLIGHT TESTS; *GLOBAL POSITIONING SYSTEM; *NAVSTAR SATELLITES; *ROTARY WING AIRCRAFT
DE- AIRBORNE/SPACEBORNE COMPUTERS; CALIBRATING; DATA ACQUISITION; GROUND
TESTS; SATELLITE CONFIGURATIONS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01373067
AN- <AEROSPACE> A83-18381
TI- Helicopter icing - Testing and certification
AU- WILSON, G. W. (U.S. Army, Aviation Engineering Flight Activity, Edwards AFB, CA)
SO- American Helicopter Society, Journal, vol. 27, Apr. 1982, p. 66-72.
PY- 1982
PD- 198204
RF- 18
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8306
AB- Some pertinent points gathered from the Army's eight years of icing tests are presented. The theory of ice formation is briefly discussed along with a summary of some of the more successful attempts at solving the helicopter icing problem. Basic design philosophy for electrothermal deicing systems is covered. Advantages and shortcomings of both natural and artificial testing are discussed as are the procedures for use of the Army's Helicopter Icing Spray System. A sample list of instrumentation requirements is presented along with some suggested special equipment required for icing tests. Finally, the FAA's current icing certification requirements are discussed as they apply to the rotary wing community. ((Author))
DE- <MAJOR> *CERTIFICATION; *DEICERS; *HELICOPTERS; *ICE FORMATION; *PERFORMANCE TESTS
DE- FLIGHT CONDITIONS; MILITARY AIRCRAFT; SYSTEMS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01372384
AN- <AEROSPACE> A83-17698
TI- The peculiarities of medical support for helicopter flights
TI- <ORIGINAL> Osobennosti meditsinskogo obespecheniia poletov na vertoletakh
AU- KOPANEV, V. I.; EGOROV, V. A.
SO- Voenno-Meditsinskii Zhurnal, Nov. 1982, p. 42, 43. In Russian.
PY- 1982
PD- 198211

LA- Russian
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8305
AB- Medical aspects of the effects on humans of helicopter flights are examined, and several recommendations concerning the medical support and the preparation of helicopter flight crews are presented. Topics discussed include the physiological and hygienic characteristics of the habitability conditions during helicopter flights, and the psychological and physiological peculiarities of the activities of the helicopter flight crews. Among the recommendations proposed for improving the health of helicopter flight crews are a specific series of exercises designed to lessen the effects of helicopter flights, physiotherapy to prevent the harmful effects of dynamic factors, and preliminary training on helicopter models to acquaint the flight crews with the correct procedures to be followed during the flights. (N.B.)
SF- AIAA
DE- <MAJOR> *FLIGHT SAFETY; *HELICOPTERS; *PHYSIOLOGICAL EFFECTS; *PILOT PERFORMANCE; *PSYCHOLOGICAL EFFECTS
DE- AEROSPACE MEDICINE; PSYCHOPHYSIOLOGY
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01371483
AN- <AEROSPACE> A83-16797
TI- On-board instrumentation for test vehicles with varying roll rates
AU- OSKAY, V.; MERMAGEN, W. H. (U.S. Army, Ballistics Research Laboratories, Aberdeen Proving Ground, MD); DAHLKE, C. W. (U.S. Army, Missile Command, Huntsville, AL)
SO- American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 10 p.
PY- 1983
PD- 198301
RF- 8
RN- AIAA PAPER 83-0570
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8305
AB- Although the highly nonlinear roll moments of Wrap-Around Fins (WAFs) have in the past prevented their more extensive use in compact helicopter- and aircraft-launcher rocket systems, increasing understanding of WAF aerodynamics has made possible the design of missiles with specific roll histories. A multisensor yawsonde was designed and used during the testing of the WAF-employing MK 66 MOD 1 2.75-in. and Zuni 5-in. rockets, in the former case to determine the missile's roll history and in the latter to verify theoretical predictions for several alternative WAF designs. Attention is given to yawsonde design characteristics. (O.C.)
SF- AIAA
DE- <MAJOR> *FINS; *FLIGHT TESTS; *ONBOARD EQUIPMENT; *ROCKET TEST FACILITIES; *ROLL
DE- CALIBRATING; SOLAR SENSORS; TIME RESPONSE; ZUNI ROCKET VEHICLE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01370812
AN- <AEROSPACE> A83-16126
TI- Advanced Aircrew Display Symposium, 5th, Patuxent River, MD, September 15, 16, 1981, Proceedings
SO- Patuxent River, MD, U.S. Naval Air Test Center, 1982. 280 p. (For individual items see A83-16127 to A83-16136)
PY- 1982
PD- 198200
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8304
AB- Various topics in aircrew display are discussed. Among the subjects addressed are: human engineering in aircraft and system design; color selection and verification testing for airborne color CRT displays; flight information requirements for monitoring an automatic landing; maneuvering flight path display; application of diffraction optics LANTIRN head-up display. Also considered are: Advanced Fighter Technology Integrator; multicolor CRT displays for military aircraft; helmet mounted display for helicopter landing on small ships; head-up display operational problems; 'light bar' attitude indicator. (C.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *CONFERENCES; *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING; *MILITARY TECHNOLOGY
DE- AUTOMATIC LANDING CONTROL; CATHODE RAY TUBES; FIGHTER AIRCRAFT; FLIGHT

PATHS; HEAD-UP DISPLAYS; HELICOPTERS; MAN MACHINE SYSTEMS; OPERATIONAL
PROBLEMS; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01370112
AN- <AEROSPACE> A83-15426
TI- Mission specific survival equipment for helicopter aircrew
AU- GILLESPIE, G. P. (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA)
SO- In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. (A83-15401 04-54) Van Nuys, CA, SAFE Association, 1982, p. 154-157.
PY- 1982
PD- 198200
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8304
AB- Three mission specific survival ensembles for Naval helicopter aircrewmen, developed by the Naval Air Development Center, are examined. The systems, intended for use by stationary aircrewmen, mobile aircrewmen, and passengers, are designed to meet the diverse requirements of the aircrew, be fully compatible with in-flight duties, and provide the equipment necessary to aid in survival and detection. The specific features of each ensemble and its duties are detailed, and a diagram of each ensemble is presented. (N.B.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT SAFETY; *HELICOPTER PERFORMANCE; *MISSION PLANNING; *SURVIVAL EQUIPMENT
DE- HUMAN FACTORS ENGINEERING; NAVY; PASSENGERS; PILOTS (PERSONNEL);
RESEARCH AND DEVELOPMENT; SYSTEMS ENGINEERING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01367341
AN- <AEROSPACE> A83-12654
TI- Reliability and maintainability aspects of a 'fleet' of prototype helicopters
AU- KIRAN, N. S. (Hindustan Aeronautics, Ltd., Bangalore, India)
SO- Aeronautical Society of India, Journal, vol. 33, Feb.-May 1981, p. 5-9.
PY- 1981
PD- 198105
LA- English
GL- India
CP- India
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8302
AB- Reliability, availability, and maintainability (RAM) studies are undertaken on a prototype fleet of helicopters to investigate whether it is possible to complete the certification program of 1000 hours of flying in two and one-half years. It is found that this can be accomplished and that the reliability of the test vehicle, the airborne data acquisition unit, and the tele-surveillance unit are involved. These units constitute a repairable series system with an overall reliability of 85.99%. It is also found that backup systems in all phases of the activity are necessary. The vehicle and the instrumentation make up one unit, and the telemetry reception forms another. The availability of the test vehicle, data acquisition system, and tele-surveillance system is indispensible for the conduct of the test program. If the computer is not available during on-line work, however, this will not seriously affect the flight/tele-surveillance activity. (C.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *AIRCRAFT RELIABILITY; *FLIGHT TESTS;
*HELICOPTER PERFORMANCE; *PROTOTYPES
DE- CERTIFICATION; DATA ACQUISITION; QUALITY CONTROL; TELEMETRY
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01366262
AN- <AEROSPACE> A83-11575
TI- The complete book of cockpits
AU- DWIGGINS, D.
SO- Blue Ridge Summit, PA, TAB Books, Inc., 1982. 233 p
PY- 1982
PD- 198200
LA- English
CP- United States
DT- BOOK
JA- IAA8302
AB- A photographic account is given of the development and variety of aircraft cockpit instrumentation and control systems, ranging over

commercial and military aircraft from the First World War to the present, with attention also given to home-built experimental and general aviation aircraft. Color plates are included for the cockpits of such historically and technologically noteworthy aircraft as the Messerschmitt Bf. 109G and Me 262, the U.S. Air Force's B-52H, F-15 and F-16, the Space Shuttle Columbia, and a next-generation L-1011 airliner cockpit mockup incorporating multicolor CRT avionics displays. The photographic sections of the book are preceded by an historical account of the development of avionics and instrument flying rules, with attention to the operating principles of such basic cockpit instrumentation as magnetic compasses, attitude and airspeed indicators, altimeters and tachometers. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPITS; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS
DE- ATTITUDE INDICATORS; COLOR PHOTOGRAPHY; COLUMBIA (ORBITER); COMMERCIAL AIRCRAFT; HELICOPTERS; HISTORIES; LIGHT AIRCRAFT; MILITARY AIRCRAFT; NAVIGATION INSTRUMENTS; PRESSURIZED CABINS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01362733
AN- <AEROSPACE> A82-46313
TI- Performance degradation during 18 Hz vertical sinusoidal vibrations
TI- <ORIGINAL> Degradation de performance sous vibrations sinusoidales verticales de 18 Hz
AU- POIRIER, J.-L.; BOUTELIER, C. (Centre d'Essais en Vol, Bretigny-sur-Orge, Essonne, France)
SO- Medecine Aeronautique et Spatiale, vol. 21, 2nd Quarter, 1982, p. 101-104. In French.
PY- 1982
PD- 198206
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8223
AB- The results of trials assessing the psychomotor performance of seated subjects experiencing 18 Hz sinusoidal vertical vibrations for 90 min at 0.1, 0.2 and 0.3 g are reported. The subjects were required to perform visual tracking tasks consisting of crossing two needles mounted on a gage one meter away and free from vibrations. The tests simulated conditions experienced with an ILS in a helicopter. A secondary task comprised pressing a button to extinguish red and green lights which would appear for 3 sec on either side of the ILS mock-up. Control tests were also run for 90 min without the vibrations. The performancyof the principal task degraded to a constant level, while an accelerated fatigue in terms of lengthening reaction times was seen for the secondary task during the 0.3 g trials. (M.S.K.)
SF- AIAA
DE- <MAJOR> *PHYSIOLOGICAL TESTS; *PSYCHOMOTOR PERFORMANCE; *TRACKING (POSITION); *VERTICAL MOTION SIMULATORS
DE- AEROSPACE MEDICINE; FATIGUE (BIOLOGY); HELICOPTERS; HUMAN FACTORS ENGINEERING; PHYSIOLOGICAL EFFECTS; PILOT PERFORMANCE; SINE WAVES; STRESS (PHYSIOLOGY); VIBRATION EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01362694
AN- <AEROSPACE> A82-46274
TI- Simulation technology and the fixation phase
TI- <EXTENSION> skill acquisition during pilot training
AU- STARK, E. A. (Singer Co., Link Flight Simulation Div., Binghamton, NY)
SO- In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. (A82-46251 23-53) Columbus, OH, Ohio State University, 1981, p. 289-305.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8223
AB- Prospects and techniques for using the fixation phase of human learning to teach specific flying skills without total fidelity, high cost simulators are explored. The fixation phase is defined as a period of simple skill acquisition, where a single pilot skill can be learned, in response to very specific stimuli, and later transferred to the real flying situations during the automation phase of learning, when skills become integrated as part of general knowledge and behavior. Examples of isolation of individual situations requiring very specific responses are provided, including flying a loop, rapid deceleration of a

helicopter, and a high speed yo-yo. All are discussed in terms of procedural, perceptual, and perceptual motor functions, anticipation, and judgment components. Continued analyses of complex flight tasks to define important subtasks are indicated. (M.S.K.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *PILOT TRAINING
; *TECHNOLOGY UTILIZATION; *TRANSFER OF TRAINING
DE- AIRCRAFT MANEUVERS; COMPUTERIZED SIMULATION; DECISION MAKING; PILOT
PERFORMANCE; SENSORIMOTOR PERFORMANCE; SENSORY PERCEPTION; TASK
COMPLEXITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01362692
AN- <AEROSPACE> A82-46272
TI- Changes in the US Army aviator selection and training program
AU- BROWN, W. R.; DOHME, J. A.; SANDERS, M. G. (U.S. Army, Research Institute, Fort Rucker, AL)
SO- In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. (A82-46251 23-53) Columbus, OH, Ohio State University, 1981, p. 267-278.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8223
AB- Features of the U.S. Army screening programs for predicting the performance of commissioned officers (CO) and warrant officers (WO) in rotary wing flight school are discussed. A Flight Aptitude Selection Test for both CO and WO candidates tests biographical data and interest information, spatial ability, mechanical ability, and aviation information levels. Revisions were added to the test to account for nap-of-the-earth flying techniques and the presence of female pilot candidates. Additionally, a retest form has been implemented, and it is noted that 25% of aviator candidates earn Aeroscout wings, while a majority of the candidates qualify for utility aviator status in the UH-1 helicopter. (M.S.K.)
SF- AIAA
DE- <MAJOR> *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *PILOT SELECTION;
*PILOT TRAINING; *TRAINING EVALUATION
DE- APTITUDE; ARMED FORCES (UNITED STATES); FEMALES; HELICOPTER CONTROL;
HUMAN FACTORS ENGINEERING; UH-1 HELICOPTER
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01362681
AN- <AEROSPACE> A82-46261
TI- PAVE LOW III - Interior lighting reconfiguration for night lighting and night vision goggle compatibility
AU- TASK, H. L.; GRIFFIN, L. L. (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, OH)
SO- In: Symposium of Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. (A82-46251 23-53) Columbus, OH, Ohio State University, 1981, p. 106-116.
PY- 1981
PD- 198100
RN- AD-A123531; AFAMRL-TR-82-3
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8223
AB- The PAVE LOW III aircraft is a modified HH 53-H helicopter that has a low altitude (below 100 feet), night/day rescue mission. The desired night flying configuration is for the pilot to wear night vision goggles (NVGs) to fly the aircraft while the copilot, without NVGs, observes displays and monitors the aircraft instruments. The problems of NVG incompatibility in the cockpit were successfully countered using several light control techniques. The light control modifications were evaluated on the ground in the PAVE LOW III helicopter at Kirtland AFB in April 1980 by PAVE LOW instructor pilots. The evaluation results were extremely positive. ((Author))
DE- <MAJOR> *AIRCRAFT LIGHTS; *GOGGLES; *H-53 HELICOPTER; *HUMAN FACTORS
ENGINEERING; *NIGHT VISION
DE- BAFFLES; COCKPITS; RESCUE OPERATIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01360175

AN- <AEROSPACE> A82-43755
TI- Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
AU- SELLIER, B.; PIGERE, J. (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France)
SO- (International Symposium on Applications of Laser-Doppler Anemometry to Fluid Mechanics, Lisbon, Portugal, July 5-7, 1982.) ONERA, TP no. 1982-61, 1982. 12 p.
PY- 1982
PD- 198200
RF- 6
RN- ONERA, TP NO. 1982-61
LA- English
GL- France
CP- France
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8222
AB- The equipment, instrumentation and results of a laser Doppler anemometry study of helicopter rotor wake airflow are described. Azimuthal and radial distributions of vertical induced velocities and tip vortex paths are determined for the cases of hovering and forward flight. Attention is given to the arrangement of the laser velocimeter system and the data acquisition system, which can operate in both a 'wake' and a 'histogram' mode. The former simultaneously obtains the two induced velocities and the angular position of the blade, while in the latter, velocities are measured for one given azimuthal blade location. (O.C.)
SF- AIAA
DE- <MAJOR> *AIR FLOW; *FLOW MEASUREMENT; *HELICOPTER WAKES; *LASER DOPPLER VELOCIMETERS; *ROTARY WINGS
DE- ANEMOMETERS; DATA ACQUISITION; FLOW DISTRIBUTION; FLOW VELOCITY; HOVERING; RADIAL DISTRIBUTION; THREE DIMENSIONAL FLOW; VELOCITY DISTRIBUTION; VORTICES
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 01358107
AN- <AEROSPACE> A82-41687
TI- A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior
TI- <ORIGINAL> Ein flugfaehig eingespannter Modellhubschrauber fuer Untersuchungen zum menschlichen Mehrgroessenreglerverhalten
TI- <EXTENSION> German thesis
AU- OESTERLIN, W. H.
SO- Darmstadt, Technische Hochschule, Fachbereich Regelungs- und Datentechnik, Dr.-Ing. Dissertation, 1980. 259 p. In German. Research supported by the Deutsche Forschungsgemeinschaften.
PY- 1980
PD- 198000
RF- 77
LA- German
CP- Germany
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8221
AB- The control of a Remotely Piloted Vehicle (RPV) with six degrees of freedom of motion represents for the human operator a very difficult problem. The present investigation is concerned with this problem. The conducted studies involve the control of the hovering flight of a remotely piloted model helicopter. A 'model helicopter trainer' was employed in place of a model engaged in free flight. By means of a special mechanism, the helicopter is connected to a carriage which is mounted on two rails. The constructional design involved permits helicopter hovering flight operations. The conduction of investigations regarding the control behavior of man requires that the dynamic behavior of the controlled system is known. A model for the operational characteristics of the helicopter in hovering flight was, therefore, developed. The model provided the basis for the development of a dynamic multiparameter control model for two experienced pilots. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MODELS; *HELICOPTER CONTROL; *HOVERING; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *REMOTELY PILOTED VEHICLES
DE- BEARING (DIRECTION); DYNAMIC MODELS; EXPERIMENT DESIGN; FLIGHT SIMULATION; GYROCOMPASSES; POSITION (LOCATION); ROTARY WINGS; SPEED CONTROL
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01356955
AN- <AEROSPACE> A82-40535
TI- NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
AU- PEACH, L. L., JR.; TOBIAS, L.; LEE, H. Q. (NASA, Ames Research Center, Moffett Field, CA)

CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 322-336.
PY- 1982
PD- 198200
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8220
AB- The NASA/FAA Helicopter Air Traffic Control (ATC) simulation investigations to determine the feasibility of simultaneous, independent instrument approach procedures for helicopters at major terminal areas, using Area Navigation/Microwave Landing System (RNAV/MLS) guidance, was conducted at several levels of helicopter display sophistication, up to that of a Cockpit Display of Traffic Information (CDTI) system. Test objectives included the determination of pilot acceptability and the tracking performance of the RNAV/MLS's noninterfering rotorcraft approach path structure, along with the evaluation of the effect on controller workload of multiroute structures combining conventional and rotorcraft approaches at various arrival rates and traffic separations. The utility of electronic area maps and CDTI displays was also investigated. Participating pilots flew 127 simulated instrument approaches in an ATC simulation laboratory. (O.C.)
SF- AIAA
DE- <MAJOR> *AIR TRAFFIC CONTROL; *AREA NAVIGATION; *ENVIRONMENT SIMULATION
; *HELICOPTER CONTROL; *INSTRUMENT APPROACH; *MICROWAVE LANDING SYSTEMS
DE- AIRSPEED; APPROACH CONTROL; APPROACH INDICATORS; PILOT PERFORMANCE;
PILOT SELECTION; RUNWAY CONDITIONS; TRACKING (POSITION)
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01356950
AN- <AEROSPACE> A82-40530
TI- Concept demonstration of automatic subsystem parameter monitoring
TI- <EXTENSION> military helicopter cockpit instrumentation
AU- RANDOLPH, M. S. (General Electric Co., Aerospace Control Systems Dept., Binghamton, NY); KUROWSKY, R. V. (U.S. Army, Fort Monmouth, NY)
SO- In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 274-286.
PY- 1982
PD- 198200
CN- DAAK80-79-C-0270
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8220
AB- A feasibility demonstration model of an Electronic Master Monitor and Advisory Display System (EMMADS) has been developed as part of the Army's efforts to reduce aircrew workload, integrate cockpit instrumentation, and enhance aircraft maintenance capability. The feasibility demonstration hardware is considered along with aspects of system operation, taking into account the philosophy of operation, the types of operation, manually commanded operations, and fault commanded operations. Under a follow on development effort currently in progress, the capabilities of the current feasibility hardware will be expanded to include fault logic for all CH-47D model subsystems. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *AUTOMATIC CONTROL; *COCKPITS; *HELICOPTER
CONTROL; *IN-FLIGHT MONITORING; *MILITARY HELICOPTERS
DE- AIRCRAFT PILOTS; AVIONICS; DISPLAY DEVICES; FEASIBILITY ANALYSIS; HELICOPTER ENGINES; NUMERICAL CONTROL
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01356930
AN- <AEROSPACE> A82-40510
TI- An evaluation of vertical drag and ground effect using the RSRA rotor balance system
TI- <EXTENSION> Rotor Systems Research Aircraft
AU- FLEMMING, R. J. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT); ERICKSON, R. E. (NASA, Ames Research Center, Moffett Field, CA)
CS- Sikorsky Aircraft, Stratford, CT.
CS- <CODE> SL280853
SO- In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American

Helicopter Society, 1982, p. 43-54.
PY- 1982
PD- 198200
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8220
AB- A flight test program utilizing the Rotor Systems Research Aircraft (RSRA) main rotor balance system was conducted to obtain data for the helicopter configuration. The test program is discussed along with the employed data reduction methods, and the results. NASA 740, the RSRA used for the vertical drag test, was in the standard helicopter configuration. The 31-foot radius blades have a linear twist of eight degrees and NACA 0012 airfoil sections. Aspects of instrumentation are considered, taking into account the data recording system, the static calibration facility, and aspects of data calibration and processing. Attention is given to the test procedure, data analysis methods, balance measurements, the ground effect, and vertical drag. It is found that the RSRA rotor balance system is capable of providing high quality performance data. The vertical drag of the RSRA is 4%, compared to 2.9% predicted. (G.R.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC DRAG; *AIRCRAFT CONFIGURATIONS; *FLIGHT TESTS; *GROUND EFFECT (AERODYNAMICS); *HELICOPTER PERFORMANCE; *VERTICAL FLIGHT
DE- DATA REDUCTION; PERFORMANCE PREDICTION; RESEARCH AIRCRAFT; ROTOR AERODYNAMICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01356697
AN- <AEROSPACE> A82-40277
TI- Experimentally determined pilot models using hovering VTOL flight data
AU- ANDRISANI, D. (Purdue University, West Lafayette, IN); BOURNE, S. M.; GAU, C. F.
SO- American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, 12 p.
PY- 1982
PD- 198208
RF- 10
CN- N62269-81-C-0729
RN- AIAA PAPER 82-1294
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8220
AB- It is pointed out that the successful design of manned aircraft and their flight control systems requires careful attention to the dynamic interaction of the pilot and the vehicle. The present investigation is concerned with this interaction for a hovering VTOL. The specific approach employed in the investigation involves the use of time domain parameter identification methods to determine the mathematical model of the human pilot. In connection with the conducted research the pilot was told to precisely hover a VTOL aircraft, the X-22A, over a landing pad which moved in semirandom step like manner. The reported research involves an attempt to obtain time domain pilot models from transient responses of a manned VTOL. Attention is given to the employed two-strategy pilot model, preliminary pilot model results using that model, and a discussion of problems involved with time domain pilot modeling. (G.R.)
SF- AIAA
DE- <MAJOR> *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- FLIGHT CONTROL; MATHEMATICAL MODELS; PARAMETER IDENTIFICATION; SWITCHING; VERTICAL TAKEOFF AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01355360
AN- <AEROSPACE> A82-38940
TI- Pilot models for discrete maneuvers
AU- HEFFLEY, R. K. (Systems Technology, Inc., Mountain View, CA)
SO- In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 132-142.
PY- 1982
PD- 198200
RF- 17
RN- AIAA PAPER 82-1519
LA- English
GL- United States
CP- United States

DT- CONFERENCE PAPER
JA- IAA8219
AB- Discrete maneuvers comprise a class of piloting tasks which can include fixed-wing landing flare; gross change of heading, altitude, or airspeed; helicopter or VTOL transition to hover; and helicopter nap-of-the-earth dash and quick-stop. While these maneuvers may appear to differ fundamentally from basic tracking tasks, pilot models can be constructed using the same mathematical forms. Several examples of discrete-maneuver pilot models are presented along with accompanying flight and simulator data. The value of such models is discussed with regard to handling qualities, simulator fidelity, and pilot training. The main benefit is the ability to exploit pilot-in-the-loop analysis more effectively by formulating a complete pilot-vehicle-task context. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *AIRCRAFT MANEUVERS; *CONTROLLABILITY; *FLIGHT SIMULATION; *MATHEMATICAL MODELS; *PILOT PERFORMANCE
DE- AIRCRAFT LANDING; HELICOPTER PERFORMANCE; HOVERING; NAP-OF-THE-EARTH NAVIGATION; TASKS; VERTICAL TAKEOFF AIRCRAFT
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01354199
AN- <AEROSPACE> A82-37779
TI- Army helicopter crew seat vibration - Past performance, future requirements
AU- CREWS, S. T.; HAMILTON, W. W. (U.S. Army, Qualifications Directorate, St. Louis, MO)
SO- American Helicopter Society, Northeast Regional National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, 8 p.
PY- 1981
PD- 198111
RF- 12
RN- AHS PREPRINT 81-3
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8218
AB- The Army is interested in setting vibration specifications as a means to insure that pilot, copilot, and crew are able to perform whatever tasks they have to accomplish to make their mission a success. Mission tasks vary in different flight regimes and for different missions. The level of vibration which will interfere with task performance will vary consequently with flight regime and mission, and, correspondingly, the vibration specifications should vary also. Investigations related to an establishment of suitable vibration specifications for Army helicopters are discussed, taking into account ride quality research, the intrusion index, flight test results, and Army ride quality specifications. The results of the study show that the Army has achieved marginally acceptable vibration related ride quality on its operational helicopters. (G.R.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *RIDING QUALITY; *SEATS; *VIBRATION EFFECTS
DE- FLIGHT OPERATIONS; FLIGHT TESTS; HUMAN FACTORS ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01339382
AN- <AEROSPACE> A82-22961
TI- Development and inflight testing of a multi-media course for instructing navigation for night nap-of-the-earth flight
AU- SMITH, B. A. (Canyon Research Group, Inc., Fort Rucker, AL)
SO- In: Human Factors Society, Annual Meeting, 24th, Los Angeles, CA, October 13-17, 1980, Proceedings. (A82-22901 09-54) Santa Monica, CA, Human Factors Society, Inc., 1980, p. 568-571.
PY- 1980
PD- 198000
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8209
AB- This paper describes the development and evaluation of a course of instruction to train Army aviators to navigate during flight operations at nap-of-the-earth (NOE) altitudes at night. The course was developed to provide instruction in map interpretation and terrain analysis using both unaided (naked eye) and aided (Night Vision Goggles) vision, and incorporated lecture, textual, and visual materials. Evaluation of the course was carried out in the UH-1 helicopter flying at NOE altitudes at night. Results of the evaluation indicated that a group of student pilots who received instruction in the course navigated at night along

an NOE route with significantly more accuracy than did a control group. Implications of these results for training NOE night navigation are discussed. ((Author))
DE- <MAJOR> *FLIGHT OPERATIONS; *FLIGHT TESTS; *FLIGHT TRAINING; *NAP-OF-THE-EARTH NAVIGATION; *NIGHT FLIGHTS (AIRCRAFT); *TERRAIN ANALYSIS
DE- AIR NAVIGATION; FLIGHT CREWS; MAPS; MILITARY AIRCRAFT; NIGHT VISION; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01337172
AN- <AEROSPACE> A82-20751
TI- Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980
SO- Symposium sponsored by the Society of Flight Test Engineers. Lancaster, CA, Society of Flight Test Engineers, 1980. 451 p. (For individual items see A82-20752 to A82-20771)
PY- 1980
PD- 198000
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8208
AB- Flight testing procedures were discussed in terms of F-18 carrier suitability testing, the suitability of using JP-8 fuel for U.S. combat aircraft assigned to NATO forces, and icing test programs for the F-16 and for helicopters. Methods of instrumenting a test airplane were examined, as well as the development of a self-contained flight test data acquisition system. Attention was given to fuel conservation data bases for general aviation aircraft, to flight testing the airborne cruise missile, and testing the Jetwing STOL research aircraft. Tests of the Tornado advanced avionics system were described, as were tests of a jet-powered sailplane, flight tests of effect, and flyover noise level tests. Finally, size reduction of flight test instrumentation and simulator data test instrumentation were considered, and data processing for flight tests and real-time telemetry were reviewed. (M.S.K.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT TESTS; *GENERAL AVIATION AIRCRAFT; *MILITARY AIRCRAFT; *TEST EQUIPMENT
DE- ACTIVE CONTROL; CRUISE MISSILES; ENERGY CONSERVATION; FREE FLIGHT TEST
APPARATUS; GLIDERS; HELICOPTERS; ICE FORMATION; RESEARCH AIRCRAFT; SHORT TAKEOFF AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01336965
AN- <AEROSPACE> A82-20544
TI- Minimum cost performance monitoring of turboshaft engines
AU- SARAVANAMUTTOO, H. I. H. (Carleton University, Ottawa, Canada)
SO- In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. (A82-20540 01-07) London, Royal Aeronautical Society, 1980. 13 p.
PY- 1980
PD- 198000
LA- English
GL- Canada
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8207
AB- A low-cost Engine Health Monitoring system for turboshaft engines is presented, which is suitable for use by small operators who do not have access to computing facilities. Two approaches are discussed, Gas Path Analysis (GPA) and Trend Analysis, according to which measurements are made of the power fuel flow, inlet conditions, pressure levels, and temperatures. GPA is shown to be the more powerful method, but requires extra instrumentation. Fuel flow errors can be detected either by a large increase in airflow or an increase in turbine efficiency. Fuel flow proved to be the most critical measurement (a 1% error gave a 1.4% error in airflow, whereas a 1% error in power only gave a 0.4% error in airflow). This lower sensitivity to power errors results since GPA deduces the airflow from the gross power developed by both turbines, and power absorbed by the compressor is usually greater than that absorbed by the rotor. Trend Analysis, on the other hand, requires no extra instrumentation, but when applied with good judgement, can indicate troubles before they become critical. (J.F.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *FUEL FLOW; *HELICOPTER ENGINES; *IN-FLIGHT
MONITORING; *LOW COST; *TURBOSHAFTS
DE- AIR FLOW; COMPUTER TECHNIQUES; ENGINE TESTS; HELICOPTER PERFORMANCE;
POWER EFFICIENCY; TREND ANALYSIS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01336950
AN- <AEROSPACE> A82-20529
TI- Flight simulation - The military need
AU- MOORE, P. D. M. (RAF, London, England)
SO- In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. (A82-20526 07-01) London, Royal Aeronautical Society, 1981. 4 p.
PY- 1981
PD- 198100
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8207
AB- Military applications of simulators for helicopter and jet pilot training are reviewed. Experience in simulators which mock the VC 10, Hercules, and Nimrod helicopters is intended to eliminate much airborne training, noting that simulation of all known threat radars is now possible. Although the RAF currently uses 23 simulators for jet flight, emphasis is placed on the fact that the simulators allow practice at emergency conditions, procedures, and instrumentation, while only with new Tornado simulators will there be full handling capability simulation. The use of g seats, the length of an acceleration impulse, and the possibilities for full-image motion generation by computer are discussed. The instructor's instrument panel is criticized, and suggestions are made for improving switch spacing, more accurate feedback instrumentation from the trainee's panel, and a more advantageous viewing position. (M.S.K.)
SF- AIAA
DE- <MAJOR> *FLIGHT SAFETY; *FLIGHT SIMULATORS; *FLIGHT TRAINING; *MILITARY AIRCRAFT; *PILOT TRAINING
DE- AIRCRAFT PILOTS; FLIGHT SIMULATION; JET AIRCRAFT; MILITARY HELICOPTERS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01335441
AN- <AEROSPACE> A82-19020
TI- Design requirements for modern rescue helicopters
TI- <ORIGINAL> Konstruktive Anforderungen an moderne Rettungshubschrauber /RTH/
AU- WEILAND, E. (Messerschmitt-Boelkow-Blohm GmbH, Unternehmensbereich Drehflueger und Verkehr, Munich, West Germany)
SO- In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. (A82-19001 07-03) Munich, Allgemeiner Deutscher Automobile-Club, 1981, p. 418-436. In German.
PY- 1981
PD- 198100
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
JA- IAA8207
AB- The architecture and size of a rescue helicopter is determined by its function as well as the time and space required to successfully complete its mission. A matrix is presented which outlines the various technical requirements of a rescue helicopter and the corresponding design solutions. The resulting architecture includes a helicopter airframe with a large interior cabin for transporting and caring for the sick or injured; a wide door to facilitate loading; a main rotor with at least three blades; a rotor arrangement that provides sufficient ground clearance; the use of gas turbine propulsive units, interior noise attenuation; and additional communication linkages. The weight of the helicopter and the diameter of its rotor must also be determined. As an example, the German BK 117 and BO 105 rescue helicopters are discussed in detail; the necessary mobile and standard equipment and instrumentation for these aircraft are illustrated. (J.F)
SF- AIAA
DE- <MAJOR> *AIR TRANSPORTATION; *AIRFRAMES; *HELICOPTER DESIGN; *NOISE REDUCTION; *RESCUE OPERATIONS; *ROTARY WINGS
DE- AIRCRAFT NOISE; COMMUNICATION EQUIPMENT; EMERGENCIES; EVACUATING (TRANSPORTATION); GAS TURBINE ENGINES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01335435
AN- <AEROSPACE> A82-19014
TI- The reliability of flight personnel during the operation of the Mi-4 helicopter
AU- ZORBAS, Y. G. (European Institute of Environmental Cybernetics, Athens, Greece)
SO- In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West

Germany, September 16-19, 1980, Reports. (A82-19001 07-03) Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 177-180.
PY- 1981
PD- 198100
LA- English
GL- Greece
CP- Germany
DT- CONFERENCE PAPER
JA- IAA8207
AB- The effect of vibration and noise of an Mi-4 helicopter on the reliability of the flight personnel was examined. A study group composed of 53 Mi-4 flight personnel was divided into work-related groups which were tested for simple motor reactions, reactions to a moving object, the critical frequency of flicker fusion, the capacity for fine coordination of movements, and the reproducibility of muscular exertion. The tests were applied before and after flights for one month, and the results were compared with results from similar tests carried out on a control group manning a helicopter which had low noise and vibration levels. Significant deterioration in the performance of the tests was observed in all crewmembers on the Mi-4, and were highest among the captains, while the control group exhibited few of the performance degradations. It is noted that some of the declines in performance were cumulative, i.e. grew greater with longer times. (M.S.K.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT STRESS (BIOLOGY); *HELICOPTER PERFORMANCE; *NOISE (SOUND); *PILOT PERFORMANCE; *VIBRATION EFFECTS
DE- ERROR ANALYSIS; RELIABILITY ANALYSIS; YAK 40 AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01334289
AN- <AEROSPACE> A82-17868
TI- Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
AU- TOBIAS, L.; LEE, H. Q.; PEACH, L. L. (NASA, Ames Research Center, Moffett Field, CA); WILLETT, F. M., JR.; OBRIEN, P. J. (FAA, Technical Center, Atlantic City, NJ)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, 13 p.
PY- 1982
PD- 198201
RF- 11
RN- AIAA PAPER 82-0260
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8206
AB- Helicopter IFR routes at hub airports have been investigated in an air-traffic-control system simulation involving a piloted helicopter simulator, computer-generated air traffic, and air traffic controllers. Problems studied included: (1) pilot acceptance of the approach procedure and tracking accuracy; (2) ATC procedures for handling a mix of helicopter and fixed-wing traffic; and (3) utility of the Cockpit Display of Traffic Information (CDTI) for the helicopter. Results indicate that the helicopter routes were pilot acceptable and were noninterfering with fixed-wing traffic. Merging and spacing maneuvers using CDTI were successfully carried out by the pilots, but controllers had some reservations concerning CDTI. ((Author))
DE- <MAJOR> *AIR TRAFFIC CONTROL; *CONTROL SIMULATION; *HELICOPTER CONTROL;
*INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE; *REAL TIME OPERATION;
*SYSTEMS SIMULATION
DE- AIRPORT PLANNING; APPROACH CONTROL; AREA NAVIGATION; COCKPITS; DISPLAY
DEVICES; FIXED WINGS; HUMAN FACTORS ENGINEERING; MICROWAVE LANDING
SYSTEMS; POSITION ERRORS; RADAR TRACKING; TERMINAL FACILITIES
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01331372
AN- <AEROSPACE> A82-14951
TI- Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings
SO- Canoga Park, CA, Survival and Flight Equipment Association, 1981. 278 p
(For individual items see A82-14952 to A82-14985)
PY- 1981
PD- 198100
LA- English
CP- United States

DT- CONFERENCE PROCEEDINGS
JA- IAA8204
AB- Topics discussed regarding life support systems development included emergency in-flight egress from general aviation aircraft, an ejection seat for the F/A-18 Hornet, ripcord pull force capabilities of males and females, and automatic parachute releases. Papers were presented on sea rescue operations, safety harnesses, parachutes with automatic inflation modulation, and the effects of UV radiation, dyes, and acidity on the tensile strength of nylon fabrics. A metallized coating for fabrics was described, along with holographic laser eye protection, an on-board molecular sieve oxygen supply system for naval aircraft, post ejection survival, and a terrain activated pyrotechnic ejection seat parachute deployment system.
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *CONFERENCES; *HUMAN FACTORS ENGINEERING; *LIFE SUPPORT SYSTEMS; *PARACHUTES; *SAFETY DEVICES
DE- EGRESS; EJECTION SEATS; HELICOPTER DESIGN; METALLIZING; OXYGEN SUPPLY EQUIPMENT; PARACHUTE DESCENT; PARACHUTE FABRICS; RESCUE OPERATIONS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01330332
AN- <AEROSPACE> A82-13911
TI- Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
AU- GALLAGHER, J.; TILL, R. D. (FAA, Technical Center, Atlantic City, NJ)
SO- AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 9 p.
PY- 1981
PD- 198111
RF- 14
RN- AIAA PAPER 81-2514
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8203
AB- This paper describes instrumentation developed and flight testing conducted by the Federal Aviation Administration (FAA), Technical Center, to determine the suitability of RNAV systems for helicopter navigation. A data collection package consisting of a militarized minicomputer interfaced to aircraft sensors and RNAV systems typically representative of LORAN-C, GPS, Inertial Navigation, and Omega was designed and fabricated. A portable low cost position tracking system was devised for non-precision approach navigation tests by Kalman filtering post flight position data derived from a pulsed radar ranging system with inertial and air data measurements, resulting in improved position accuracy. ((Author))
DE- <MAJOR> *AIR NAVIGATION; *FLIGHT TESTS; *HELICOPTERS; *NATIONAL AIRSPACE SYSTEM; *RADIO NAVIGATION; *SYSTEM EFFECTIVENESS
DE- GLOBAL POSITIONING SYSTEM; LOW COST; NAVSTAR SATELLITES; TRAJECTORY ANALYSIS; TRAJECTORY OPTIMIZATION
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01330302
AN- <AEROSPACE> A82-13881
TI- Planning a helicopter flight test program
AU- KUPPUSWAMY, K.; KIRAN, N. S. (Hindustan Aeronautics, Ltd., Flight Test Dept., Bangalore, India)
SO- AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 6 p.
PY- 1981
PD- 198111
RN- AIAA PAPER 81-2381
LA- English
GL- India
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8203
AB- A study has been undertaken to assess the feasibility of completing the flight test program for the three different prototypes of the Advanced Light Helicopter, a high-performance twin-jet craft designed to operate under Indian conditions, within the 30 months allotted for the purpose. It was found that in order to achieve the 1000 hours of flight time required, all prototypes must carry identical instrumentation packages capable of making about 100 different dynamic, quasi-static and identifying measurements, with a fourth package as backup. Analysis of the weight of such an instrumentation package indicates it to contribute about 400 kg to the weight of the helicopter, with one third of the total represented by cables and connectors. Cost estimates reveal over 50% of the program cost per flight hour to be accounted for

by insurance and depreciation, while the more controllable engineering and flying costs make up only 33% of the total. Finally, a study of expected reliability, availability and maintainability of the test vehicle, airborne data acquisition system and telemetry system reveals that they are compatible with the planned schedule. (S.C.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT RELIABILITY; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *INSTRUMENT PACKAGES; *PERFORMANCE TESTS; *RELIABILITY ANALYSIS
DE- AVAILABILITY; COST ESTIMATES; DATA SYSTEMS; FLIGHT TIME; LIGHT HELICOPTERS; MAINTAINABILITY; PROTOTYPES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01330293
AN- <AEROSPACE> A82-13872
TI- In-flight computation of helicopter transmission fatigue life expenditure
AU- FRASER, K. F. (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia)
SO- AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 10 p.
PY- 1981
PD- 198111
RF- 5
RN- AIAA PAPER 81-2434
LA- English
GL- Australia
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8203
AB- Estimates of the safe fatigue life of critical helicopter transmission components may be made if in-service load data together with component fatigue data are available. Instrumentation has been developed to provide in-flight computation and indication of the current values of fatigue life expended for critical gears in single or twin-engine helicopter transmission systems. In addition basic transmission load data in the form of totalized times spent in a number of contiguous torque bands are continually updated and stored during flight. The basic load data together with values of life expenditure for critical gears for the current flight can be automatically printed out after flight. This development opens the way towards fatigue life monitoring of individual transmissions. ((Author))
DE- <MAJOR> *AIRCRAFT PARTS; *FATIGUE LIFE; *HELICOPTER PROPELLER DRIVE; *IN-FLIGHT MONITORING; *TRANSMISSIONS (MACHINE ELEMENTS)
DE- AIRCRAFT MAINTENANCE; COST REDUCTION; DYNAMIC RESPONSE; REAL TIME OPERATION; TORQUE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01328348
AN- <AEROSPACE> A82-11927
TI- Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
AU- LLORET, P.; LAGARDE, X.; LAVOIPIERRE, G. (Societe d'Applications Generales d'Electricite et de Mecanique, Paris, France)
SO- In: Symposium Gyro Technology 1980; Proceedings of the Symposium, Stuttgart, West Germany, September 24, 25, 1980. (A82-11926 02-04) Duesseldorf, Deutsche Gesellschaft fuer Ortung und Navigation, 1981, p. 1.0-1.25.
PY- 1981
PD- 198100
LA- English
GL- France
CP- Germany
DT- CONFERENCE PAPER
JA- IAA8202
AB- Results of verification tests to determine if gyrocompass mechanization can be used to find true headings within 0.5 deg in less than two minutes for helicopter navigation are presented. A strapdown inertial-Doppler navigation system which uses a pair of two-axis tuned rotor gyroscopes is described. The high accuracy of mechancial gyroscopes is attributed to the repeatability of the thermal behavior of tuned rotor gyroscopes. The gyros were temperature measured externally and in the instrument block, and correlations were sought between temperatures and drift patterns. Although true correlations were necessarily synthetic, drift rates of 15 deg/hr were reduced to 0.5 deg/hr peak residual drifts, confirming the potential use of 0.5 deg accuracy, two minute true heading mechanical gyroscopes as a complement to magnetic headings. (M.S.K.)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *GYROCOMPASSES; *MILITARY HELICOPTERS; *ROTARY GYROSCOPES; *STRAPDOWN INERTIAL GUIDANCE

DE- ACCELEROMETERS; BLOCK DIAGRAMS; DOPPLER NAVIGATION; DRIFT (INSTRUMENTATION); THERMODYNAMIC PROPERTIES
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01325441
AN- <AEROSPACE> N81-33153
TI- The consequences of certain operational requirements on the conceptual design of combat helicopters
TI- <ORIGINAL> les consequences de certaines exigences operationnelles sur la conception des helicopteres de combat
AU- DUBREUIL, J. P.
CS- Societe Nationale Industrielle Aerospatiale, Marignane (France).
CS- <CODE> SQ446513
PY- 1981
PD- 198106
NT- In AGARD The Impact of Mil. Appl. on Rotorcraft and VSTOL Aircraft Design (SEE N81-33137 24-01)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A12/MF A02
JA- STAR8124
AB- Three areas of helicopter design were examined: helicopter performance engineering; operational requirements for combat; and instrumentation. Helicopter performance is discussed in terms of controllability and flight speed. Operational characteristics include detectability, vulnerability, and survivability. The avionics are addressed in terms of man machine systems and display devices. (T.M.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT SURVIVABILITY; *COMBAT; *HELICOPTER DESIGN; *MILITARY HELICOPTERS
DE- AIRCRAFT RELIABILITY; AVIONICS; HELICOPTER PERFORMANCE; MAN MACHINE SYSTEMS; STRUCTURAL DESIGN; USER REQUIREMENTS; VULNERABILITY
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01325153
AN- <AEROSPACE> N81-32865
TI- Evaluations of a modified crew seat for the Iroquois
AU- CLARK, B. A. J.; SARRAILHE, S. R.
CS- Aeronautical Research Labs., Melbourne (Australia).
CS- <CODE> AF441057
PY- 1980
PD- 198005
PG- 42P.
RN- ARL/APP-REPT-80; AR-001-815
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity
JA- STAR8123
AB- The aircrew of Iroquois helicopters criticized aspects of the comfort and safety provided by the crew seats and additional faults were identified in crash investigations. The complaints include: (1) lack of protection against hyperextension of the neck (whiplash) and against impact onto the shoulder strap guide at the top of the backrest; (2) discomfort and pain during and after use of the crew seats; and (3) lack of provision for occasional wearing of parachutes. Studies of a modified crew seat show that the proposed head restraint is adequately strong and should reduce the likelihood of hyperextension injury. Replacement of the net seat by a foam cushion did not give a reliable improvement in comfort, nor did it improve the crash protection. Continued use of either crew seat in the aircraft is likely to lead to chronic backache in some pilots. Further modifications are suggested. (A.R.H.)
SF- NASA CASI
DE- <MAJOR> *COMFORT; *HUMAN FACTORS ENGINEERING; *SAFETY FACTORS; *SEATS; *UH-1 HELICOPTER
DE- CUSHIONS; FLIGHT CREWS; PROTECTION; WHIPLASH INJURIES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01323769
AN- <AEROSPACE> N81-31468
TI- An automated multiple choice intelligibility testing system
AU- PRATT, R. L.
CS- Royal Aerospace Establishment, Farnborough (England).
CS- <CODE> R1297595
PY- 1981
PD- 198106

RF- 1
NT- In AGARD Aural Commun. in Aviation 3 p (SEE N81-31449 22-32)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A02
JA- STAR8122
AB- The test material used is the Modified Rhyme Test and the Clarke's Vowel Test (CVT). The MRT consists of groups of single syllable words which differ only in their initial or final consonant; for the CVT only the vowel is different. The relative performance of various noise cancelling microphones was compared by recording MRT and CVT word lists against a background of rotary wing noise provided using a prerecorded sample formed into a tape loop. The word lists were then replayed to subjects, seated in the same noise environment used for the recordings, through a communications headset with attenuation properties similar to helmets used in rotary wing aircraft. Subjects were required to select the word they thought they heard from a group of six words (five in the case of the CVT) presented on a Visual Display Unit (VDU). It is suggested that subjects' reaction time, when used in conjunction with the percentage correct score, may assist in discriminating between microphones of comparable performance. (T.M.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT NOISE; *INTELLIGIBILITY; *MICROPHONES; *PERFORMANCE TESTS; *VOICE COMMUNICATION
DE- COMMUNICATION EQUIPMENT; HELMETS; HUMAN FACTORS ENGINEERING; SIGNAL TO NOISE RATIOS
SH- 7532 Communications (1975-)

AN- <DIALOG> 01323759
AN- <AEROSPACE> N81-31458
TI- Voice warning systems: Some experimental evidence concerning application
AU- REINECKE, M.
CS- Air Force Inst. of Aviation Medicine, Manching (Germany).
CS- <CODE> AI174277
PY- 1981
PD- 198106
NT- In AGARD Aural Commun. in Aviation 8 p (SEE N81-31449 22-32)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A02
JA- STAR8122
AB- Two experiments with voice warning systems (VWS), one in a helicopter UH-1D and the other one in a F 104 flight simulator are described. In the first experiment recognition times to identify simulated failures were measured in cruise and low level flights with 5 pilots. It was proved that voice warnings compared to light warnings do reduce recognition time. This is especially true during low level flight, and when only precise warning texts are used. In the second experiment the interaction of voice warnings and radio communication was investigated. Eleven pilots had to do a navigation flight and to react with correct emergency procedures when failures were introduced. Reaction times suggest that additional light warnings tend to slow down pilots reactions. The findings stress the possibility that the pilot might become overloaded when voice warnings do occur while radio communication is going on. (T.M.)
SF- NASA CASI
DE- <MAJOR> *AUDITORY SIGNALS; *HUMAN REACTIONS; *PILOT PERFORMANCE; *VISUAL SIGNALS; *VOICE; *WARNING SYSTEMS
DE- AVIONICS; CUES; RADIO COMMUNICATION; REACTION TIME; SYSTEM EFFECTIVENESS
SH- 7532 Communications (1975-)

AN- <DIALOG> 01322451
AN- <AEROSPACE> N81-30139
TI- Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
TI- <EXTENSION> hingeless rotor helicopters
AU- FAULKNER, A. J.; BUCHNER, F.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany). Unternehmensbereich Drehflueger.
CS- <CODE> MT620643
PY- 1980
PD- 198008
PG- 23P.
NT- Presented at 6th European Rotocraft and Powered Lift Aircraft Forum, Bristol, England, 16-19 Sep. 1980

RN- MBB-UD-306/80-OE
LA- English
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8121
AB- An indirect method for estimating airspeed, particularly suitable for modern hingless-rotor helicopters, is described. Air-speed indication is useful since handling characteristics are primarily dependent on the rotor in-plane component. The theoretical analysis developed uses of an existing simplified analytical solution (not involving nonlinear effects) for rotor flapping and thrust equations. These equations are inverted and appropriate approximations made for second-order quantities. Equations are thus derived for the longitudinal and lateral aerodynamic velocity components. Experimental results obtained for trimmed and transient flight states are presented. A 16 bit processor was employed. Particular attention is given to the rotor down-wash model together with instrumentation and accuracy improvements obtainable. (Author (ESA))
SF- ESA
DE- <MAJOR> *AIRSPEED; *HELICOPTER CONTROL; *LOW SPEED STABILITY; *RIGID ROTORS; *SPEED INDICATORS
DE- AERODYNAMIC STABILITY; CONTROL STABILITY; DOWNWASH; MATHEMATICAL MODELS ; MICROPROCESSORS; ROTARY WINGS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01322077
AN- <AEROSPACE> N81-29761
TI- Flight related changes in parametes of external respiration in helicopter crews
AU- KAMENSKIY, Y. N.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1981
PD- 198107
NT- In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) p 127-129 (SEE N81-29736 20-51)
NT- Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 83-84
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08/MF A01
JA- STAR8120
AB- Functional changes in the external respiratory system of helicopter crews are examined. Vital lung capacity (VC), the pneumotonometric index (PTI) and maximum breathing capacity (MBC) before and after the flights were measured. The dynamics of postflight changes in MBC and PTI as a function of flying time. VC showed virtually no postflight change. (S.F.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT FATIGUE; *HELICOPTERS; *PILOT PERFORMANCE; *RESPIRATORY SYSTEM
DE- AEROSPACE MEDICINE; EXOBIOLOGY; PHYSIOLOGICAL EFFECTS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01321414
AN- <AEROSPACE> N81-29082
TI- Development for helicopter flight in icing conditions
AU- GIBBINGS, D.
CS- Westland Helicopters Ltd., Yeovil (England).
CS- <CODE> WW895582
PY- 1981
PD- 198104
NT- In AGARD Subsystem Testing and Flight Test Instr. p (SEE N81-29065 20-01)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A02
JA- STAR8120
AB- The requirement for airframe, intake and rotor deicing systems and the instrumentation considered necessary for safe flight development are discussed. The problems involved in carrying out icing and snow flight development as part of a full prototype development program are considered and some of the favored icing simulation test methods are

addressed. (R.C.T.)
SF- NASA CASI
DE- <MAJOR> *ENVIRONMENTAL TESTS; *FLIGHT CONDITIONS; *HELICOPTERS; *ICE
FORMATION
DE- AVIONICS; CLIMATE; FLIGHT CONTROL; FLIGHT INSTRUMENTS; ROTOR BLADES
(TURBOMACHINERY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01318390
AN- <AEROSPACE> N81-26028
TI- NASA's Role in Aeronautics: A Workshop. Volume 1: Summary
CS- National Academy of Sciences - National Research Council, Washington, DC. Assembly of Engineering.
CS- <CODE> NB210513
PY- 1981
PD- 198100
PG- 71P.
VO- 7
NT- Workshop held at Woods Hole, Mass., 27 Jul. - 2 Aug. 1980
CN- NASW-3455; NASW-2342
RN- NASA-CR-164513
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8117
AB- The state of the U.S. aeronautic industry and progressive changes in national priorities as reflected in federal unified budget outlays are reviewed as well as the contribution of NACA and the character and substance of U.S. aeronautical research under NASA. Eight possible roles for the future defined by NASA are examined and the extent to which the agency should carry out these activities is considered. The roles include: (1) national facilities expertise; (2) flight sciences research; (3) generic technology evolution; (4) vehicle class evolution; (5) technology demonstration; (6) prototype development; (7) technology validation; and (8) operations feasibility; How NASA's roles varies in the areas of military aviation, general aviation, transport aircraft aeronautics, rotorcraft aeronautics, engineering education, information dissemination, and cooperation with other organizations and agencies is discussed with regard to research in aerodynamics; structures and materials; propulsion; electronics and avionics; vehicle operations; and human engineering. (A.R.H.)
SF- NASA CASI
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *CONFERENCES; *GOVERNMENT/INDUSTRY
RELATIONS; *NASA PROGRAMS; *POLICIES; *RESEARCH MANAGEMENT
DE- AERODYNAMICS; AIRCRAFT STRUCTURES; AVIONICS; ELECTRONIC EQUIPMENT;
HUMAN FACTORS ENGINEERING; PROPULSION
SH- <COSATI> 1B Aeronautics
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01314857
AN- <AEROSPACE> N81-22437
TI- Aircraft crash dynamics: Some major considerations
CS- Lockheed-California Co., Burbank.
CS- <CODE> L0372000
PY- 1981
PD- 198103
NT- In The Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 3 p 3-6 (SEE N81-22436 13-39)
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS SVIC, Code 5804, Naval Research Lab., Washington, D.C.
JA- STAR8113
AB- The considerations are aircraft crash environments, available analytical methods, and occupant protection. The aircraft crash environment varies depending on aircraft size, configuration, and usage. Current crash design requirements for military and civil helicopters, small airplanes, and large airplanes are presented. Analytical modeling of crash behavior requires three levels of capability: simple, intermediate, and detailed. Brief descriptions of methods and reference simulations are provided. Occupant protection, which is the goal of the crash design effort, is related to a design in which the load capability of the various systems is compatible with the crash environment. (T.M.)
SF- NASA CASI

DE- <MAJOR> *AIRCRAFT DESIGN; *CRASHES; *DYNAMIC STRUCTURAL ANALYSIS;
*PASSENGERS; *SAFETY MANAGEMENT; *STRUCTURAL DESIGN CRITERIA
DE- AIRCRAFT ACCIDENTS; AIRCRAFT CONFIGURATIONS; AIRCRAFT HAZARDS; AIRCRAFT
SAFETY; HUMAN FACTORS ENGINEERING; SHOCK SPECTRA
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01313504
AN- <AEROSPACE> N81-21068
TI- Study of pilot visual information requirements for Navy vertical take-off and landing capability development
AU- MITCHELL, W. S.; DOUGLAS, C. A.
CS- Quanta Systems Corp., Rockville, MD.
CS- <CODE> QD235292
SP- NO026316
PU- <PLACE> Lakehurst, N.J.
PU- <PUBLISHER> NAEC
PY- 1979
PD- 197906
PG- 223P.
RN- AD-A096074; NAEC-MISC-91-OR019
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR8112
AB- This report provides a comprehensive analysis of pilot visual landing aid requirements for operation of helicopters and V/STOL aircraft from ship and shorebased sites. The report is organized into eight sections starting with this introduction which further describes the requirement, background and approach to the study. The last four sections detail the terminology used to define pilot information, data tabulated as a result of pilot surveys, and typical existing VLA configurations. The analysis of the pilot data, evaluation of existing sources and identification of deficiencies are discussed in Section II for Helicopters and Section III for the AV-8A. The conclusions of the study, performance requirements, and recommendations are described in Section 4. (DTIC)
SF- DTIC
DE- <MAJOR> *HELICOPTERS; *LANDING AIDS; *PILOT PERFORMANCE; *REQUIREMENTS;
*VERTICAL TAKEOFF AIRCRAFT; *VISUAL AIDS
DE- AIRCRAFT LANDING; FLIGHT SAFETY; SAFETY DEVICES; SURVEYS
SH- <COSATI> 1B Aeronautics
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01310165
AN- <AEROSPACE> N81-17704
TI- Disorientation in Army helicopter operations: A general review
TI- <EXTENSION> accident investigation
AU- EDGINGTOM, K.; BOX, C. J.
CS- Army Air Corps, Stockbridge (England).
CS- <CODE> AY878010
PY- 1980
PD- 198010
NT- In AGARD Spatial Disorientation in Flight 9 p (SEE N81-17698 08-52)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8108
AB- Accidents involving aircraft mishandled during takeoff, landing or tactical low flying (or nap of the earth flight) were investigated. Special emphasis was placed on examining those accidents which occurred as a result of flight disorientation. Orientation error rates, the type of accidents as well as influencing factors were reviewed. Significant results are reported. (R.C.T.)
SF- NASA CASI
DE- <MAJOR> *ACCIDENT INVESTIGATION; *ATTITUDE (INCLINATION); *FLIGHT OPERATIONS; *HELICOPTERS
DE- AIRCRAFT ACCIDENTS; FLIGHT CONDITIONS; HUMAN FACTORS ENGINEERING;
JUDGMENTS; PILOT ERROR
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01309485
AN- <AEROSPACE> N81-17020
TI- Aviator performance in week-long extended flight operations in a helicopter simulator

AU- KRUEGER, G. P.; ARMSTRONG, R. N.; CISCO, R. R.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1980
PD- 198010
NT- In AGARD Aircrew Safety and Survivability (Ltd. to Combat Aircraft) 14 p (SEE N81-17000 08-03)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08/MF A01
JA- STAR8108
AB- Three 2 man crews of rotary wing aviators performed 14 hours of precision instrument flight in a simulator on each of five successive work days. Missions included repetitions of routine 2 hour standardized day and night instrument flight profiles which were occasionally interrupted by simulated flight emergency situations. Aviator flight performance was measured. Parameters assessed included: meeting airspeed, altitude, headings, turn rates, navigation ability, etc. In addition, measures of fatigue, stress and bodily state were collected throughout the study. These latter measures included physiological (cardiovascular monitoring and body temperature), psychological (behavioral, short term memory, oculomotor performance and subjective ratings), and biochemical (urine and isoprene) parameters. When not flying, pilots participated in laboratory tests of pursuit rotary tracking skill and visual search strategies. They were also examined by flight surgeons daily. The pilots ate three regularly scheduled meals and slept approximately four hours each night. Baseline data were collected prior to, and recovery data after the extended flight schedule. (T.M.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT CREWS; *PILOT PERFORMANCE; *STRESS (PHYSIOLOGY); *STRESS (PSYCHOLOGY); *WORK CAPACITY
DE- BIOLOGICAL EFFECTS; FATIGUE (BIOLOGY); FLIGHT SIMULATORS; PHYSICAL FITNESS; PSYCHOMOTOR PERFORMANCE; SENSORIMOTOR PERFORMANCE; WORK-REST CYCLE
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01309482

AN- <AEROSPACE> N81-17017
TI- Test and evaluation of improved aircrew restraint systems for combat helicopers
AU- SINGLEY, G. T., III
CS- Army Aviation Research and Development Command, Fort Eustis, VA. Applied Technology Lab.
CS- <CODE> AZ143130
PY- 1980
PD- 198010
NT- In AGARD Aircrew Safety and Survivability (Ltd. to Combat Aircraft) 16 p (SEE N81-17000 08-03)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A08/MF A01
JA- STAR8108
AB- US Army aviation accident data shows that a majority of all injuries in attack helicopters could have been avoided if these aircraft had been equipped with crashworthy seat and restraint systems. The compactness of the cockpit and the close proximity of mission equipment to the crew in attack and scout helicopters pose serious crash impact hazards. Although not desirable from a crashworthiness standpoint, operational considerations may dictate that mission equipment and structure be located within the occupant's crash impact motion envelope. Given this situation, it is critical to the occupant's crach impact survival chances that he be provided with a restraint system that minimizes his crash impact motion envelope, particularly for his head. The cockpit can be delethalized further when the improved restraint is complemented by padding potential strike surfaces in the cockpit, making contact surface frangible, and providing weapon system sights with frangibility, telescoping, and/or swing-away features. (T.M.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *DESIGN ANALYSIS; *FLIGHT CREWS; *FLIGHT SAFETY; *MILITARY HELICOPTERS; *SAFETY DEVICES
DE- AIRCRAFT SAFETY; COLLISIONS; FLIGHT HAZARDS; HUMAN FACTORS ENGINEERING; MILITARY OPERATIONS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01307120
AN- <AEROSPACE> N81-14620

TI- Crew stress and fatigue in the PAVE
TI- <SUPPLEMENT> Final Report, Jun. 1978 - Dec. 1979
AU- DOWD, P. J.; BRUNSTETTER, F. H. (ARRS/SG, Scott AFB, Ill.)
CS- School of Aerospace Medicine, Brooks AFB, TX. Aerospace Medical Div.
CS- <CODE> SD261436
PY- 1980
PD- 198007
PG- 35P.
CN- AF PROJ. 7930
RN- AD-A091668; SAM-TR-80-26
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8105
AB- The purpose of the PAVE LOW III system is to demonstrate that helicopter crews can perform combat rescue at night and in marginal weather conditions. This report discusses the PAVE LOW III system crew stress and fatigue and human factors problems encountered during combat simulated exercises. From the subjective fatigue (SF) data and self-report rating scales it appears that the system significantly stressed experienced test pilots. Workload was extremely demanding of pilot attention, skill, and alertness during terrain following/terrain avoidance, approach to hovering, and hovering maneuvers. It is recommended that the maximum flying time should be no more than 6 hours for these types of missions, and there should be at least 8 hours of uninterrupted sleep or 12 hours of crew rest between missions. Attention should be given to improving the following features: seating, acoustic insulation, display illumination, maps and holders, and communication and ventilation systems. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT FATIGUE; *FLIGHT STRESS; *HUMAN FACTORS ENGINEERING; *RESCUE OPERATIONS
DE- FLIGHT CREWS; HUMAN PERFORMANCE; TERRAIN FOLLOWING AIRCRAFT
SH- <COSATI> 6S Stress Physiology
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01307060
AN- <AEROSPACE> N81-14560
TI- Aircraft icing instrumentation: Unfilled needs
TI- <EXTENSION> rotary wing aircraft
AU- KITCHENS, P. F.
CS- Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
CS- <CODE> A2870159
PY- 1980
PD- 198003
NT- In NASA. Marshall Space Flight Center Proc: Fourth Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems p 61-65 (SEE N81-14555 05-47)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A13/MF A02
JA- STAR8105
AB- A list of icing instrumentation requirements are presented. Because of the Army's helicopter orientation, many of the suggestions are specific to rotary wing aircraft; however, some of the instrumentation are also suitable for general aviation aircraft. (R.C.T.)
SF- NASA CASI
DE- <MAJOR> *ATMOSPHERIC TEMPERATURE; *ICE FORMATION; *METEOROLOGICAL PARAMETERS; *ROTARY WING AIRCRAFT
DE- AIRCRAFT SPECIFICATIONS; ATMOSPHERIC MOISTURE; DROP SIZE; DROPS (LIQUIDS); SOLAR RADIATION
SH- <COSATI> 4B Meteorology
SH- 7547 Meteorology & Climatology (1975-)

AN- <DIALOG> 01303565
AN- <AEROSPACE> N81-11034
TI- Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
TI- <SUPPLEMENT> Final Report, Sep. 1978 - Apr. 1980
AU- BALL, E. G.
CS- Martin Marietta Corp., Baltimore, MD.
CS- <CODE> MI439137
SP- AZ143130
PY- 1980
PD- 198008
PG- 76P.
CN- DAAK51-78-C-0026; DA PROJ. 1L1-62209-AH-76

RN- AD-A089794; ER-15047; USAAVRADCOM-TR-80-D-20
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR8102
AB- This report covers the efforts required to manufacture and test two operational preproduction militarized CLAHs for Army flight evaluation and operational suitability. The CLAH is an external load-carrying device that is suspended under a cargo helicopter and enables the helicopter flight crew to automatically align with, engage, lock on, pick up, transport, and deposit an 8 x 8 x 20 foot MILVAN or commercial container without assistance of ground crew. This production prototype CLAH design has evolved from a series of contracts involving research, study, development, and testing of experimental container lifting devices. The design change per this contract included eliminating the retractable guide system and the pyrotechnic emergency jettison system. Reliability, maintainability, logistic and cost analyses were conducted, and orientation/training sessions were provided to enable Government personnel to operate, maintain, repair, and provide logistic support for the CLAH field test program. (DTIC)
SF- DTIC
DE- <MAJOR> *AUTOMATIC CONTROL; *CARGO; *HEAVY LIFT HELICOPTERS; *HELICOPTER CONTROL; *LOGISTICS; *TRANSPORT AIRCRAFT
DE- AIRCRAFT EQUIPMENT; ATTITUDE CONTROL; COST ANALYSIS; MATERIALS HANDLING
; RELIABILITY
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01302554
AN- <AEROSPACE> N81-10022
TI- Engineering and development program plan aircraft crashworthiness
AU- CAIAFA, C. A.; NERI, L. M.
CS- Federal Aviation Administration, Atlantic City, NJ. Technical Center.
CS- <CODE> FI751336
PY- 1980
PD- 198006
PG- 55P.
RN- AD-A089431; FAA-CT-80-166; FAA-ED-18-6
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8101
AB- The Aircraft Crashworthiness Program Plan is designed to reduce or prevent aircraft occupants from incurring serious or fatal injuries in a survivable crash impact accident by incorporating crashworthy design features into the initial stages of fixed-wing and rotary-wing aircraft development. It describes a 5 year development program for both airplanes and rotorcraft. It identifies five major subprogram areas for study and analysis to accomplish the programs goals; (1) Airframes; (2) Cabin safety; (3) Fuel system protection; (4) Emergency evacuation system; and (5) Standards, criteria, and procedures. The plan emphasizes use of available background data, development of analytical techniques, validation of analytical techniques, validation of data to determine feasibility/acceptability and transmittal of appropriate data for consideration as the basis for regulation, standards, etc. The federal aviation administration groups, other government agencies/departments and industry organizations participating in this effort are identified. Program schedule with milestones is presented. Program management and funding requirements are also identified. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT DESIGN; *AIRCRAFT FUEL SYSTEMS; *AIRCRAFT SAFETY;
*CRASHES; *ESCAPE SYSTEMS; *FIXED WINGS; *ROTARY WING AIRCRAFT
DE- AIRCRAFT ACCIDENTS; AIRCRAFT COMPARTMENTS; AIRFRAMES; FLIGHT SAFETY;
HUMAN FACTORS ENGINEERING; SAFETY DEVICES
SH- <COSATI> 1B Aeronautics
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01301604
AN- <AEROSPACE> N80-33406
TI- Helicopter flight test instrumentation
AU- POOL, A.; SANDERSON, K. C., eds.; FERRELL, K. R. (Army Aviation Research and Development Command, Edwards AFB, Calif.)
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1980
PD- 198007

PG- 46P.
RN- AGARD-AG-160-VOL-10; AD-A089909
LA- English
GL- International Organization
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8024
AB- The helicopter characteristics with which instrumentation must contend with are discussed. Typical tests that are conducted are outlined. Major aircraft components and systems which may be instrumented are listed and suggestions are made for sensors, locations, and installation. Instrumentation requirements are summarized. A sample instrumentation management technique is also presented. (T.M.)
SF- NASA CASI
DE- <MAJOR> *DYNAMIC TESTS; *FLIGHT CHARACTERISTICS; *FLIGHT TEST INSTRUMENTS; *HELICOPTER PERFORMANCE; *RECORDING INSTRUMENTS; *STABILITY TESTS
DE- AIRCRAFT INSTRUMENTS; AIRCRAFT RELIABILITY; FLIGHT INSTRUMENTS; FLIGHT TESTS; GROUND SUPPORT SYSTEMS; HELICOPTER DESIGN
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01298531
AN- <AEROSPACE> N80-30308
TI- Helicopter electro-optical system display requirements. 2: Performance of helicopter pilots when using a low-light-level television system during simulated nap-of-the-earth flight
AU- HYMAN, A.; JOHNSON, R. M.; GADE, P. A.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA. Manpower and Educational Systems Technical Area.
CS- <CODE> A2025595
PY- 1980
PD- 198003
PG- 21P.
CN- DA PROJ. 2Q1-62722-A-765
RN- AD-A086855; ARI-TR-442
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8021
AB- Previous ARI research has shown that pilots feel they can successfully use a low light level television system as an aid in night nap-of-the-earth (NOE) flight, even when the highlight luminance of its display is as little as 0.06 footlambert (fL). Videotaped presentations were used in this prior research, and estimations of the lowest usable display luminance were established on the basis of pilot judgment. The present experiment was designed to provide more objective evidence for determining the utility of such low luminance displays when they are used as aids in night NOE flight. Each of 24 Army helicopter pilots made 24 simulated flights over a highly realistic three dimensional terrain model as generated from an optical probe used in conjunction with an SIT television camera. The results showed that pilots had fewer crashes when using a larger display. All pilots flew as well with displays set so that highlight luminance was about 0.05 fL as they did with displays set so highlight luminance was about 0.2 fL. This report discusses the implications of these results for designing a usable low light level television system for night NOE flight. (DTIC)
SF- DTIC
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *HELICOPTERS; *NAVIGATION AIDS; *PILOT PERFORMANCE
DE- CATHODE RAY TUBES; ELECTRON OPTICS; MAN MACHINE SYSTEMS; TELEVISION EQUIPMENT; THREE DIMENSIONAL MODELS
SH- <COSATI> 1B Aeronautics
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01294580
AN- <AEROSPACE> N80-26325
TI- The digital control system as part of an integrated accessory fit for future engines
AU- PERKS, M. P.; MORTON, T. G.
CS- Rolls-Royce Ltd., Leavesden (England). Aero Div.
CS- <CODE> RZ252010
PY- 1980
PD- 198002
RF- 1
NT- In AGARD Advan. Control Systems for Aircraft Powerplants 11 p (SEE N80-26306 17-07)
LA- English
GL- United Kingdom

CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8017
AB- The development of digital control systems for gas turbine engines is discussed. It is suggested that the traditional approach of designing the control system in isolation from the other accessories on a gas turbine engine may not provide the most cost effective total solution for an engine having a digital control system. It is considered that the integrity of the digital control can be maintained while providing additional functions not associated with its prime control task. This could allow the development of advanced monitoring systems to minimize life cycle costs and achieve maximum aircraft utilization. The application of these principles to helicopter engines is discussed and an arrangement proposed which could provide substantial benefits both to the helicopter pilot and to the ground crew. Pilot work-load would be substantially reduced by advising him of engine or aircraft management factors on a 'need to know' basis. Operators would benefit from regular information on the operational status of the engines. (M.G.)
SF- NASA CASI
DE- <MAJOR> *DIGITAL SYSTEMS; *ENGINE CONTROL; *GAS TURBINE ENGINES; *NUMERICAL CONTROL
DE- AIRBORNE/SPACEBORNE COMPUTERS; FLY BY WIRE CONTROL; HELICOPTER CONTROL;
HELICOPTER ENGINES; PILOT PERFORMANCE
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01292560
AN- <AEROSPACE> N80-24283
TI- US Army survey of aircrew survival kits/vests
TI- <SUPPLEMENT> Final Report
AU- JUDGE, T. H.
CS- Army Natick Research and Development Command, MA. Clothing Equipment and Materials Engineering Lab.
CS- <CODE> A1630770
PY- 1980
PD- 198001
PG- 101P.
RN- AD-A081153; CE-MEL-210; NATICK/TR-80/012
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR8015
AB- For a number of years air crew members have complained of problems with survival kits, vests, and components. These complaints have been debated time and again with no resolution forthcoming to meet the comprehensive crash survival needs of the aircrew members. In an effort to resolve these complaints, a survey was initiated throughout the U.S. Army Aviation Community to identify the problem areas and develop rationale for correction action. This report discusses results of the survey and conferences held following completion of the survey. Medical, Crash, Search and Rescue and Aviation Community Data provided rationale for new approaches to survival kits and vests. These approaches to reduce the amount of present day survival components were modified by each conference and upgraded to improve the aircraft crash survival environment. The reductions in helicopter crash fires and the ability of rescue teams to recover crash survivors in six hours or less has contributed to the need to replace present day nonessential items with only essential, absolute need, survival components. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT SURVIVABILITY; *ARMED FORCES (UNITED STATES); *SURVIVAL EQUIPMENT; *VESTS
DE- AIRCRAFT ACCIDENTS; FLIGHT CREWS; HUMAN FACTORS ENGINEERING; RESCUE
OPERATIONS; SAFETY MANAGEMENT; USER REQUIREMENTS
SH- <COSATI> 6G Escape, Rescue, & Survival
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01291427
AN- <AEROSPACE> N80-23142
TI- The verification of a computer model of internal light reflections for helicopter canopy design
TI- <SUPPLEMENT> Final Report
AU- SMYTH, C. C.; STOWELL, H. R.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1979
PD- 197910
PG- 58P.
RN- AD-A080473; HEL-TM-21-79
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR8013
AB- The U.S. Army Human Engineering Laboratory (USAHEL) has experimentally verified a computer model for internal light reflections on the transparent surfaces of helicopter canopies. The model was verified using a mockup of the Model 209 AH-1S Helicopter with the flat plate canopy design. The transmittance and coordinates of the light images on the canopy surfaces were measured at various light source positions. A matched sample was computed for the source positions using the computer model. Pearson's correlation coefficients for a linear regression analysis of the matched measured and computed values are greater than 0.98, and the results are statistically significant at the .01 level. (DTIC)
SF- DTIC
DE- <MAJOR> *CANOPIES; *COMPUTER PROGRAMS; *HELICOPTERS; *LIGHT HELICOPTERS
; *MATHEMATICAL MODELS; *OPTICAL REFLECTION
DE- DESIGN ANALYSIS; HUMAN FACTORS ENGINEERING; LIGHT (VISIBLE RADIATION);
LIGHT SOURCES; REGRESSION ANALYSIS
SH- <COSATI> 1C Aircraft
SH- 7574 Optics (1975-)

AN- <DIALOG> 01283630
AN- <AEROSPACE> N80-15067
TI- NASA/Army XV-15 tilt rotor research aircraft wind-tunnel test program plan
TI- <EXTENSION> Ames 40-ft by 80-ft wind tunnel tests
AU- WEIBERG, J. A.; MAISEL, M. D. (AVRADCOM Res. and Technol. Labs.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1979
PD- 197903
PG- 73P.
CN- RTOP 744-01-01
RN- NASA-TM-78562; A-7740; AVRADCOM-TR-79-7-AM
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NASA. Ames Research Center, Moffett Field, Calif. 94035
JA- STAR8006
AB- To ensure that the XV-15 tilt rotor research aircraft will meet the requirements of the program plan and the contract model specification and statement of work, one of the two aircraft will be tested in the Ames 40 x 80 foot wind tunnel to provide an initial assessment of the aerodynamic characteristics, structural loads, and rotor/pylon/wing dynamics in a simulated flight environment for correlation with estimated values. The tests will also serve to verify the functional operation of the aircraft systems and on-board instrumentation in a flight environment. The management structure, operational plan, support requirements and responsibilities, safety provisions and reporting requirements for conduct of the wind tunnel tests are defined and related to other phases of the program. (A.R.H.)
SF- NASA CASI
DE- <MAJOR> *PROJECT PLANNING; *RESEARCH AIRCRAFT; *TILT ROTOR AIRCRAFT;
*WIND TUNNEL TESTS
DE- AERODYNAMIC CHARACTERISTICS; AEROELASTICITY; CHECKOUT; DATA ACQUISITION
; DYNAMIC STABILITY; LOADS (FORCES)
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01280358
AN- <AEROSPACE> N80-11774
TI- Rotary wing proficiency-based Aviator Selection System (PASS)
TI- <SUPPLEMENT> Final Report, 15 Feb. 1977 - 1 Mar. 1978
AU- MARCO, R. A.; BULL, R. F.; VIDMAR, R. L.; SHIPLEY, B. D., JR.
CS- McDonnell-Douglas Astronautics Co., Saint Louis, MO.
CS- <CODE> MP536003
PY- 1979
PD- 197901
PG- 244P.
CN- DAHC19-77-C-0015; DA PROJ. 2Q2-63743-A-722
RN- AD-A069838; MDC-1839; ARI-TR-79-A2
LA- English
GL- United States
CP- United States
DT- REPORT

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A02
JA- STAR8002
AB- The Proficiency-Based Aviator Selection System (PASS) is the result of an operational feasibility program developed to determine whether a learning sample approach could be used to select candidates for rotary wing aviator training. PASS was based on the Automatic Pilot Aptitude Measurement System (APAMS), a five-hour learning sample of fixed wing piloting tasks, developed for the Air Force Pilot Selection Program. PASS utilizes a UH-1 Flight Simulator (UH-1 FS) with a five-degree-of-freedom motion base to present the syllabus and test materials. the APAMS syllabus was extensively modified to conform to rotary wing flight operations, and the UH-1 FS software was reconfigured and formatted to meet the PASS requirements for training and performance measurement. Four voice synthesizers (VOTRAX) were interfaced to the UH-1 FS to provide vocal feedback. The operational capability of the PASS was demonstrated in a test with 11 experienced rotary wing pilots and 11 candidates for rotary wing training. The primary audience for this report will be operational personnel in training selection and simulation, particularly for rotary wing aircraft. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT TRAINING; *PILOT SELECTION; *PILOT TRAINING; *UH-1 HELICOPTER
DE- APTITUDE; FLIGHT SIMULATORS; LEARNING; PILOT PERFORMANCE; PROGRAMMED INSTRUCTION
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01279677
AN- <AEROSPACE> N80-11084
TI- In-flight performance evaluation of experimental information
TI- <SUPPLEMENT> Final Report
AU- LEES, M.; SANDERS, M. G.; BURDEN, R. T., JR.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1979
PD- 197905
PG- 27P.
CN- DA PROJ. 3E7-62773-A-819
RN- AD-A071701; USAARL-79-8
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR8002
AB- The objective of this investigation was to evaluate a method of displaying information which permits rapid transmission of flight data to the operator under three viewing conditions: (1) day flights with the unaided eye, (2) night flights with the unaided eye, and (3) night flights using the AN/PVS-5 night vision goggles (40 deg field of view focused at infinity). Information obtained from the analyses of aviator performance data demonstrated the potential of presenting flight information to the aircrew via prototype displays for all viewing modes. (DTIC)
SF- DTIC
DE- <MAJOR> *DISPLAY DEVICES; *INFORMATION SYSTEMS; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION; *PILOT PERFORMANCE
DE- DATA TRANSMISSION; FLIGHT INSTRUMENTS; HELICOPTERS; MAN MACHINE SYSTEMS
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01279352
AN- <AEROSPACE> N80-10757
TI- Age-related distinctions of changes in psychophysiological functions of pilots in the civil aviation under the influence of vibration and noise
AU- KAMENSKIY, Y. N., ; SOKOLOVA, Y. A.
CS- Joint Publications Research Service, Arlington, VA.
CS- <CODE> J1957394
PY- 1979
PD- 197910
NT- In its USSR Report: Space Biol. and Aerospace Med., Vol. 13, No. 5 (JPRS-74470) p 30-34 (SEE N80-10752 01-51)
NT- Transl. into ENGLISH from Kosm. Biol. i Aviakosm. Med. (Moscow), vol. 13, no. 5, 1979 p 21-24
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01

JA- STAR8001
AB- The effect of vibration and noise of helicopters on the psychophysiological functions of their crewmembers was studied in relation to their age. The changes were mostly pronounced in pilots younger than 20-25 and older than 45 years. The peculiar changes in the psychophysiological functions can be associated with the age-related features of adaptation to vibration and noise effects and with the different level of professional training. (Author)
DE- <MAJOR> *AGING (BIOLOGY); *CIVIL AVIATION; *PILOT PERFORMANCE; *PSYCHOPHYSIOLOGY
DE- AEROSPACE MEDICINE; COCKPITS; NOISE (SOUND); VIBRATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01278574
AN- <AEROSPACE> A81-49953
TI- Backache in helicopter pilots
AU- MALIK, H.; KAPUR, R. R. (Indian Air Force, Aero-Medical Training Centre, Hindan, India)
SO- Aviation Medicine, vol. 25, June 1981, p. 11-15.
PY- 1981
PD- 198106
RF- 8
LA- English
GL- India
CP- India
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8124
AB- Long term flying in helicopters currently in use produces backache. Attempts have been made to analyze the problem with special emphasis on helicopter seat design. Suitable human engineering aspects in terms of seat and relocation of controls have been recommended. Regular spinal exercises by aircrew have been advised. ((Author))
DE- <MAJOR> *AIRCRAFT PILOTS; *BACK INJURIES; *FLIGHT STRESS (BIOLOGY); *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *SEATS
DE- CONTROL STICKS; HELICOPTER CONTROL; PHYSICAL EXERCISE; SPINAL CORD
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01275257
AN- <AEROSPACE> A81-46636
TI- HH-65A Dolphin engine condition monitoring system
AU- EHLERS, K. K. (Aerospatiale Helicopter Corp., Grand Prairie, TX)
SO- In: American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings. (A81-46603 22-01) Washington, DC, American Helicopter Society, 1981, p. 386-394.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8122
AB- The approach to engine condition monitoring incorporated into the Coast Guard's HH-65A Dolphin Short Range Recovery helicopter is discussed. It is noted that this approach requires no dedicated hardware for the Engine Condition Monitoring System (ECMS) but uses hardware which is required for other functions. The five major aircraft subsystems that contribute to the ECMS are described. These are the Sensors, the Mission Computer Unit (MCU), the Control Display Unit (CDU), a caution advisory CDU annunciator, and the Flight Data Storage Unit (FDSU). It is noted that engine data are already available in digital form from the vertical scale electrical optical engine instruments. By means of the ECMS software, the MCU performs the data processing. The flight crew controls the systems using the CDUs, on which the data are displayed. (C.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *DISPLAY DEVICES; *ENGINE MONITORING INSTRUMENTS; *HELICOPTER ENGINES; *SYSTEMS ENGINEERING
DE- AIRCRAFT RELIABILITY; COMPUTER TECHNIQUES; DIGITAL COMPUTERS; HARDWARE; TURNAROUND (STS)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01275245
AN- <AEROSPACE> A81-46624
TI- The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
AU- DIAMOND, E. D.; MACIOLEK, J. R. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT)
SO- In: American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings. (A81-46603 22-01) Washington, DC,

American Helicopter Society, 1981, p. 252-262.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8122
AB- It appears that existing cockpits will be inadequate for performance of anticipated future helicopter missions. Further proliferation of discrete mission related equipment in the cockpit will not solve the problem. A new approach is, therefore, required. Pilot productivity has to be increased by controlling workload and reducing fatigue for a given mission. Pilot productivity, in this connection, means that the pilot can perform the anticipated expanded missions at no higher than current mission workload, thereby producing more effective results with the helicopter. Attention is given to the cockpit redesign potential offered by integrating modern information processing and flight control technologies. The new approach requires an evaluation of various levels of integration of electro-optic displays, multiplexing and fly-by-wire/light by cockpit design requirements, and an exploitation of digital computation capabilities. (G.R.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *COCKPITS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS
DE- DISPLAY DEVICES; ELECTRO-OPTICS; FLY BY WIRE CONTROL; NIGHT FLIGHTS (AIRCRAFT); PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01275238
AN- <AEROSPACE> A81-46617
TI- CH-53 Helicopter Night Vision System simulation experiments
AU- MOWERY, G. W.; MILELLI, R. J. (Martin Marietta Aerospace, Orlando, FL); MCDONALD, L. B. (McDonald and Associates, Inc., Orlando, FL); PONTELANDOLFO, C. (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA); NOGGLE, P. (U.S. Navy, Naval Air Systems Command, Washington, DC)
SO- In: American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings. (A81-46603 22-01) Washington, DC, American Helicopter Society, 1981, p. 163-178.
PY- 1981
PD- 198100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8122
AB- A Helicopter Night Vision Program has been undertaken to improve the low altitude night operational and reduced visibility capability of the Marine assault transport helicopter force. The Helicopter Night Vision Program is challenged with defining a Helicopter Night Vision System (HNVS) capable of being retrofitted into the transport helicopter force at the lowest possible cost, and with the highest possible performance characteristics. After a comparative examination it was concluded that forward looking infrared (FLIR) devices will perform better than other electro-optical systems. Consequently a FLIR system was selected for the assault transport helicopter. The HNVS simulation experiment is discussed. It was found that pilots can maneuver under 100 feet above ground level and between 60 to 80 knots in the night assault transport mission with a panel mounted display, gimballed sensor, and Doppler navigation. (G.R.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATION; *H-53 HELICOPTER; *HELICOPTER DESIGN; *NIGHT FLIGHTS (AIRCRAFT); *NIGHT VISION
DE- COCKPIT SIMULATORS; DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; HYBRID COMPUTERS; MAN MACHINE SYSTEMS; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01275236
AN- <AEROSPACE> A81-46615
TI- Electronic Master Monitor and Advisory Display System
AU- KUROWSKY, R. V. (U.S. Army, Avionics Research and Development Activity, Fort Monmouth, NJ); MCLANE, R. C. (General Electric Co., Pittsfield, MA)
SO- In: American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings. (A81-46603 22-01) Washington, DC, American Helicopter Society, 1981, p. 143-152.
PY- 1981
PD- 198100
RF- 12
CN- DAAK80-79-C-0270
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
JA- IAA8122
AB- An Electronic Master Monitor and Advisory Display System (EMMADS) is designed around the requirements of the CH-47 helicopter with the intent of automating the crew's monitoring of the basic aircraft subsystems. The objective of the reported investigation is the feasibility demonstration of a direct view flat panel technology (electroluminescent) display controlled by digital logic with integrated, programmable operator controls. The system design goal is to relieve the crew of routine 'housekeeping' tasks. The Human Engineering Program which supported the EMMADS design is considered, taking into account an information requirements analysis, a pilot evaluation, testing, control/display design criteria, and display formats. Beginning in mid-1981, the flight test phase of EMMADS will commence with further Human Engineering activity. (G.R.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *CH-47 HELICOPTER; *DISPLAY DEVICES; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- AUTOMATION; FEASIBILITY ANALYSIS; PILOT PERFORMANCE; SOLID STATE DEVICES
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01272731
AN- <AEROSPACE> A81-44110
TI- Investigation of control, display, and crew-loading requirements for helicopter instrument approach
AU- LEBACQZ, J. V.; GERDES, R. M. (NASA, Ames Research Center, Moffett Field, CA); FORREST, R. D. (FAA, Moffett Field, CA); MERRILL, R. K. (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- In: Guidance and Control Conference, Albuquerque, NM, August 19-21, 1981, Collection of Technical Papers. (A81-44076 21-12) New York, American Institute of Aeronautics and Astronautics, Inc., 1981, p. 281-295.
PY- 1981
PD- 198100
RF- 19
RN- AIAA PAPER 81-1820
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8121
AB- A ground simulation experiment was conducted on a flight simulator for advanced aircraft to investigate the influence and interaction of flight-control system, flight-director display, and crew-loading situation on helicopter flying qualities during terminal-area operations in instrument conditions. Six levels of control complexity were implemented on a representative helicopter model. The six levels of augmentation were examined with display variations consisting of raw elevation and azimuth data only and of raw data plus one-, two-, and three-cue flight directors. Crew-loading situations simulated for the control-display combinations were dual-pilot operation and single-pilot operation. Four pilots performed a total of 150 evaluations of combinations of these parameters for a representative microwave landing system approach task. Pilot rating results indicated the existence of a control display trade-off for ratings of satisfactory, whereas ratings of adequate-but-unsatisfactory depended primarily on the control system; the control system required for ratings of adequate-but-unsatisfactory was clearly more complex for the single-pilot situation than that for the dual-pilot situation. ((Author))
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *FLIGHT SIMULATION;
*HELICOPTER CONTROL; *INSTRUMENT APPROACH; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT GUIDANCE; AIRCRAFT RELIABILITY; CONTROLLABILITY; FLIGHT CONTROL; GROUND TESTS; HELICOPTER DESIGN; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01271994
AN- <AEROSPACE> A81-43373
TI- Effects of whole-body vibrations on sensory motor system performance in man
AU- GAUTHIER, G. M.; ROLL, J. P.; MARTIN, B.; HARLAY, F. (Aix-Marseille I, Universite, Marseille, France)
SO- Aviation, Space, and Environmental Medicine vol. 52, Aug. 1981, p. 473-479. Research supported by the Societe Nationale Industrielle Aerospatiale; Centre National de la Recherche Scientifique
PY- 1981
PD- 198108
RF- 28
CN- CNRS-272

LA- English
GL- France
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8120
AB- The effects of whole-body vibration of a frequency and amplitude encountered on cruising helicopters on human sensorimotor performance at position, velocity and force-controlled tasks are investigated. Subjects performed tasks involving blindfolded arm positioning, the forearm and foot tracking of visual targets, and the foot control of static and dynamic torques while vibrated in a sitting position at 0.1 G and 18 Hz. Systematic over-pointing is observed in both directions in the arm positioning task, while position and velocity errors in the foot and arm tracking task increased and torque holding stability and torque amplitude precision were significantly degraded in the presence of vibration. The observed alterations in position, velocity and force control are attributed to the effects of vibration on the proprioceptive system, and it is suggested, on the basis of these results, that particular care should be taken in helicopters and other vibrating vehicles to isolate muscles involved in motor tasks from vibration. (A.L.W.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *HELICOPTERS; *HUMAN BODY; *PILOT PERFORMANCE; *SENSORIMOTOR PERFORMANCE; *VIBRATION EFFECTS
DE- MOTION PERCEPTION; MUSCULOSKELETAL SYSTEM; OPTICAL TRACKING; VELOCITY ERRORS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01271370
AN- <AEROSPACE> A81-42749
TI- Rotorcraft researchers and operators - Is there is common ground
AU- TALBOT, P. D.; SNYDER, W. J. (NASA, Ames Research Center, Aeronautical Systems Branch, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- Society of Automotive Engineers, Business Aircraft Meeting and Exposition, Wichita, KS, Apr. 7-10, 1981, 18 p.
PY- 1981
PD- 198104
RF- 10
RN- SAE PAPER 810589
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8120
AB- An investigation is conducted concerning the extent to which a program for rotorcraft research presented by NASA meets the user needs. Problems of civil operators are examined, taking into account powerplants, reliability and maintainability, environment, noise and vibration, and lack of space for passengers' baggage. A description of applicable technology is provided, giving attention to aerodynamics and structures, propulsion, power transfer methodology, flight control, avionic systems, human factors, and vehicle configurations. One of the most difficult challenges in trying to bring research to bear on operator problems is that in general researchers are working on long-term solutions while operators are seeking short-term answers. Attention is also given to potential technological bright spots, higher risk technologies, highest technological risks, and advanced vehicle configurations. (G.R.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *NASA PROGRAMS; *OPERATIONAL PROBLEMS; *ROTORCRAFT AIRCRAFT
DE- AIRCRAFT PARTS; AVIONICS; CIVIL AVIATION; HELICOPTER ENGINES; PROPULSION SYSTEM PERFORMANCE
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01271057
AN- <AEROSPACE> A81-42436
TI- Recommendations for the NASA Avionics program for the 1980's
AU- SPITZER, C. R.; BRUMMER, E. A.; JONES, W. R. (NASA, Langley Research Center, Avionics Planning Office, Hampton, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
SO- In: National Aerospace Symposium, Dayton, OH, March 11-13, 1980, Proceedings. (A81-42430 19-04) Washington, DC, Institute of Navigation, 1980, p. 85-89.
PY- 1980
PD- 198000
LA- English

GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8119
AB- NASA is examining the merits of a significant expansion of its avionics, controls, and human factors technology program for the 1980's. The rationale for an expanded program is related to two factors. One factor is related to a utilization of recent and anticipated significant advances in microelectronics. The second factor is the need to develop new concepts in avionics and control systems for more efficient aircraft operation and better utilization of extremely limited airport capacity. Substantial benefits could be realized in three major categories, including improved aircraft efficiency, improved flight operations, and improved/extended operational capability. The NASA Avionics, Controls, and Human Factors Technology Plan is the report of a task force of agency personnel working in close cooperation with industry, DOD, and FAA. Attention is given to the NASA role, aircraft controls, crew station technology, flight management, integration and interfacing, commercial transports, general aviation, rotorcraft, V/STOL, and high performance aircraft. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *AVIONICS; *HUMAN FACTORS ENGINEERING; *MICROELECTRONICS; *NASA PROGRAMS
DE- COMMERCIAL AIRCRAFT; GENERAL AVIATION AIRCRAFT; ROTARY WING AIRCRAFT; SYSTEMS INTEGRATION; TECHNOLOGICAL FORECASTING; V/STOL AIRCRAFT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01271051
AN- <AEROSPACE> A81-42430
TI- National Aerospace Symposium, Dayton, OH, March 11-13, 1980, Proceedings
SO- Symposium sponsored by the Institute of Navigation. Washington, DC, Institute of Navigation, 1980. 152 p. (For individual items see A81-42431 to A81-42440)
PY- 1980
PD- 198000
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8119
AB- The topics considered include general aviation requirements for navigation services, engineering approaches for cost savings with ILS glide-slope installations, helicopter navigation in the 80's, an evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont, IFR direct means conservation, and CAINS II - an application of standard laser gyro inertial and computer technology for existing naval carrier aircraft. Attention is also given to nuclear magnetic resonance gyro development, navigation computers with automatic flight plan delivery in the digital aircraft, FAA activities in support of the Federal Radionavigation Plan, recommendations for the NASA avionics program for the 1980's, low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System, low-cost inertial instruments using molded materials, a status report on Position Location Reporting System, and an overview of DOD navigation planning. (G.R.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENGINEERING; *AIR NAVIGATION; *AVIONICS; *CONFERENCES; *NAVIGATION AIDS
DE- AIR TRAFFIC CONTROL; AIRBORNE/SPACEBORNE COMPUTERS; COST REDUCTION; HELICOPTERS; INERTIAL GUIDANCE; INSTRUMENT FLIGHT RULES; INSTRUMENT LANDING SYSTEMS; LASER GYROSCOPES; LORAN C; MOLDING MATERIALS; NASA PROGRAMS; NUCLEAR MAGNETIC RESONANCE; RADIO NAVIGATION
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01270545
AN- <AEROSPACE> A81-41924
TI- Pilot guidance and display considerations for energy efficient flight profiles
AU- SAMMS, K. H.; MORELLO, S. A. (NASA, Langley Research Center, Hampton, VA)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
SO- AIChE, ASME, IEEE, ISA, and SME, Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Paper. 8 p.
PY- 1981
PD- 198106
RF- 9
LA- English
GL- United States
CP- United States

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8119
AB- Two computer programs are applied to energy efficient flight operation in order to minimize aircraft operating costs. One algorithm (OPTIM) computes vertical flight profiles which optimize direct operating costs, including fuel and time costs, for an aircraft flying over a fixed range and with a fixed time-of-arrival. The second program (TRAGEN) simulates an aircraft steered to fly along a specified vertical flight trajectory, in order to examine fuel and cost penalties involved in flying nonoptimal trajectories. Constraints such as air traffic control procedures, and atmospheric and weight conditions are considered and supported by graphs and diagrams. The use of the algorithms as preflight planning tools is discussed, emphasizing OPTIM's future application for on-board energy management. Finally, research questions concerning pilot guidance and display considerations for advanced energy/flight management systems are addressed. (J.F.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT GUIDANCE; *COMPUTER TECHNIQUES; *COST REDUCTION; *FLIGHT OPTIMIZATION; *FUEL CONSUMPTION; *PILOT PERFORMANCE
DE- AIRBORNE/SPACEBORNE COMPUTERS; AIRLINE OPERATIONS; ALGORITHMS; COMMERCIAL AIRCRAFT; COMPUTER PROGRAMS; NUMERICAL CONTROL
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01268780
AN- <AEROSPACE> A81-40159
TI- Flight test results for task oriented flying qualities evaluation
AU- PAUSDER, H.-J.; GMELIN, B. L. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmechanik, Braunschweig, West Germany)
SO- In: American Helicopter Society, Annual Forum, 36th, Washington, DC, May 13-15, 1980, Proceedings. (A81-40136 18-01) Washington, DC, American Helicopter Society, 1980. 15 p.
PY- 1980
PD- 198000
RF- 17
RN- AHS 80-29
LA- English
GL- Germany
CP- United States
DT- CONFERENCE PAPER
JA- IAA8118
AB- Attention is given to a technique which has been developed for establishing a data base and recommendations for mission oriented flying qualities. The technique was conceived in connection with the objective to replace, in the evaluation of a specific helicopter system, pilot opinions by objective scales, which would make it possible to quantify the requirements for the aircraft, estimate the characteristics of a project at an early stage, and perform the evaluation of an aircraft with a minimum of tests. Aspects of task definition are considered along with flight tests, data collection, pilot evaluation, data analysis, statistical parameters, parameters relevant to evaluation, and the interpretation of hovering tracking results. (G.R.)
SF- AIAA
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *FLIGHT TESTS; *HELICOPTER PERFORMANCE ; *MILITARY HELICOPTERS
DE- AIRCRAFT CONTROL; BO-105 HELICOPTER; CONTROLLABILITY; HOVERING; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01268769
AN- <AEROSPACE> A81-40148
TI- Subsystem status monitor
TI- <EXTENSION> for military helicopters
AU- MCGEE, J. P. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT)
SO- In: American Helicopter Society, Annual Forum, 36th, Washington, DC, May 13-15, 1980, Proceedings. (A81-40136 18-01) Washington, DC, American Helicopter Society, 1980. 10 p.
PY- 1980
PD- 198000
RN- AHS 80-17
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8118
AB- The reduction of the crew workload is an important factor for the improvement of helicopter mission effectiveness. The past and predicted growth in the number and complexity of subsystems in U.S. Army helicopters has made subsystem monitoring a prime candidate for design efforts aimed at the reduction of this workload. A Subsystem Status

Monitor study was conducted to explain suitable approaches for subsystem monitoring. Conclusions of this study are discussed. Properly human engineered in terms of display logic, formats, and contents, the use of on-board computers and multi-function electronic displays can be effectively applied to the conversion of instrument panel space, improvement of out-of-cockpit visibility, and reduction of in-cockpit eye-time and workload during the monitoring of helicopter subsystems. Computerized voice warning and voice recognition technologies should be considered for application to subsystem status monitoring. (G.R.)
SF- AIAA
DE- <MAJOR> *COCKPITS; *HELICOPTER DESIGN; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS; *NAVIGATION AIDS
DE- DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; TASK COMPLEXITY; VISUAL TASKS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01268752
AN- <AEROSPACE> A81-40131
TI- Integrated multiplex for the Agusta A-129 attack helicopter
AU- OHLHABER, J. I. (Harris Corp., Government Systems Group, Melbourne, FL)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 6th, Bristol, England, September 16-19, 1980, Conference Papers. Part 2. (A81-40076 18-01) Bristol, University of Bristol, 1980. 14 p.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8118
AB- A program has been initiated to fully integrate the electrical and electronic subsystems as well as the cockpit instrumentation of the Agusta A-129 attack helicopter. The system will utilize redundant data bus communication, multimode cockpit displays, digital flight control with backup fly-by-wire, and armament management, all controlled through a central processor system. These integration measures are expected to increase pilot effectiveness in giving him better controls and displays with more usable information and increase aircraft performance, survivability, and reliability. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *ATTACK AIRCRAFT; *AUTOMATIC FLIGHT CONTROL; *ELECTRONIC AIRCRAFT; *HELICOPTER CONTROL; *MILITARY HELICOPTERS; *MULTIPLEXING
DE- CHANNELS (DATA TRANSMISSION); COCKPITS; DISPLAY DEVICES; FLY BY WIRE CONTROL
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 01268741
AN- <AEROSPACE> A81-40120
TI- A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
AU- GERDES, R. M. (NASA, Ames Research Center, Moffett Field, CA)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 6th, Bristol, England, September 16-19, 1980, Conference Papers. Part 2. (A81-40076 18-01) Bristol, University of Bristol, 1980. 18 p.
PY- 1980
PD- 198000
RF- 7
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8118
AB- Results from a series of simulation and flight investigations undertaken to evaluate helicopter flying qualities and the effects of control system augmentation for nap-of-the-earth (NOE) agility and instrument flying tasks were analyzed to assess handling-quality factors common to both tasks. Precise attitude control was determined to be a key requirement for successful accomplishment of both tasks. Factors that degraded attitude controllability were improper levels of control sensitivity and damping and rotor-system cross-coupling due to helicopter angular rate and collective pitch input. Application of rate-command, attitude-command, and control-input decouple augmentation schemes enhanced attitude control and significantly improved handling qualities for both tasks. NOE agility and instrument flying handling-quality considerations, pilot rating philosophy, and supplemental flight evaluations are also discussed. ((Author))

DE- <MAJOR> *CONTROLLABILITY; *FLIGHT CONTROL; *HELICOPTER CONTROL; *MANUAL
CONTROL; *NAP-OF-THE-EARTH NAVIGATION; *PILOT PERFORMANCE
DE- AERODYNAMIC STABILITY; ATTITUDE CONTROL; FLIGHT CHARACTERISTICS; FLIGHT
SIMULATION; HELICOPTER PERFORMANCE; HELICOPTER PROPELLER DRIVE;
INSTRUMENT FLIGHT RULES; MANEUVERABILITY; MILITARY HELICOPTERS; ROTARY
WINGS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01268731
AN- <AEROSPACE> A81-40110
TI- An integrated performance and air data system for helicopters
AU- FROST, S. (Marconi Avionics, Ltd., Rochester, Kent, England)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 6th, Bristol,
England, September 16-19, 1980, Conference Papers. Part 2. (A81-40076
18-01) Bristol, University of Bristol, 1980. 20 p.
PY- 1980
PD- 198000
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8118
AB- The XM-143 Helicopter Air Data Subsystem used by the AH-1S Enhanced
Cobra attack helicopter is described. By using a swivelling
pitot-static pressure probe located in the rotor flow field together
with an integral air pressure sensor, the system can determine
essential air data parameters with great accuracy under all flight
conditions. The integrated Lift Margin System in turn combines air data
parameters with engine, rotor and transmission sensor inputs to compute
and display mission-critical performance information to the flight
crew. Among the performance parameters displayed are: (1) ground effect
power and weight margins; (2) maximum and vertical rates of climb,
along with the airspeed at which they are achieved; (3) gross weight,
center of gravity and cargo hook load; and (4) maximum range and
endurance and the speeds at which to achieve them. (O.C.)
SF- AIAA
DE- <MAJOR> *AIR DATA SYSTEMS; *DATA SYSTEMS; *HELICOPTER PERFORMANCE;
*ROTOR AERODYNAMICS; *SYSTEMS ENGINEERING; *TECHNOLOGY ASSESSMENT
DE- CENTER OF GRAVITY; GROUND EFFECT (AERODYNAMICS); RATE OF CLIMB
INDICATORS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01268724
AN- <AEROSPACE> A81-40103
TI- U.K. development of a rotor de-icing system
AU- CLARK, J. E. (Westland Helicopters, Ltd., Yeovil, Somerset, England)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 6th, Bristol,
England, September 16-19, 1980, Conference Papers. Part 1. (A81-40076
18-01) Bristol, University of Bristol, 1980. 24 p.
PY- 1980
PD- 198000
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8118
AB- The described investigation deals with the need for a rotor ice
protection system, the instrumentation fit considered necessary for its
development, and the results of flight trials in both high and low
icing temperatures. Ice formation on the rotor blades will cause a
deterioration of the aerodynamic characteristics of the blades, which,
without corrective action, will lead to an unacceptable degradation of
the handling qualities of the aircraft. Conditions for shedding ice
from the blade are examined. Accumulated experience on unprotected
rotors suggests that the combined effect of ice accretion and natural
shedding leads to an equilibrium rotor performance penalty after
(typically) 5 minutes in a given icing condition. When a helicopter's
operational requirements are not met by this limited capability, a
rotor protection system is required. The basic rotor de-icing system
which is being developed is discussed. (G.R.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *DEICING; *FLIGHT TESTS;
*HELICOPTER CONTROL; *ROTARY WINGS
DE- CONTROLLABILITY; HEATING; ICE FORMATION; RESEARCH VEHICLES; SHEDDING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01268715
AN- <AEROSPACE> A81-40094
TI- Effects of whole-body vibrations on perception and control of posture

and movement
AU- GAUTHIER, G. M.; ROLL, J. P.; MARTIN, B.; HUGON, M. (Aix-Marseille I, Universite, Marseille, France)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 6th, Bristol, England, September 16-19, 1980, Conference Papers. Part 1. (A81-40076 18-01) Bristol, University of Bristol, 1980. 15 p.
PY- 1980
PD- 198000
RF- 17
LA- English
GL- France
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8118
AB- The extent of postural and movement control alterations due to vibrations having frequency and amplitude similar to those encountered in cruising helicopters is defined. The selective application of vibrations to various parts of the body in laboratory controlled conditions allowed the identification of the muscular proprioception system as the major site of stimulus action. Electrically and mechanically induced spinal reflexes were analyzed during and after vibrations applied to subjects, and were found to be severely depressed. These effects outlasted the duration of the vibrations. Tests were conducted on standing and seated subjects at 18 Hz and plus or minus 0.2 to 0.5 g by means of a hydraulic jack. (O.C.)
SF- AIAA
DE- <MAJOR> *FLUTTER; *HUMAN PERFORMANCE; *MOTION PERCEPTION; *PHYSIOLOGICAL EFFECTS; *POSTURE; *PROPRIOCEPTION; *VIBRATION TESTS
DE- EFFERENT NERVOUS SYSTEMS; HELICOPTERS; HUMAN BODY; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; MUSCULOSKELETAL SYSTEM; REFLEXES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01268194
AN- <AEROSPACE> A81-39573
TI- Development of an aviator's night vision imaging system /ANVIS/
AU- JENKINS, D. (U.S. Army, Night Vision Electro-Optics Laboratory, Fort Belvoir, VA); EFKEMAN, A. (Bell and Howell Co., Chicago, IL)
SO- In: Optomechanical Systems Design; Proceedings of the Seminar, San Diego, CA, July 31, 1980. (A81-39571 18-74) Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1980, p. 18-23.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8118
AB- The development of a high performance, lightweight, night vision imaging system for use by helicopter pilots is discussed with reference to the historical background, system requirements, optical concept, and mechanical design of the system. The advanced night vision system ANVIS, uses new image intensifiers which provide operational capability under all light level; the tube design and components have been optimized to provide improved resolution and MTF. Primary emphasis is on the use of lightweight, precision molded, aspheric plastic optical elements and injection-molded plastic mechanical components. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *IMAGE INTENSIFIERS; *IMAGING TECHNIQUES; *NIGHT VISION; *OPTICAL EQUIPMENT
DE- DESIGN ANALYSIS; HISTORIES; HUMAN FACTORS ENGINEERING; SYSTEMS ENGINEERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 01265182
AN- <AEROSPACE> A81-36561
TI- Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
AU- LANCRAFT, R.; ZACHARIAS, G.; BARON, S. (Bolt Beranek and Newman, Inc., Cambridge, Mass.)
CS- Bolt, Beranek, and Newman, Inc., Cambridge, MA.
CS- <CODE> BS628995
SO- In: Flight Simulation Technologies Conference, Long Beach, Calif., June 16-18, 1981, Technical Papers. (A81-36554 16-09) New York, American Institute of Aeronautics and Astronautics, Inc., 1981, p. 49-59.
PY- 1981
PD- 198100
RF- 17
CN- NAS2-10145
RN- AIAA PAPER 81-0972
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

JA- IAA8116
AB- The optimal control model for pilot/vehicle analysis is used to explore the effects of a CGI visual system and motion system dynamics on helicopter hover simulation fidelity. This is accomplished by expanding the perceptual aspects of the model to include motion sensing and by relating CGI parameters to information processing parameters of the model. Simulator fidelity is examined by comparing predicted performance and workload for flight with that predicted for various simulator configuration. The results of the analysis suggest that simulator deficiencies or a reasonable nature (by current standards) can result in substantial performance and/or workload infidelity. Both CGI and motion system effects are significant for this task. There is also a distinct interaction between the two sources of pilot cues. In particular, the presence of motion reduces the sensitivity to CGI limitations. ((Author))
DE- <MAJOR> *FLIGHT SIMULATION; *HELICOPTER CONTROL; *HOVERING; *MAN MACHINE SYSTEMS; *OPTIMAL CONTROL; *PILOT PERFORMANCE; *TRAINING ANALYSIS
DE- CONTROL SIMULATION; CUES; MOTION PERCEPTION; PERFORMANCE PREDICTION; SYSTEMS SIMULATION; VISUAL SIGNALS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01262835
AN- <AEROSPACE> A81-34214
TI- Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
AU- STAPLEFORD, R. L. (Systems Technology, Inc., Hawthorne, Calif.)
SO- Society of Automotive Engineers, Aerospace Congress and Exposition, Los Angeles, Calif., Oct. 13-16, 1980, 10 p. Navy-supported research.
PY- 1980
PD- 198010
RF- 5
RN- SAE PAPER 801206
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8115
AB- A new flight control concept for a hovering VTOL aircraft has been developed. The main feature of this system is that deflection of a pilot's controller produces a linear velocity command with position hold when the controller is centered. Another novel feature is that horizontal commands both tilt the aircraft and deflect the thrust vector, while the position feedbacks only deflect the thrust vector. This system has been evaluated in two piloted simulations of landing a VTOL aircraft on a small ship. The pilots consistently rated this system better than three other, more conventional, control systems. ((Author))
DE- <MAJOR> *FLIGHT CONTROL; *HOVERING; *LANDING SIMULATION; *SPEED CONTROL ; *VERTICAL LANDING; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT CONTROL; AIRSPEED; COMMAND AND CONTROL; CONTROL SIMULATION; FEEDBACK CONTROL; PILOT PERFORMANCE; THRUST VECTOR CONTROL; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01257679
AN- <AEROSPACE> A81-29058
TI- Helicopter transmission fatigue life
AU- FRASER, K. F.; KING, C. N. (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia)
SO- In: International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings. (A81-29051 12-07) Bangalore, National Aeronautical Laboratory, 1981, p. 09-1 to 09-10.
PY- 1981
PD- 198100
RF- 6
LA- English
GL- Australia
CP- India
DT- CONFERENCE PAPER
JA- IAA8112
AB- A Royal Australian Navy program aimed at providing safe life estimates for the critical components of helicopter main rotor gearboxes is discussed. The torque spectra instrumentation used is described along with the methods for obtaining gear fatigue data. A third generation instrument presently undergoing flight trials computes and displays fatigue life expenditure up to four critical gears, and also indicates total flying time. Basic transmission torque data are automatically printed at the termination of each flight. It is noted that this development is leading toward the fatigue life monitoring of individual components. (L.S.)

SF- AIAA
DE- <MAJOR> *FATIGUE LIFE; *FATIGUE TESTS; *HELICOPTER PROPELLER DRIVE;
*ROTARY WINGS; *TRANSMISSIONS (MACHINE ELEMENTS)
DE- DYNAMIC RESPONSE; PREDICTION ANALYSIS TECHNIQUES; TORQUEMETERS
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01257672
AN- <AEROSPACE> A81-29051
TI- International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings
AU- PARANJPE, P. A., (ED.); RAMACHANDRA, M. S. (National Aeronautical Laboratory, Bangalore, India)
SO- Symposium sponsored by ICAS, AIAA, UNESCO, et al Bangalore, National Aeronautical Laboratory, 1981. 557 p. (For individual items see A81-29052 to A81-29112)
PY- 1981
PD- 198100
LA- English
CP- India
DT- CONFERENCE PROCEEDINGS
JA- IAA8112
AB- The symposium focused on the operation, maintenance, and diagnostics of turbine engines, advanced and hybrid systems, turbine cooling, instrumentation, combustor design problems, materials, vibration and flutter, cascade flow, and compressors. Papers are included on the environmental aspects of aircraft emissions, a new breed of an air breathing engine, discrete hole film cooling of turbine blades, some fundamental aspects of flame stabilization, and numerical computations of compressible steady cascade flows. (V.L.)
SF- AIAA
DE- <MAJOR> *AIR BREATHING ENGINES; *AIRCRAFT ENGINES; *CONFERENCES
DE- AIRCRAFT MAINTENANCE; AIRCRAFT NOISE; CASCADE FLOW; ENGINE DESIGN;
ENVIRONMENT EFFECTS; EXHAUST EMISSION; FILM COOLING; FLUTTER ANALYSIS;
GAS TURBINE ENGINES; HELICOPTER ENGINES; TURBINE BLADES
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01256511
AN- <AEROSPACE> A81-27890
TI- Some university experiences of aircraft simulator research
AU- CHAPLEO, A. Q. (Belfast, Queen's University, Belfast, Northern Ireland)
SO- (Royal Aeronautical Society, Symposium on 'Is Flight Simulation of Academic Interest', London, England, Nov. 22, 1979.) Aeronautical Journal, vol. 84, Aug. 1980, p. 223-226.
PY- 1980
PD- 198008
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8111
AB- An historical overview is given of the series of aircraft-control simulation devices constructed and development programs undertaken at the Queen's University of Belfast since the early 1960's. The flight simulation studies covered include an investigation of piloting problems using analog techniques (1963), the manual control of jet lift aircraft in hovering flight (1966), manual control of a dynamic VTOL simulator (1968), quantitative investigation of aircraft simulator pitch motion laws (1973), quantitative investigation of the effects of motion on an aircraft roll simulator (1977), and the effect of visual information on the pilot's ability to land an aircraft (1977). (O.C.)
SF- AIAA
DE- <MAJOR> *EDUCATION; *FLIGHT SIMULATION; *FLIGHT SIMULATORS; *PILOT TRAINING
DE- AIRCRAFT CONTROL; CONTROL SIMULATION; DISPLAY DEVICES; MANUAL CONTROL;
PILOT PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01253562
AN- <AEROSPACE> A81-24941
TI- Helicopter-ship qualification testing
AU- FANG, R.; HOEKSTRA, T.; LEIJNSE, C.; RENIRIE, L. T. (National Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands)
SO- In: Nederlandse Vereniging voor Luchtvaarttechniek, Yearbook 1979. (A81-24938 09-01) Amsterdam, Nederlandse Vereniging voor Luchtvaarttechniek, 1980, p. 4-1 to 4-9.
PY- 1980
PD- 198000
LA- English
GL- Netherlands

CP- Netherlands
DT- ANALYTIC OF COLLECTED WORK
JA- IAA8109
AB- A test method developed by the Netherlands Aerospace Laboratory for the establishment of shipboard helicopter landing operation restrictions is described. The helicopter, in such an operational environment, must be maneuvered close to the ship's flight deck with extremely turbulent aerodynamic conditions prevailing, in addition to the movements of the flight deck. The method includes the recording and analysis of relevant parameters (such as wind speed and direction) for the helicopter and the ship, and a quantification of human factors by a pilot rating technique. Special attention is paid to a method for defining and presenting ship motion limits. (O.C.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CARRIERS; *AIRCRAFT LANDING; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *MILITARY HELICOPTERS; *PERFORMANCE TESTS
DE- EQUIPMENT SPECIFICATIONS; FLOW VISUALIZATION; SCALE MODELS; VERTICAL TAKEOFF; WIND TUNNEL TESTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01251244
AN- <AEROSPACE> A81-22623
TI- Helicopter fatigue qualification
AU- PISSO, G. P. (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy)
SO- In: Conference on Fatigue in Aerospace Structures, Turin, Italy, February 22, 23, 1978, Proceedings. (A81-22621 08-39) Turin, Editrice Levrotto e Bella, 1979, p. 17-30.
PY- 1979
PD- 197900
RF- 12
LA- English
GL- Italy
CP- Italy
DT- CONFERENCE PAPER
JA- IAA8108
AB- Procedures involved in the fatigue qualification of civil aircraft are reviewed with emphasis on helicopters. The key points examined include: adopted fatigue philosophy and regulations, test techniques and analysis of test results, airworthiness requirements, instrumentation, operational spectrum, flight tests, flight data analysis, and damage and fatigue life calculation. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONSTRUCTION MATERIALS; *AIRCRAFT RELIABILITY; *CIVIL AVIATION; *FATIGUE TESTS; *HELICOPTER PERFORMANCE
DE- FATIGUE LIFE; FLIGHT TESTS; NONDESTRUCTIVE TESTS; SPECTRUM ANALYSIS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01250705
AN- <AEROSPACE> A81-22084
TI- New developments in restraint systems
AU- FARRIS, L. (Pacific Scientific Co., Anaheim, Calif.)
SO- In: Survival and Flight Equipment Association, Annual Symposium, 17th, Las Vegas, Nev., December 2-6, 1979, Proceedings. (A81-22076 08-03) Canoga Park, Calif., Survival and Flight Equipment Association, 1980, p. 70-72.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8108
AB- The development of hardware and theories for aircrew restraint systems for use in current and future high-performance aircraft is discussed. Attention is given to a two-motion lift-lever buckle for lap belt systems, a heavy-duty rotary buckle, a two-motion rotary buckle, a mini rotary buckle with dual inertia lock reels, a gas-operated lift-lever buckle, the use of polyester webbing, a recyclable powered inertia lock reel for command prepositioning the aircrew during adverse maneuvers, limb restraints during ejection, and a dual tension inertia reel. The current need for the development of advanced aircrew restraints for high performance aircraft is emphasized as a means of preventing injury and saving lives. (A.L.W.)
SF- AIAA
DE- <MAJOR> *FLIGHT SAFETY; *MILITARY TECHNOLOGY; *SAFETY DEVICES
DE- FLIGHT CREWS; HUMAN FACTORS ENGINEERING; LIMBS (ANATOMY); MILITARY HELICOPTERS; TECHNOLOGY ASSESSMENT; WEBBING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01249123
AN- <AEROSPACE> A81-20502
TI- Helicopter pilot performance and workload as a function of night vision symbologies
AU- HARTZELL, E. J. (U.S. Army, Aeromechanics Laboratory, Moffett Field, Calif.)
SO- In: Conference on Decision and Control, and Symposium on Adaptive Processes, 18th, Fort Lauderdale, Fla., December 12-14, 1979, Proceedings. Volume 2. (A81-20426 07-63) Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1979, p. 995, 996.
PY- 1979
PD- 197900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8107
AB- A full six-degree-of-freedom motion simulation of an advanced U.S. Army helicopter flying a night time nap-of-the-earth scenario was conducted in order to assess pilot performance, training requirements, and workload as a function of the flight control symbologies used. The results of the time estimation techniques used in conjunction with this experiment support the predicted levels of difficulty designed into the flight scenario. Time estimation provides a relative scale of workload between hover maneuvers and suggests that there is no significant difference in workload between the three symbology types studied. (V.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTERS; *NIGHT VISION; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING; PILOT TRAINING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01248674
AN- <AEROSPACE> A81-20053
TI- US Army working group on aircraft noise
AU- MORELAND, S. (U.S. Army, Directorate for Development and Qualification, St. Louis, Mo.)
SO- In: Symposium on Internal Noise in Helicopters, Southampton, England, July 17-20, 1979, Proceedings. (A81-20051 07-71) Southampton, England, University of Southampton, 1980, p. A2 1-A2 30.
PY- 1980
PD- 198000
RF- 15
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA8107
AB- The research carried out by a U.S. Army working group on the internal noise of helicopters is discussed. A new noise standard is felt to be needed because the standard used to date has never been considered adequate for helicopters and because of the Surgeon General's hearing conservation program. Attention is given to the preliminary considerations of the working group, and data on current noise levels and on aircrew exposure to noise are presented. The two noise limit curves (for helicopters weighing less than/more than 20,000 lbs) proposed by the working group for the design of helicopters are discussed. It is concluded that while current technology is able to bring noise levels in helicopters having a gross weight of less than 20,000 lbs within acceptable limits, reduction of internal noise in helicopters weighing more than 20,000 lbs poses a major problem. (C.R.)

SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *HELICOPTER DESIGN; *MILITARY HELICOPTERS;
*NOISE REDUCTION; *STANDARDS
DE- HUMAN FACTORS ENGINEERING; NOISE POLLUTION; NOISE SPECTRA; POLLUTION
CONTROL; SOUND PRESSURE; VIBRATION EFFECTS
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 01246672
AN- <AEROSPACE> A81-18051
TI- International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
SO- Conference sponsored by ASCE, SAE, AIAA, ICE, ATRIF, and Transportation Research Board. New York, American Society of Civil Engineers, 1979. Vol. 1, 485 p.; vol. 2, 343 p. (For individual items see A81-18052 to A81-18093)
PY- 1979
PD- 197900
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8106

AB- The conference included papers on airspace analysis in airport system planning, performance of flexible highway pavements, microwave landing systems, civic-electrical engineering interface, hedging against errors in airport forecasting, a computer program for slabs with discontinuities, and flight instrumentation for all-weather approach and landing. Also discussed were air service for small communities, helicopters for all-weather terminals, NDT techniques, airline deregulation, runway configuration management systems, and the role of aircraft separation assurance in the cockpit. (A.T.)
SF- AIAA
DE- <MAJOR> *AIR TRANSPORTATION; *AIRPORTS; *CONFERENCES; *MICROWAVE LANDING SYSTEMS; *NAVIGATION AIDS
DE- AIRPORT PLANNING; ALL-WEATHER LANDING SYSTEMS; COCKPITS; HELICOPTERS; NONDESTRUCTIVE TESTS; PAVEMENTS; RUNWAYS; SYSTEMS ENGINEERING
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01246142
AN- <AEROSPACE> A81-17521
TI- Exhaust gas reingestion measurements
TI- <EXTENSION> in helicopters
AU- TURCZENIUK, B. (Boeing Vertol Co., Philadelphia, Pa.)
SO- In: Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers. (A81-17501 05-01) Washington, D.C., American Helicopter Society, 1980. 12 p.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8105
AB- Results of flight tests to measure the magnitude and effects of engine exhaust gas reingestion and inlet pressure distortion are presented. The tandem rotor CH-47 and single rotor YUH-61A helicopters were flown with instrumented engine inlets using fast-response probes. A wide range of flight maneuvers were evaluated, including operating in and out of ground effect, flares, hovering turns, lateral and rearward flight. The dynamic inlet air temperature and pressure patterns, time histories, and variation of basic engine parameters during exhaust reingestion are provided. The effect of instrumentation time constant on the maximum inlet temperature rise is discussed. Also shown is the effect of an inlet screen on pressure distortion. Conclusions are drawn as to the use of this data to establish turbine engine compressor stall margin requirements needed to avoid experiencing problems with the engine/helicopter integration. ((Author))
DE- <MAJOR> *ENGINE INLETS; *EXHAUST GASES; *FLIGHT TESTS; *HELICOPTERS; *INGESTION (ENGINES)
DE- CH-47 HELICOPTER; INLET PRESSURE; INLET TEMPERATURE; UH-61A HELICOPTER; VORTICES
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01246134
AN- <AEROSPACE> A81-17513
TI- A survey of propulsion systems' malfunctions/failures resulting in helicopter mishaps
AU- BURROWS, L. T. (U.S. Army, Applied Technology Laboratory, Fort Eustis, Va.)
SO- In: Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers. (A81-17501 05-01) Washington, D.C., American Helicopter Society, 1980. 6 p.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8105
AB- A survey of propulsion systems malfunctions/failures (M/F) was based on the record of four Army helicopter models during 1971-1978. The analysis included power plants, power transmissions, lubrication, fuel, and instrumentation; the tail rotor gearbox, the intermediate/combiner gearbox, and drive shafting were evaluated in the power train subsystems. Component M/F histories relating to helicopter mishaps are presented, noting that relatively insignificant components have been a continuing cause of mishaps. M/F occurrence can be reduced by proper design and manufacturing practices, together with adequate maintenance during the life of the helicopter. (A.T.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *ENGINE FAILURE; *HELICOPTER ENGINES; *PROPULSION SYSTEM PERFORMANCE

DE- FUEL SYSTEMS; GEARS; LUBRICATION SYSTEMS; MILITARY HELICOPTERS; TURBOSHAFTS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01245209
AN- <AEROSPACE> A81-16588
TI- The XV-15 tilt rotor research aircraft
AU- DUGAN, D. C. (NASA, Ames Research Center, Moffett Field, Calif.); ERHART, R. G. (Bell Helicopter Textron, Fort Worth, Tex.); SCHROERS, L. G. (U.S. Army, Aeromechanics Laboratory, Moffett Field, Calif.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
SO- (Society of Experimental Test Pilots, Symposium, 24th, Beverly Hills, Calif., Sept. 24-27, 1980.) Society of Experimental Test Pilots, Technical Review, vol. 15, no. 2, 1980, p. 168-185.
PY- 1980
PD- 198000
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8105
AB- The XV-15 tilt rotor has shown good handling qualities in all modes of flight; in the helicopter mode it allows precision hover and agility with low pilot workload. Vibration and noise levels are low; the conversion procedure is easy, with satisfactory acceleration or deceleration. The XV-15 handling demonstrated its potential for many civil and military applications. (A.T.)
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *TILT ROTOR RESEARCH AIRCRAFT PROGRAM; *XV-15 AIRCRAFT
DE- FLIGHT CHARACTERISTICS; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01245197
AN- <AEROSPACE> A81-16576
TI- 1980 report to the aerospace profession; Proceedings of the Twenty-fourth Symposium, Beverly Hills, Calif., September 24-27, 1980
SO- Symposium sponsored by the Society of Experimental Test Pilots. Society of Experimental Test Pilots, Technical Review, vol. 15, no. 2, 1980. 282 p. (For individual items see A81-16577 to A81-16588)
PY- 1980
PD- 198000
LA- English
CP- United States
DT- JOURNAL ISSUE; CONFERENCE PROCEEDINGS
JA- IAA8105
AB- Topics discussed include military aviation trends for the 1980s, the test pilot and commercial aviation in the 1980s, civil and V/STOL aircraft, and lessons learned from past programs. Particular attention is given to the implications of current flight control research and development, head-up display flight tests, 757/767 design considerations for improved productivity, the future air traffic control system as influenced by advanced avionics, and general aviation in the 1980s. (B.J.)
SF- AIAA
DE- <MAJOR> *AERONAUTICS; *AIRCRAFT; *CONFERENCES
DE- AIRCRAFT CONTROL; AVIONICS; B-47 AIRCRAFT; GENERAL AVIATION AIRCRAFT; HELICOPTERS; HUMAN FACTORS ENGINEERING; MILITARY AIRCRAFT; PERFORMANCE TESTS; TAILLESS AIRCRAFT
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01239388
AN- <AEROSPACE> A81-10767
TI- Piloted simulation studies of helicopter agility
AU- TOMLINSON, B. N.; PADFIELD, G. D. (Royal Aircraft Establishment, Bedford, England)
SO- Vertica, vol. 4, no. 2-4, 1980, p. 79-106.
PY- 1980
PD- 198000
RF- 17
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8101
AB- The need for helicopters to operate close to the ground and near obstacles has prompted a critical look at design features which affect performance and handling qualities in this environment. Some

experiments using a ground-based flight simulator have been conducted to investigate this subject and to obtain data on helicopter agility. These experiments required the development of a general mathematical model capable of representing helicopter flight, including gross maneuvers, from hover to cruise and validation by comparison with flight tests. An exacting low level flying course was created on a model ground terrain and formed the primary task for the six pilots involved in the experiments. A set of rotors were represented which differed in blade flapping stiffness and inertia (Lock number). The paper describes these aspects and then goes on to describe how the simulated helicopter was flown over the agility course with each rotor to investigate the effects of rotor design. Some of the theoretical consequences of these variations are outlined and the results of piloted flights in the simulator described. ((Author))
DE- <MAJOR> *AIRCRAFT MANEUVERS; *COCKPIT SIMULATORS; *CONTROLLABILITY;
*FLIGHT SIMULATION; *HELICOPTER PERFORMANCE
DE- AIRSPEED; FLIGHT PATHS; LOW ALTITUDE; MATHEMATICAL MODELS; PILOT PERFORMANCE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01237924
AN- <AEROSPACE> A80-53383
TI- Helicopter Ka-26 equipment for investigation of pollution in the atmospheric boundary layer
TI- <ORIGINAL> Oborudovanie vertoleta Ka-26 dlia issledovaniia zagriazneniia v pogranichnom sloe atmosfery
AU- VDOVIN, B. I.; GOROSHKO, B. B.
SO- In: Atmospheric diffusion and air pollution. (A80-53376 24-45) Leningrad, Gidrometeoizdat, 1979, p. 55-59. In Russian.
PY- 1979
PD- 197900
RF- 5
LA- Russian
CP- U.S.S.R.
DT- ANALYTIC OF COLLECTED WORK
JA- IAA8024
AB- The paper describes laboratory equipment in the Ka-26 helicopter used for measuring pollution levels and meteorological conditions which determine the transport and dispersion of atmospheric contaminants. The laboratory includes instrumentation for determining air temperature, pressure, and humidity; an actinometer; and devices for measuring dust concentration and composition. The helicopter was used for the determination of distribution of impurities from single and clustered urban pollution sources. (A.T.)
SF- AIAA
DE- <MAJOR> *AIR POLLUTION; *ATMOSPHERIC BOUNDARY LAYER; *ATMOSPHERIC
DIFFUSION; *HELICOPTERS; *METEOROLOGICAL PARAMETERS; *POLLUTION MONITORING
DE- ACTINOMETERS; ATMOSPHERIC COMPOSITION; ATMOSPHERIC TEMPERATURE; CITIES
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 01234671
AN- <AEROSPACE> A80-50130
TI- Pilot study on the value of a beta-blocking drug in initial helicopter training
AU- DONALDSON, E.; GRANT-THOMSON, J.; MORWOOD, P.; OCONNOR, N.; TIPPETT, R.
(Royal Australian Army, Army Aviation Centre, Oakey, Queensland, Australia)
SO- Aviation, Space, and Environmental Medicine, vol. 51, Sept. 1980, p. 926-929.
PY- 1980
PD- 198009
RF- 25
LA- English
GL- Australia
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8022
AB- The effect on performance of a standard dose of a beta-blocking drug was examined in a controlled test situation closely approximating actual flying training conditions and involving helicopter flying skills. Pindolol or a placebo was administered 90 min before a test flight and the flying and hovering performance of five students was assessed by qualified flying instructors. No significant difference was found between assigned performance ratings of test drug flights and placebo flights. It could not be concluded that a beta-blocking drug would improve the hovering performance of ab initio helicopter trainee pilots. ((Author))
DE- <MAJOR> *AEROSPACE MEDICINE; *FLIGHT TRAINING; *HELICOPTERS; *MILITARY
PSYCHOLOGY; *PILOT PERFORMANCE; *PILOT TRAINING; *TRANQUILIZERS

DE- HEART RATE; TRAINING EVALUATION
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01226231
AN- <AEROSPACE> A80-41690
TI- Predicting the effects of vertical vibration frequency, combinations of frequencies and viewing distance on the reading of numeric displays
AU- LEWIS, C. H.; GRIFFIN, M. J. (Southampton, University, Southampton, England)
SO- Journal of Sound and Vibration, vol. 70, June 8, 1980, p. 355-377. Research supported by the Ministry of Defence (Procurement Executive).
PY- 1980
PD- 198006
RF- 16
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8017
AB- The effects of vertical vibration frequency, viewing distance and multifrequency vibrations on the performance of a numerical reading task are investigated in order to derive frequency weighting functions for the establishment of vibration standards for vehicle design. Subjects were required to read white numerals printed on black cards when subjected to five levels of sinusoidal vibration at ten frequencies between 2.8 and 63 Hz, five levels of sinusoidal vibration at frequencies of 3.15 and 16 Hz with viewing distances from 0.75 to 3.0 m, and twelve combinations of three vibrations at various levels. Contours of vibration levels required to produce mean equal reading errors indicate the visual task to be most sensitive to vibration in the frequency range 8 to 16 Hz, with the sensitivities of individual subjects exhibiting similar trends. Increases in viewing distance from 0.75 to 1.5 m are found to result in increased relative sensitivities to higher frequencies, although the overall effect of vibration is decreased. Finally, the effects of complex vibration on performance are observed to be most accurately predicted from the most severe weighted spectral component alone. (A.L.W.)
SF- AIAA
DE- <MAJOR> *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *READING; *VERTICAL MOTION; *VIBRATION EFFECTS; *VISUAL ACUITY
DE- CORRELATION COEFFICIENTS; ERROR ANALYSIS; FLIGHT CREWS; GRAPHS (CHARTS) ; HELICOPTERS; TABLES (DATA); WEIGHTING FUNCTIONS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01225440
AN- <AEROSPACE> A80-40899
TI- Optimal control model predictions of system performance and attention allocation and their experimental validation in a display design study
AU- JOHANNSEN, G.; GOVINDARAJ, T. (Purdue University, Lafayette, Ind.)
CS- Purdue Univ., West Lafayette, IN.
CS- <CODE> P9391092
SO- IEEE Transactions on Systems, Man, and Cybernetics, vol. SMC-10, May 1980, p. 249-261.
PY- 1980
PD- 198005
RF- 25
CN- NSG-2119
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8017
AB- The influence of different types of predictor displays in a longitudinal vertical takeoff and landing (VTOL) hover task is analyzed in a theoretical study. Several cases with differing amounts of predictive and rate information are compared. The optimal control model of the human operator is used to estimate human and system performance in terms of root-mean-square (rms) values and to compute optimized attention allocation. The only part of the model which is varied to predict these data is the observation matrix. Typical cases are selected for a subsequent experimental validation. The rms values as well as eye-movement data are recorded. The results agree favorably with those of the theoretical study in terms of relative differences. Better matching is achieved by revised model input data. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *HUMAN FACTORS ENGINEERING ; *MANUAL CONTROL; *OPTIMAL CONTROL; *PERFORMANCE PREDICTION
DE- DATA RECORDING; EYE MOVEMENTS; HOVERING; MAN MACHINE SYSTEMS; MATHEMATICAL MODELS; OPERATOR PERFORMANCE; SYSTEM EFFECTIVENESS; VERTICAL LANDING; VERTICAL TAKEOFF AIRCRAFT

SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01224778
AN- <AEROSPACE> A80-40237
TI- Direct measure of cathode-ray tube /CRT/ image quality
AU- VERONA, R. W. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.); TASK, H. L. (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio); ARNOLD, V. C. (Honeywell, Inc., Minneapolis, Minn.); BRINDLE, J. H. (U.S. Army, Night Vision and Electro-Optics Laboratory, Fort Belvoir, Va.)
SO- In: Measurements of optical radiations; Proceedings of the Seminar, San Diego, Calif., August 29, 30, 1979. (A80-40229 16-35) Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1979, p. 106-113.
PY- 1979
PD- 197900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8016
AB- This paper describes a direct measuring technique for determining the image quality of raster-scanned cathode-ray tube (CRT) displays. This technique is based on the Modulation Transfer Function (MTF) theory and human visual psychophysical data. The rationale for the technique is discussed from a theoretical as well as functional viewpoint. The instrumentation necessary to obtain these measures in manual and automatic modes is discussed. Data obtained using this measurement technique are analyzed and compared with the theoretical performance of the displays. The image quality of new CRT displays procured for the U.S. Army's Advanced Attack Helicopter is being specified and tested using this direct measuring technique. ((Author))
DE- <MAJOR> *CATHODE RAY TUBES; *DISPLAY DEVICES; *HELICOPTER DESIGN; *IMAGE RESOLUTION
DE- ATTACK AIRCRAFT; ELECTRO-OPTICS; MODULATION TRANSFER FUNCTION; SINE WAVES
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 01214542
AN- <AEROSPACE> A80-30001
TI- Built-in-test in MIL-STD-1553 systems
TI- <EXTENSION> multiplex data bus for automatic tests of avionics equipment
AU- LUDVIGSON, M. T. (Rockwell International Corp., Collins Government Avionics Div., Cedar Rapids, Iowa)
SO- In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. (A80-29991 11-59) New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 102-106.
PY- 1979
PD- 197900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8011
AB- The application of the MIL-STD-1553 data bus to future systems is discussed with regard to built-in-test that serves both the flight crew and the maintenance crew. Continuous monitoring is on line, and the system detects any failure to communicate on either bus in addition to microprocessor failures, and monitors power supplies in the computer control units and primary control unit (PCU), as well as PCU deflection circuits. The Army integrated avionics control system for helicopter cockpit management is cited as an example for which a small increase in hardware costs has provided about a two to one improvement in mean time to repair, and about a four to one improvement in maximum time to repair. (J.P.B.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC TEST EQUIPMENT; *AVIONICS; *ELECTRONIC EQUIPMENT TESTS; *MILITARY TECHNOLOGY
DE- CHANNELS (DATA TRANSMISSION); COMPUTER SYSTEMS PROGRAMS; CONTROL EQUIPMENT; FLIGHT CREWS; FLIGHT TESTS; LIFE CYCLE COSTS; SPACE MAINTENANCE
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01209066
AN- <AEROSPACE> A80-24525
TI- Aviation medicine. Volume 1 - Physiology and human factors
TI- <EXTENSION> Book
AU- DHENIN, G., (ED.) (RAF, London, England)
SO- London, Tri-Med Books, Ltd., 1978. 790 p
PY- 1978

PD- 197800
LA- English
CP- United Kingdom
DT- COLLECTED WORK
JA- IAA8008
AB- The book discusses the physiological and psychological aspects of human responses to flight stresses and the principles used in the protection of man from the hostile environment of flight. Consideration is given to changes of pressure, long- and short-duration acceleration including vibration and temperature extremes encountered in flying. The effects of each stress on normal performance, human tolerances to each stress and the physiological and psychological procedures used to minimize the impairment of performance due to each stress are presented. The effects of flight on vision, hearing and spatial orientation are also discussed, and the effects of irregular sleep and work schedules are considered. The psychology of flight tasks and training is also examined, and the medical aspects of helicopter, VTOL and SST flight and manned space flight are indicated. (A.L.W.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *CIVIL AVIATION; *CLINICAL MEDICINE; *MILITARY AVIATION; *PSYCHOLOGY
DE- ACCELERATION STRESSES (PHYSIOLOGY); ATTITUDE (INCLINATION); BIODYNAMICS
; DECOMPRESSION SICKNESS; FLIGHT STRESS (BIOLOGY); HEAT ACCLIMATIZATION
; HUMAN BEHAVIOR; HYPOXIA; MOTION SICKNESS; NOISE POLLUTION; PILOT ERROR; PRESSURE EFFECTS; SLEEP DEPRIVATION; SOCIAL FACTORS; STRESS
(PSYCHOLOGY); THERMAL ENVIRONMENTS; TOXIC HAZARDS; VIBRATION EFFECTS;
VISION; WORK CAPACITY
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01208591
AN- <AEROSPACE> A80-24050
TI- Data analysis methodology for day/night inflight tactical navigation
AU- CONNELLY, E. M.; COMEAU, R. F. (Performance Measurement Associates, Inc., Vienna, Va.); HOLMAN, G. L.; BYNUM, J. A. (U.S. Army, Army Research Institute, Fort Rucker, Ala.)
SO- In: Human Factors Society, Annual Meeting, 23rd, Boston, Mass., October 29-November 1, 1979, Proceedings. (A80-24026 08-53) Santa Monica, Calif., Human Factors Society, Inc., 1979, p. 563-567.
PY- 1979
PD- 197900
CN- DAHC19-77-C-0042
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8008
AB- Nap-of-the-earth helicopter navigation, both at night and during the day, is essential to the Army's mission. Navigation performance, defined as the probability of navigating along a prescribed route or route segment without deviation, is a function of many factors including map and terrain types. Determination of the effects of these factors is important information for predicting performance of Army navigators, identifying factors critical to navigation, evaluating the probability of navigation success along a route and developing training aids. The purpose of the research work reported here was to analyze NOE flight experiment data to develop that information. This paper contains results from analyses of helicopter NOE navigation data to determine the probability of navigation success along a route as a function of terrain type, to develop a means of determining route difficulty, and to develop a method of scoring student performance. ((Author))
DE- <MAJOR> *DATA PROCESSING; *HELICOPTER PERFORMANCE; *NIGHT FLIGHTS
(AIRCRAFT); *PERFORMANCE PREDICTION; *TACAN; *TERRAIN FOLLOWING AIRCRAFT
DE- AIRCRAFT SAFETY; ARMED FORCES (UNITED STATES); HUMAN FACTORS ENGINEERING; METHODOLOGY; MILITARY HELICOPTERS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01208582
AN- <AEROSPACE> A80-24041
TI- Operator visual workload shifts as a function of vehicle stability
AU- SIMMONS, R. R.; KIMBALL, K. A. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.)
SO- In: Human Factors Society, Annual Meeting, 23rd, Boston, Mass., October 29-November 1, 1979, Proceedings. (A80-24026 08-53) Santa Monica, Calif., Human Factors Society, Inc., 1979, p. 352-356.
PY- 1979
PD- 197900
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

JA- IAA8008
AB- This research was initiated to compare the visual performance/workload of pilots during fixed wing and rotary wing flights. The corneal reflection technique was used to obtain the visual data. The results demonstrate that visual performance/workload of the pilots was different for each aircraft. Because the major difference between the aircraft was the aerodynamic stability, it was assumed that the visual workload was in fact a function of aircraft stability. The overall purpose of such research has been to provide information concerning pilots' visual requirements for safe mission accomplishment. ((Author))

DE- <MAJOR> *AIRCRAFT STABILITY; *PILOT PERFORMANCE; *VISUAL TASKS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT MANEUVERS; FIXED WINGS; HUMAN FACTORS ENGINEERING; ROTARY WING AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01208579
AN- <AEROSPACE> A80-24038
TI- The development of objective inflight performance assessment procedures
AU- CHILDS, J. M. (Canyon Research Group, Inc., Fort Rucker, Ala.)
SO- In: Human Factors Society, Annual Meeting, 23rd, Boston, Mass., October 29-November 1, 1979, Proceedings. (A80-24026 08-53) Santa Monica, Calif., Human Factors Society, Inc., 1979, p. 329-333.
PY- 1979
PD- 197900
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA8008
AB- The purpose of this research was to develop procedures for objectively evaluating Initial Entry Rotary Wing (IERW) student performance in flight. Maneuvers of the Basic Instrument phase were addressed. Descriptive inflight scoring procedures to assess absolute deviations of desired values from observed values at designated times, were developed. Desired values were determined on the basis of the rates specified in IERW training guides. Observed values were instrument indications of airspeed, altitude, or heating at those times. Four tolerance categories were incorporated into alternative six-point maneuver scoring algorithms designed to assess aircraft control precision. The criterion for acceptable proficiency was the maintenance of each sampled measure within standard IERW tolerance limits for each sampling point of a maneuver. Tests of the objective scoring procedures were conducted in the UH-1 flight simulator. ((Author))
DE- <MAJOR> *AIRCRAFT MANEUVERS; *IN-FLIGHT MONITORING; *PILOT PERFORMANCE; *ROTARY WING AIRCRAFT; *TRAINING EVALUATION
DE- AIRCRAFT CONTROL; ALGORITHMS; CLIMBING FLIGHT; DATA SAMPLING; FLIGHT SIMULATORS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01208000
AN- <AEROSPACE> A80-23459
TI- Symposium on Explosives and Pyrotechnics, 10th, San Francisco, Calif., February 14-16, 1979, Proceedings
SO- Symposium sponsored by the Franklin Institute. Philadelphia, Pa., Franklin Research Center, 1979. 468 p (For individual items see A80-23460 to A80-23471)
PY- 1979
PD- 197900
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA8008
AB- The Symposium covered developments in materials and processes, developments in devices and applications, testing techniques and instrumentation, safety, and basic studies. Particular attention was given to such topics as separation bolts for the Space Shuttle solid rocket booster separation system, advanced transient pulse analysis of electroexplosive devices, a new method of disposal by burning of pyrotechnic and explosive waste material, and the shock initiation of explosive pellets at low temperatures. (B.J.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *EXPLOSIVES; *FIRE CONTROL; *PYROTECHNICS; *SAFETY FACTORS
DE- AIRCRAFT RELIABILITY; CERAMICS; DETONATORS; ELECTROSTATIC SHIELDING; ESCAPE SYSTEMS; FLIGHT SAFETY; GLASS; HELICOPTER DESIGN; HERMETIC SEALS ; IMPACT TESTS; LASER APPLICATIONS; PARACHUTES; PILOTLESS AIRCRAFT; QUALITY CONTROL; REMOTELY PILOTED VEHICLES; SPACE SHUTTLE BOOSTERS;

STAINLESS STEELS
SH- 7528 Propellants & Fuels (1975-)

AN- <DIALOG> 01203564
AN- <AEROSPACE> A80-19023
TI- Proficiency maintenance and assessment in an instrument flight simulator
AU- WEITZMAN, D. O.; FINEBERG, M. L.; GADE, P. A. (U.S. Army, Research Institute, Alexandria, Va.); COMPTON, G. L. (U.S. Army, Fort Campbell, Ky.)
SO- Human Factors, vol. 21, Dec. 1979, p. 701-710. Army-supported research.
PY- 1979
PD- 197912
RF- 10
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8005
AB- Transfer effects have been studied to evaluate the suitability of a high fidelity flight simulator (Device 2B24) for maintaining and assessing instrument proficiency among experienced Army helicopter pilots. Evidence in support of positive transfer was obtained by comparing pilots trained in the simulator with pilots trained in the aircraft (UH-1H) and with pilots trained in both. In addition, performance evaluation in the simulator accurately predicted performance in the aircraft. This study suggests that simulators of proven effectiveness can be used both to maintain and assess the proficiency of experienced pilots. ((Author))
DE- <MAJOR> *FLIGHT SIMULATORS; *FLIGHT TRAINING; *PILOT PERFORMANCE; *PILOT TRAINING; *TRAINING EVALUATION; *TRANSFER OF TRAINING
DE- ASSESSMENTS; HUMAN FACTORS ENGINEERING; MILITARY HELICOPTERS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01200174
AN- <AEROSPACE> A80-15633
TI- The physiopathology of vertebral pain in helicopter pilots
TI- <ORIGINAL> Physiopathologie des algies vertebrales des pilotes d'helicopteres
AU- DELAHAYE, R. P.; AUFFRET, R.; METGES, P. J.; POIRIER, J. L.; VICENS, J. (Hopital d'Instruction des Armees Begin, Saint Mande, Val-de-Marne; Centre d'Essais en Vol, Bretigny-sur-Orge, Essonne; Armee de l'Air, Ecole d'Application, Paris, France)
SO- Medecine Aeronautique et Spatiale, Medecine Subaquatique et Hyperbare, vol. 18, 2nd Quarter, 1979, p. 142-145. In French.
PY- 1979
PD- 197906
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA8004
AB- The effects of posture and vibration on spinal pathology in helicopter pilots are discussed, and preventative measures are presented. Consideration is given to the physical requirements of the task of piloting a helicopter, the relations between pilot postures determined by the seats of various helicopters and optimal comfort angles, and the origin of vertebral pain. The physiological effects of resonant vibrations in the z-axis on a spine already sensitized by poor posture are discussed, noting the apparition of clinically observed degenerative discopathy. Attempts to adapt aircraft to human requirements, such as the replacement of articulated metal systems by single plastic constructions, the installation of vibration dampers and the use of automatic postural stabilizers in the present-generation Gazelle, Dauphin, Ecureuil and Super Frelon helicopters, are presented, and the selection and periodic examination of helicopter pilots are discussed. (A.L.W.)
SF- AIAA
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *HELICOPTERS; *HUMAN PATHOLOGY; *PHYSIOLOGICAL RESPONSES; *POSTURE; *SPINE; *VIBRATION EFFECTS
DE- HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; SITTING POSITION; STRUCTURAL VIBRATION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01045542
AN- <AEROSPACE> N79-33846
TI- Development of an objective grading system along with procedures and aids for its effective implementation in flight
TI- <SUPPLEMENT> Research Note, 15 Nov. 1977 - 14 Nov. 1978

AU- CHILDS, J. M.
CS- Canyon Research Group, Inc., Westlake Village, Calif.
CS- <CODE> CG256692
SP- A2025595
PY- 1979
PD- 197905
PG- 49P.
CN- DAHC19-77-C-0008; DA PROJ. 2Q7-63743-A-772
RN- AD-A071106; FTR-09-79; ARI-RN-79-18
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7924
AB- This report contains a description of the characteristics and tests of two alternative inflight scoring procedures. These procedures were designed to meet the requirements of (1) minimal data collection, and (2) objective scores for Initial Entry Rotary Wing (IERW) student performance on Basic Instrument maneuvers. The procedures were criterion-referenced, employing different performance criteria, sampling techniques, and scoring algorithms. They were subjected to tests in the UH-1 simulator to assess the potential value of various characteristics within each procedure for meeting the requirements. Results of the tests provided general indications of those characteristics which best discriminated proficiency within and among students across training days. (GRA)
SF- DTIC
DE- <MAJOR> *FLIGHT TRAINING; *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE; *SCORING
DE- ABILITIES; IN-FLIGHT MONITORING; MANEUVERABILITY; MEASUREMENT
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01043658
AN- <AEROSPACE> N79-31952
TI- Human factors in production and prevention of aircraft accidents due to disorientation in flight
AU- ROTONDO, G.
CS- Italian Air Force Medical Service H. Q., Rome.
CS- <CODE> I7307109
PY- 1979
PD- 197906
NT- In AGARD Human Factors Aspects of Aircraft Accidents and Incidents 6 p (SEE N79-31942 22-54)
LA- English
GL- Italy
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR7922
AB- To prevent and reduce those flight accidents occasionally due to spatial disorientation, which are tied to the human factor and whose causes can, therefore, be influenced and corrected, it is very important that the pilot has exact knowledge of the possible illusory phenomena which can occur in flight, the awareness that they can be anticipated, and finally that timely actuation of adequate preventive measures allows one to avoid loss of orientation during the various conditions of flight. For that reason the most frequent circumstances and conditions should be examined which can facilitate spatial disorientation in the pilot favoring the mental conflict which originates when there is sensorial incongruity between erroneous sensations coming from the vestibular apparatus and/or the proprioceptors and inadequate visual information. The possible measures necessary to prevent those various conditions contributing to or facilitating disorientation in flight, or neutralizing them whenever they are already in effect, are discussed. (G.Y.)
SF- NASA CASI
DE- <MAJOR> *ACCIDENT PREVENTION; *AIRCRAFT ACCIDENTS; *DISORIENTATION; *HUMAN FACTORS ENGINEERING
DE- ATTITUDE (INCLINATION); FLIGHT CONDITIONS; FLIGHT HAZARDS; HELICOPTERS; MIDAIR COLLISIONS; PILOT TRAINING; VISUAL PERCEPTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01041928
AN- <AEROSPACE> N79-30212
TI- Project NAVTOLAND (Navy vertical takeoff and landing capability development)
AU- MOMIYAMA, T. S.
CS- Naval Air Systems Command, Washington, D. C. Advanced Aircraft Development and Systems Objectives Office.
CS- <CODE> NO789311

PY- 1979
PD- 197905
NT- In AGARD The Guidance and Control of Helicopters and V/STOL Aircraft at Night and in Poor Visibility 20 p (SEE N79-30198 21-08)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR7921
AB- The U.S. Navy's integrated systems approach to improve the helicopter and fixed-wing VSTOL aircraft operational capabilities at sea and in tactical sites is described. The current capability is limited to generally 400 foot ceiling and one mile visibility to 200 foot and 1/2 mile weather minima due to elementary flight control systems or lack of precision approach and landing guidance. Inability to cope with ship motions limits the small air capable ship operations generally to Sea State 3. The NAVTOLAND project goals are zero ceiling and 1/8 mile visibility weather minima and Sea State 5 operation. An integrated development of the aircraft flight control and display systems to provide flying qualities with satisfactory level of pilot workload and the shipboard and tactical site installed guidance systems and visual landing aids to effect precision in touchdown is applied toward improvement of the helicopter and AV-8 HARRIER operations and toward development of all-weather and rough sea operations of all future Navy and Marine Corps VSTOL aircraft. (M.M.M.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT GUIDANCE; *APPROACH CONTROL; *DISPLAY DEVICES; *LOW VISIBILITY; *MILITARY HELICOPTERS; *RIGID ROTOR HELICOPTERS
DE- AIRCRAFT CARRIERS; FLIGHT CONTROL; HUMAN FACTORS ENGINEERING; LANDING AIDS; TASK COMPLEXITY; WEATHER
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01041927
AN- <AEROSPACE> N79-30211
TI- The equipment-system interface in an antitank helicopter at night
TI- <ORIGINAL> etude d'interface equipage systeme dans un helicoptere anti-char de nuit
AU- FERLET, G.; MASCLE, J. L.
CS- GIE ISPENA, Paris (France).
CS- <CODE> GZ663299
PY- 1979
PD- 197905
NT- In AGARD The Guidance and Control of Helicopters and V/STOL Aircraft at Night and in Poor Visibility 10 p (SEE N79-30198 21-08)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A11/MF A01
JA- STAR7921
AB- A direct consequence of the growing complexity of modern aircraft missions is the increase of equipment workloads, which can reach a critical level in many cases. It is important to consider this problem from the beginning of the aircraft definition stage so that some really integrated solutions which guarantee maximum operational efficiency can be proposed for the equipment-system interface. Such a step requires the adoption of a rigorous, systematic work method that is capable of accounting for diverse data such as technological constraints or operational requirements, in order to obtain optimal solutions. A methodology used in the study of the equipment-system interface for an antitank helicopter capable of performing its mission by day as well as by night is presented. The technique distinguishes five stages in the iterative process, thus permitting progressive improvement in the definition of the interface, as a function of the difficulties considered at different stages. (Transl. by A.R.H.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *CONTROL EQUIPMENT; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *TASK COMPLEXITY
DE- ANTITANK MISSILES; INTERFACES; MAN MACHINE SYSTEMS; OPTIMIZATION; SYSTEMS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01041298
AN- <AEROSPACE> N79-29580
TI- Aerial radiometric and magnetic reconnaissance survey of portions of Arizona, New Mexico. Volume 1: Instrumentation and methods
TI- <SUPPLEMENT> Final Report
CS- Texas Instruments, Inc., Dallas.
CS- <CODE> TQ977069

PY- 1978
PD- 197811
PG- 63P.
CN- EY-76-C-13-1664
RN- GJBX-23(79)-VOL-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR7920
AB- Instrumentation and methods are described for a high-sensitivity, aerial gamma ray spectrometer and magnetometer survey of the Mesa, Tucson, Nogales, Clifton, Silver City, and Douglas, NTMS, 1:250,000-scale quadrangles in southeastern Arizona and southwestern New Mexico. A Bell 212 helicopter equipped with gamma ray spectrometer and six large-volume sodium iodide detectors, two 400 channel analyzers, and ancillary geophysical and electronic equipment, and a DC-3 aircraft equipped with nine detectors were used. Gamma ray spectrometric data were processed to correct for variations in atmospheric, flight, and instrument conditions and were statistically evaluated to remove the effects of surface geologic variations. The resulting first-priority uranium anomalies were interpreted to evaluate their origin and significance. Results in the form of a preferred anomaly map, along with significance-factor profile maps, stacked profiles, and histograms, are presented. (DOE)
SF- DOE
DE- <MAJOR> *AERIAL RECONNAISSANCE; *ARIZONA; *MAGNETOMETERS; *MINERAL EXPLORATION; *NEW MEXICO; *RADIOMETERS
DE- AIRBORNE EQUIPMENT; BELL AIRCRAFT; DATA PROCESSING; DATA REDUCTION; DC 3 AIRCRAFT; ELECTRONIC EQUIPMENT; ERROR CORRECTING CODES; METEOROLOGICAL PARAMETERS; STATISTICAL ANALYSIS; URANIUM
SH- 7543 Earth Resources (1975-)

AN- <DIALOG> 01037794
AN- <AEROSPACE> N79-26048
TI- Helicopter Icing Symposium
AU- DON, T. C.
CS- Ministry of Defence, London (England).
CS- <CODE> M1434205
PY- 1978
PD- 197811
PG- 316P.
NT- Symp. held at London, 6-7 Nov. 1978
RN- AD-A067981
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A01
JA- STAR7917
AB- This document is a collection of papers presented at the Helicopter Icing Symposium, held in London, England, 6-7 November 1978. The emphasis of the symposium was on helicopter rotor blade icing. Papers covered methods of rotor blade ice protection (electrothermal, ice phobic coatings, microwave, vibratory and mechanical-pneumatic concepts); design and test criteria; ice protection system capabilities and testing and certification methods. Also included are papers on meteorological data; instrumentation; icing tunnel tests and correlations of results to mathematical accretion model; and simulated and natural icing flight tests. (Author (GRA))
SF- DTIC
DE- <MAJOR> *DEICERS; *HELICOPTERS; *ICE FORMATION; *ROTARY WINGS
DE- ELECTRONIC EQUIPMENT; FLIGHT TESTS; ICE PREVENTION; MATHEMATICAL MODELS ; MECHANICAL DEVICES; METEOROLOGICAL CHARTS; MICROWAVE EQUIPMENT; THERMODYNAMIC PROPERTIES; VIBRATION; WIND TUNNEL TESTS
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01035696
AN- <AEROSPACE> N79-23913
TI- Aircraft icing: Introduction
AU- ENDERS, J. H.
CS- National Aeronautics and Space Administration, Washington, D. C.
CS- <CODE> NC452981
PY- 1979
NT- In NASA. Lewis Res. Center Aircraft Icing 3 p (SEE N79-23912 15-02)
LA- English
GL- United States

CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR7915
AB- The objectives of the Workshop were as follows: (1) to assess the current understanding of fixed wing and rotorcraft operational icing environments and problems (2) to evaluate facilities requirements for R&D and certification purposes (3) to examine means of improving icing forecasts (4) to identify shortcomings in aeronautical icing knowledge which can be alleviated by new research and instrumentation development. (L.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT HAZARDS; *ICE FORMATION
DE- FORECASTING; RESEARCH AND DEVELOPMENT; RESEARCH FACILITIES; SAFETY MANAGEMENT; VULNERABILITY
SH- <COSATI> 1C Aircraft
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 01031491
AN- <AEROSPACE> N79-19664
TI- The approach to crew protection in the crash environment for the YAH-64
AU- MCDERMOTT, J. M.
CS- Hughes Helicopters, Culver City, Calif. Structural Analysis Section.
CS- <CODE> H5785201
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The approach to crashworthiness in protecting the crew of the advanced attack helicopter is described. Basic requirements of crash criteria specified by the Army are presented. Impact modes and impact velocities are discussed. The means used to meet these requirements using a total systems approach (i.e., landing gear, plus fuselage crushing and energy absorbing seats all in series) are presented. Crash pulses felt by the occupants during the various crash impacts are presented. Design of energy absorbing seats is discussed. Protection of the crew by use of turnover structure and by means of high load factors on heavy mass items which could penetrate the cockpit is illustrated. Maintaining living space during crash barrier impacts, and protection against blade strikes using the roll over structure are discussed. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT PILOTS; *AIRCRAFT SAFETY; *ATTACK AIRCRAFT; *CRASH LANDING; *FLIGHT CREWS; *HELICOPTER DESIGN; *IMPACT DAMAGE; *MILITARY HELICOPTERS
DE- COCKPITS; ENERGY ABSORPTION; HUMAN FACTORS ENGINEERING; LANDING GEAR; SAFETY DEVICES; SEATS; SYSTEMS ENGINEERING
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031490
AN- <AEROSPACE> N79-19663
TI- Crash survivability of the UH-60A helicopter
AU- CARNELL, B. L.
CS- Sikorsky Aircraft, Stratford, Conn. Systems Engineering Branch.
CS- <CODE> SL280853
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 10 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The Sikorsky UH-60A or BLACK HAWK is designed to minimize the hazards found in the many accidents that occurred in the combat environment of Southeast Asia. Its crash survivability design features are discussed. These include: (1) a protective shell is maintained around the occupants; the energy absorbing landing gear cushions the crash impact and the structure is designed to minimize penetration by rotor blades, transmissions and engines; (2) the loads on the occupants are limited to noninjurious levels; all seats are energy attenuating; (3) major postcrash fires are prevented; a complete crash survivable fuel system

is installed; (4) the interior is noninjurious; no hard structure is in the head strike zones. Padding and shielding in the cockpit protect the aircrew from injury and entrapment; and (5) adequate emergency escape capability is provided; jettisonable cockpit doors and cabin windows allow rapid emergency egress. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT SAFETY; *AIRCRAFT SURVIVABILITY; *COCKPITS; *CRASH
LANDING; *HELICOPTER DESIGN; *UH-60A HELICOPTER
DE- AIRCRAFT ACCIDENTS; ENERGY ABSORPTION; FIRE PREVENTION; HUMAN FACTORS
ENGINEERING; IMPACT DAMAGE; JETTISON SYSTEMS; LANDING GEAR; ONBOARD
EQUIPMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031489
AN- <AEROSPACE> N79-19662
TI- Biomedical constraints on thermal protective flight clothing design: A bioengineering analysis
AU- KNOX, F. S., III; WACHTEL, T. L. (California Univ., San Diego); KNAPP, S. C. (Army Aeromedical Research Lab., Ft. Rucker, Ala.)
CS- Louisiana State Univ., Shreveport. School of Medicine.
CS- <CODE> L5524228
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 11 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- From studies of the dynamics of large JP-4 fuel fires and of instrumented helicopter hulks immersed in such fires, the worst credible postcrash fire environment was defined. Data from these fires allowed the the construction and calibration of a JP-4 fueled postcrash fire simulator. This simulator was used to expose 95 domestic white pigs (animal for human skin) to simulated postcrash fires of various intensities and various durations. In some instances fabrics (e.g., Nomex) were placed between the fire and the pig. The resultant burns were graded on surface appearance and on depth of damage. The relationship between thermal energy and burn depth is complex and depends on, among other things, initial skin temperature, skin color, length of hair stubble, exposure time, and amount and rate of tissue water boiling. Fabrics tend to lower the amount of energy transmitted to the skin provided they remain intact and maintain an insulating air layer. The experimental burn data presented and survival data from the Natural Burn Information Exchange form the basis of a rational consideration of the biomedical constraints on thermal protective flight clothing design when compared with textile engineering and cost factors. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *BIOENGINEERING; *FIRES; *FLIGHT CLOTHING; *PROTECTIVE CLOTHING
; *THERMAL PROTECTION
DE- AEROSPACE MEDICINE; AIRCRAFT ACCIDENTS; AIRCRAFT HAZARDS; COST ANALYSIS
; HUMAN FACTORS ENGINEERING; SURVIVAL
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031488
AN- <AEROSPACE> N79-19661
TI- A method for selecting a crashworthy fuel system design
AU- ROBERTSON, S. H.; THURBOW, J. W.
CS- Arizona State Univ., Tempe. Engineering Safety Center.
CS- <CODE> AX646679
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 6 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- A rating method that a crashworthy fuel system designer can use to help determine the amount of hardware and special design considerations needed to obtain a desired reduction in the fuel system fire hazard level is discussed. Man's tolerance to the thermal environment, and the escape time available to the aircraft occupants are among the factors considered. (J.M.S.)

SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT SAFETY; *CRASHES; *FUEL SYSTEMS;
*HELICOPTER DESIGN; *IMPACT DAMAGE
DE- AEROSPACE MEDICINE; DESIGN ANALYSIS; FIRE PREVENTION; HUMAN FACTORS
ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031487
AN- <AEROSPACE> N79-19660
TI- Helicopter crashworthy fuel systems and their effectiveness in preventing thermal injury
AU- KNAPP, S. C.; ALLEMOND, P. (Army Agency for Aviation Safety, Ft. Rucker, Ala.); KARNEY, D. H.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- All Army helicopter accidents during the period 1968-1976 are reviewed and classified by survivability and whether or not the aircraft was equipped with a crashworthy fuel system. Accident associated fatalities and injuries are reclassified as to the primary injury involved and its relationship to the existence of any postcrash fire. The direct costs involved in the care of thermal fatalities and thermal injuries are calculated using the most conservative estimates. It is shown that the helicopter crashworthy fuel system essentially eliminated postcrash fatalities and injuries in accidents involving helicopters equipped with the new system. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT SAFETY; *CRASH INJURIES; *FUEL
SYSTEMS; *MILITARY HELICOPTERS
DE- AIRCRAFT SURVIVABILITY; FIRE PREVENTION; FIRES; HUMAN FACTORS
ENGINEERING
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031486
AN- <AEROSPACE> N79-19659
TI- Some improvements to the UK helicopter cockpit
AU- READER, D. C.
CS- Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
CS- <CODE> R1446220
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 3 p (SEE N79-19605 10-51)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The human-factor aspects of helicopters are discussed. These include: improvements to the restraint harnesses; the location and methods of stowage of the survival aids; and the strength, adjustment and anti-vibration properties of the crew seats. Experiments conducted to investigate the feasibility of different configurations of flight control are described. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *HELICOPTER DESIGN; *SAFETY DEVICES; *SEATS
DE- CONTROL BOARDS; FLIGHT SAFETY; HARNESSES; HUMAN FACTORS ENGINEERING;
ONBOARD EQUIPMENT; SEAT BELTS; UNITED KINGDOM
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031485
AN- <AEROSPACE> N79-19658
TI- Crashworthy helicopter seats and occupant restraint systems
AU- SINGLEY, G. T., III; DESJARDINS, S. P. (Simula, Inc., Tempe, Ariz.)
CS- Army Aviation Research and Development Command, Fort Eustis, Va. Applied Technology Lab.
CS- <CODE> AZ143130
PY- 1978
PD- 197812

NT- In AGARD Operational Helicopter Aviation Med. 32 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Seats and restraint systems offering substantial improvements in comparison to existing helicopters with respect to strength, body restraint, and crash force attenuation are described. These seat and restraint systems are capable of retaining the seated occupant in the same relative position within the aircraft throughout the 95th percentile potentially survivable accident without the occupant being subjected to conditions in excess of human tolerance. Cockpit and cabin seat and restraint systems retention strengths are shown to withstand drop and sled tests with velocity changes of 50 ft/sec and peak accelerations of 48G for drop tests and 30G for sled tests. This increased strength is achieved with lightweight designs and is made possible by the application of load limiting principles. This crash force attenuation characteristic limits the impact loading not only of the seat structure but also of the seat occupant. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT SAFETY; *CRASH LANDING; *HELICOPTER DESIGN; *SAFETY DEVICES; *SEATS; *SHOCK ABSORBERS
DE- AIRCRAFT ACCIDENTS; CRASH INJURIES; HUMAN FACTORS ENGINEERING; IMPACT LOADS; STRUCTURAL DESIGN CRITERIA; SURVIVAL
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031484
AN- <AEROSPACE> N79-19657
TI- Assessment of the benefits of aircraft crashworthiness
AU- GILEWICZ, A. E.
CS- Army Agency for Aviation Safety, Fort Rucker, Ala.
CS- <CODE> AY871566
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 8 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- An assessment is made of the economic benefits of providing crashworthiness improvements within future Army helicopters. Crashworthiness features which would be most worthwhile in preventing or reducing injury and hardware damage are discussed from a cost effectiveness standpoint. Predictions of future accident losses for a number of candidate utility helicopter replacements are given. Projections were derived based on each helicopter's crashworthiness design features and the effectiveness in injury and hardware damage prevention. The technical adequacy of the design requirements is verified based on typical Army helicopter crash impacts. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS; *SURVIVAL
DE- COST EFFECTIVENESS; CRASH INJURIES; ECONOMIC FACTORS; HUMAN FACTORS ENGINEERING; IMPACT DAMAGE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031482
AN- <AEROSPACE> N79-19655
TI- Engineering analysis of crash injury in army aircraft
AU- HICKS, J. E.
CS- Army Agency for Aviation Safety, Fort Rucker, Ala.
CS- <CODE> AY871566
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 11 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- A methodology for identification of crashworthiness deficiencies in

Army aircraft is discussed. The methodology provides for injury and impact data to be extracted from accident reports using a specially developed injury coding system. Personnel injuries are costed through a technique which provides for consideration of each injury based on its relative severity as determined by medical examination. Crash injury causes are identified and ranked according to the magnitude of their effect and probability of occurrence. The technique is designed to provide recommendations as to the most urgent crashworthiness research/development/procurement efforts for consideration by aircraft systems managers and aviation research laboratories. An application of the methodology to an operated Army aircraft is shown. Preliminary results as to the more significant crash hazards in this aircraft are discussed. Recommendations are made as to the use of the methodology and to additional investigation aids which would improve the future identifications of crash hazards. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *CRASH INJURIES; *IMPACT DAMAGE; *MILITARY
HELICOPTERS
DE- AIRCRAFT PILOTS; AIRCRAFT SAFETY; ECONOMIC FACTORS; FLIGHT HAZARDS;
FLIGHT SAFETY; HELICOPTER DESIGN; HUMAN FACTORS ENGINEERING; OPERATIONS
RESEARCH; OPTIMIZATION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031481
AN- <AEROSPACE> N79-19654
TI- Comparative injury patterns in US Army helicopters
AU- SAND, L. D.
CS- Army Agency for Aviation Safety, Fort Rucker, Ala.
CS- <CODE> AY871566
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605
10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The type of injuries, body area injured, and cause of injuries to 740 U.S. Army aviators involved in 388 rotary wing accidents from 1 January 1972 through 30 September 1977 are examined. Considerations are given to two main areas: (1) relationship to injury regarding the aviator's height, weight, and location aboard the aircraft, cockpit condition, and aircraft altitude; and (2) comparison of present injury experience with previous injury studies. The results, through statistical analyses, show that not one, or even combinations, of those factors listed were significant in injury causation. Further, comparisons of injuries show that the overall injury pattern has not changed significantly in the past 20 years. For example, injuries to the extremities, the head, and the spine continue to be among the leading body areas to be injured. Also, 94 percent of all accidents from 1957 to the present were classified as survivable but produced 33 percent of all fatalities. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AIRCRAFT PILOTS; *CRASH INJURIES; *HELICOPTER DESIGN; *MILITARY HELICOPTERS
DE- AEROSPACE MEDICINE; ATTACK AIRCRAFT; FLIGHT SAFETY; HUMAN FACTORS
ENGINEERING; IMPACT DAMAGE; TRANSPORT AIRCRAFT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031480
AN- <AEROSPACE> N79-19653
TI- Occupant injury mechanisms in civil helicopter accidents
AU- SNYDER, R. G.
CS- Michigan Univ., Ann Arbor. Inst. of Highway Safety Research.
CS- <CODE> MX270710
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 14 p (SEE N79-19605
10-51)
NT- Sponsored in part by FAA and NTSB
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Mechanisms incurred in several selected accidents involving roll-over, rotor blade strike, and seat and restraint system failures are

discussed. The present injury and fatality rate could be reduced in civil accidents by improved restraints, including use of upper-torso belts, energy-absorbing seats, crashworthy fuel systems, and increased use of protective helmets. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *COMMERCIAL AIRCRAFT; *GENERAL AVIATION
AIRCRAFT; *HELICOPTERS
DE- AEROSPACE MEDICINE; AIRCRAFT SAFETY; CRASH INJURIES; HELMETS; HUMAN
FACTORS ENGINEERING; OPERATIONS RESEARCH; SEAT BELTS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031479
AN- <AEROSPACE> N79-19652
TI- Aviator visual performance: A comparative study of a helicopter simulator and the UH-1 helicopter
AU- SIMMONS, R. R.; LEES, M. A.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 13 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The visual performance/workload of pilots during helicopter and simulated helicopter instrument flights was compared. The corneal reflection technique was utilized to obtain the visual data. Although pilot performance in the Army's UH-1FS simulator and the UH-1H helicopter were similar, several differences were noted. Additionally, the zone/cost factor theory was expanded. Pilots visual requirements for safe mission accomplishment was emphasized. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT SIMULATORS; *PILOT PERFORMANCE; *UH-1 HELICOPTER; *VISUAL PERCEPTION
DE- AIRCRAFT PILOTS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; INSTRUMENT
FLIGHT RULES; OPERATIONS RESEARCH; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031477
AN- <AEROSPACE> N79-19650
TI- Training requirements for helicopter operation with night vision goggles
AU- BEHAR, I.; YOUNG, D. M.; JOHNSON, J. E.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 4 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The Army Aviation Center experience in night vision goggle (NVG) stagefield training at night which identified numerous problem areas and their remediation are described. An evaluation of an approach to circumventing many of these problems as well as providing an added margin of safety by providing the initial part of the NVG training during the daytime using appropriate filters for the goggles is included. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT TRAINING; *GOGGLES; *MILITARY HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT)
DE- FLIGHT SAFETY; MILITARY OPERATIONS; NIGHT VISION; OPERATIONS RESEARCH;
PILOT PERFORMANCE; PSYCHOPHYSIOLOGY; TERRAIN FOLLOWING AIRCRAFT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031476
AN- <AEROSPACE> N79-19649
TI- Operational consideration of AN/PVS-5 night vision goggles for helicopter night flight
AU- CHIOU, W. C.

CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 9 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Experimental results and operational problems are discussed in which artificial illumination is being utilized to increase helicopter night vision goggle (NVG) training duration when ambient illumination is insufficient. Two types of artificial illumination were evaluated. The first type utilizes the existing helicopter landing light as an illumination source. The second type uses auxiliary external illumination sources such as a searchlight. A modified one kilowatt AN/VSS-4 (XG-4) armored illuminator and the fire-fly lighting system were flight tested. Results reveal that the former provides a far better illumination pattern than the latter. Spectral transmission characteristics and optical quality of these artificial illumination sources are given in detail. Various advantages and disadvantages of using one kind versus the other will also be discussed in detail. It is shown that an artificial illumination source or a combination of various sources can be utilized to increase the helicopter NVG training time at night. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT SAFETY; *GOGGLES; *HELICOPTERS; *ILLUMINATING; *NIGHT FLIGHTS (AIRCRAFT)
DE- FLIGHT TRAINING; HUMAN FACTORS ENGINEERING; LIGHT TRANSMISSION; OPERATIONS RESEARCH
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031475
AN- <AEROSPACE> N79-19648
TI- Disorientation in Royal Naval helicopter pilots
AU- STEEL-PERKINS, A. P.; EVANS, D. A. (Royal Naval Air Medical School, Hillhead, England)
CS- Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
CS- <CODE> R1446220
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 5 p (SEE N79-19605 10-51)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The incidence of pilot disorientation in fixed and rotary wing aircraft was investigated. Information regarding special orientation problems of naval helicopter pilots engaged in operations at sea and landing on moving platforms was obtained when a survey of 104 active USN pilots was reported. This questionnaire was adapted and distributed to Royal Navy helicopter pilots. The aims of the surveys were that useful information would be obtained on aircraft manning, cockpit and instrument design for future helicopter pilots regarding disorientation and thus a possible improvement in flight safety. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *DISORIENTATION; *FLIGHT SAFETY; *MILITARY HELICOPTERS; *PHYSIOLOGICAL EFFECTS; *PILOT PERFORMANCE
DE- AIRCRAFT LANDING; COCKPITS; FLIGHT INSTRUMENTS; OPERATIONS RESEARCH; UNITED KINGDOM
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01031474
AN- <AEROSPACE> N79-19647
TI- Some aspects of helicopter communications
AU- ROOD, G. M.; LOVESEY, E. J.
CS- Royal Aircraft Establishment, Farnborough (England). Human Engineering Div.
CS- <CODE> R2785060
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605 10-51)
LA- English
GL- United Kingdom
CP- International Organization

DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Factors that influence helicopter radio communications are examined. These include: the characteristics of the signal transmitter and receivers and their siting; the effects of noise and distortion of the signals; and the ability of the operator to perceive the signals while performing other tasks. The interface of the man with the equipment and the helicopter environment and the effect of the helicopter environment upon his ability to receive and process audio signals is emphasized. Helicopter noise levels, helmet attenuation, signal masking, total operator noise dose, and crew task difficulty are considered in terms of improving the overall helicopter/crew efficiency. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *BACKGROUND NOISE; *COCKPITS; *HELICOPTERS; *NOISE INTENSITY; *RADIO COMMUNICATION
DE- AEROSPACE MEDICINE; HUMAN FACTORS ENGINEERING; NOISE THRESHOLD; PILOT PERFORMANCE; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7532 Communications (1975-)

AN- <DIALOG> 01031471
AN- <AEROSPACE> N79-19644
TI- Sensorial aspects of helicopter operations
AU- ROTONDO, G.
CS- Italian Air Force Medical Service H. Q., Rome.
CS- <CODE> I7307109
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 5 p (SEE N79-19605 10-51)
LA- English
GL- Italy
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The effects of sensorial phenomena related to the use of rotor-powered aircraft are examined, as components of physical and psychic workload in the piloting of helicopters, and therefore, as possible pathogenetic concurrent factors of operational fatigue in helicopter aircrews. Particularly, acoustic and nonacoustic vibrations are discussed with special reference to the effects exerted by vibratory motions on visual function. Another problem taken into consideration is the disorientation that the pilot may experience whenever there is a conflict between his own sensorial evaluations and the information supplied by the instruments. The means that might be employed for the purpose of ascertaining functional changes and possibly preventing negative effects produced by sensorial phenomena, are examined in order to attain a high degree of flight safety in helicopter operations as a result of the prevention of flight accidents due to the human factor. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTERS; *PILOT PERFORMANCE; *SENSORY FEEDBACK; *VIBRATION PERCEPTION; *VISUAL PERCEPTION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AEROSPACE MEDICINE; FATIGUE (BIOLOGY); HUMAN FACTORS ENGINEERING; OPERATIONS RESEARCH; VIBRATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031468
AN- <AEROSPACE> N79-19641
TI- Visual pockets: A design parameter for helicopter instrument panels
AU- BAILEY, R. W.; GLICK, D. D.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 4 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The concept of fixation points between instruments ('Visual Pockets') for instrument flight of helicopters was proposed as a new concept to reduce pilot workload and improve performance. It was also proposed that this concept be applied to cockpit instrument panel design. In view of the significance attached to this revolutionary concept of

'Visual Pockets', a review and perspective of helicopter pilot visual information requirements are presented with special emphasis on the impact of 'Visual Pocket' concepts. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *CONTROL BOARDS; *EYE MOVEMENTS; *FLIGHT INSTRUMENTS; *HELICOPTERS; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- COCKPITS; FLIGHT CONDITIONS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; INSTRUMENT FLIGHT RULES; OPERATIONS RESEARCH; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031467
AN- <AEROSPACE> N79-19640
TI- Visual performance/workload of helicopter pilots during instrument flight
AU- SIMMONS, R. R.; LEES, M. A.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 17 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Visual and psychomotor performance data was collected in an attempt to investigate and study the general visual performance of aviators during IFR conditions. Two groups of aviators, with varied experience levels, were the subjects. A NAC Eye Mark Recorder and the Helicopter In-Flight Monitoring System were utilized to collect the required data. The results indicated, among other findings, that pilot subjective opinion does not agree with objective data. Additionally, the attitude indicator and radio compass comprised over 60 percent of the pilot's total visual workload, while the aircraft's status gauges were monitored less than 10 percent of the total time. These data should provide invaluable information concerning the visual requirements of pilots for safe helicopter operations. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTERS; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE; *VISUAL FLIGHT; *VISUAL PERCEPTION; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT PILOTS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; IN-FLIGHT MONITORING; OPERATIONS RESEARCH
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031465
AN- <AEROSPACE> N79-19638
TI- Oculomotor performance of aviators during an autorotation maneuver in a helicopter simulator
AU- ARMSTRONG, R. N.; KRUEGER, G. P.; SAPP, J. H.; JONES, Y. F.
CS- Army Aeromedical Research Unit, Fort Rucker, Ala.
CS- <CODE> AY832881
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 14 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The oculomotor performance of ten US Army pilots, a group of five experienced and a group of five newly graduated aviators, was filmed during helicopter simulator flights conducted under precision instrument flight conditions. Each pilot flew a one hour precision instrument flight in a simulator on each of four days. On the fourth day, the flight scenario included a simulated engine failure that required the pilot to execute an autorotation maneuver. Oculomotor performance, pilot control, and aircraft flight dynamic measures were recorded during the fourth flight. The allocation of pilot visual activity to various instruments was observed to differ as a function of two phases of the autorotation maneuver. Pilots controlled rotor speed and airspeed closer to desired limits in the second phase than they did in the initial phase of the autorotation. Few differences of pilot visual activity were exhibited as a function of the experience level of the pilots. (J.M.S.)
SF- NASA CASI

DE- <MAJOR> *AIRCRAFT MANEUVERS; *AIRCRAFT PILOTS; *AUTOROTATION; *FLIGHT
SIMULATORS; *HELICOPTERS; *PILOT PERFORMANCE; *VISUAL FLIGHT; *VISUAL
PERCEPTION
DE- AIRCRAFT CONTROL; FLIGHT CONDITIONS; HUMAN FACTORS ENGINEERING;
INSTRUMENT FLIGHT RULES; OPERATIONS RESEARCH; VISUAL CONTROL
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031464
AN- <AEROSPACE> N79-19637
TI- Observation of night shipboard helicopter operations from a 210 foot US
Coast Guard cutter
AU- HARVEY, W. W., JR.
CS- Coast Guard, Alameda, Calif.
CS- <CODE> CS069686
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 6 p (SEE N79-19605
10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Night helicopter operations were conducted to observe the effectiveness
of flight deck lighting. These observations are outlined, and a simple
review of visual perception is given. Emphasis is placed on improving
safety aspects of night flight. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTERS; *NIGHT FLIGHTS (AIRCRAFT); *VISIBILITY; *VISUAL
PERCEPTION
DE- FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; OPERATIONS RESEARCH; SAFETY
FACTORS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031463
AN- <AEROSPACE> N79-19636
TI- Visual requirements for the helicopter pilot
AU- LOWE, W. F.
CS- Textron Bell Helicopter, Fort Worth, Tex. Human Factors and Cockpit
Arrangement Group.
CS- <CODE> TV739419
PY- 1978
PD- 197812
RF- 1
NT- In AGARD Operational Helicopter Aviation Med. 6 p (SEE N79-19605
10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Flight test results of pilots flying obstacle avoidance maneuvers are
discussed. Prediction that pilots would maneuver closer to obstacles on
their side of the aircraft as opposed to obstacles on the
copilot/observer side and that as speed of fly-by maneuvers increased
the distance required for safe clearance would increase were not
completely supported by the data. Explanation of these contradictory
results are offered. A survey of commercial operators to determine the
unique requirements of their operations is included along with a vision
plot of a new commercial twin turbine helicopter. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *PILOT
PERFORMANCE; *VISIBILITY; *VISUAL PERCEPTION
DE- AIRCRAFT MANEUVERS; OPERATIONS RESEARCH; OPTIMIZATION; SAFETY FACTORS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031462
AN- <AEROSPACE> N79-19635
TI- A system of training in aviation physiology and human factors for Army
and Navy helicopter aircrew
AU- ORMEROD, P. S.
CS- Royal Naval Air Medical School, Seafield Park (England).
CS- <CODE> R5479011
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 9 p (SEE N79-19605
10-51)

LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Aeromedical training courses designed specifically for helicopter aircrews are described. Methods used to devise the present courses and the factors considered to be important in determining the usefulness of aeromedical training to aircrews are emphasized. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT TRAINING; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *PHYSIOLOGICAL FACTORS
DE- AEROSPACE MEDICINE; OPERATIONS RESEARCH; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031459
AN- <AEROSPACE> N79-19632
TI- Human factor engineering test and evaluation of the US Navy LAMPS helicopter system
AU- CURRAN, P. M.; LAURENT, G. J.; LINTON, P. M.
CS- Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> NO000154
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 8 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The human factors engineering (HFE) planning, implementation, and contributions in the evaluation of the U.S. Navy Light Airborne Multi-purpose System (LAMPS) during calibrated range and open-sea operations are presented. Human factor engineering participation in this overall program was directed to the critical evaluation of the interfaces among the various system operators and their equipments in the two LAMPS system versions. The adequacy of the air and ship crews and their station designs in the two LAMPS system versions was assessed. The major sources of HFE data were subjective: operator questionnaire; structured observations; and tape-recorded interviews. Objective data included mission key-event printouts, internal communication system (ICS) voice tapes, and aircraft and shipboard display photographs. Conclusions are presented and discussed. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *LIGHT AIRBORNE MULTIPURPOSE SYSTEM; *MAN MACHINE SYSTEMS
DE- CREW STATIONS; FLIGHT CREWS; OPERATIONS RESEARCH; SYSTEMS ENGINEERING; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031458
AN- <AEROSPACE> N79-19631
TI- Design procedure for an information transfer method CUBITS for allocating panel area for aircrew station controls and displays
AU- CURRAN, P. M.
CS- Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
CS- <CODE> NO000154
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 10 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- A systematic and objective method for the allocation of panel areas in aircrew workspaces was developed. The developed procedure is based on: (1) the criticality of the control or display on crew safety and mission effectiveness; (2) the frequency of utilization; and (3) the amount of information which is conveyed by the operator to the system through control actuation or which is conveyed to the operator by the display presentation. This procedure utilizes a computational method

called CUBITS to establish a single figure of merit for the allocation of panel space. This method also deals with the number of control settings and accuracy required in the computation of the amount of information being transferred. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *CONTROL BOARDS; *DISPLAY DEVICES; *FLIGHT CREWS;
*FLIGHT INSTRUMENTS; *HELICOPTER DESIGN
DE- AVIONICS; DESIGN ANALYSIS; HELICOPTERS; HUMAN FACTORS ENGINEERING; MAN
MACHINE SYSTEMS; OPERATIONS RESEARCH; SAFETY FACTORS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031456
AN- <AEROSPACE> N79-19629
TI- The use of biostereometry in helicopter cockpit design
TI- <ORIGINAL> utilisation d'une methode de biostereometrie dans la conception d'un poste de pilotage d'helicoptere
TI- <EXTENSION> using a simulator and analytic geometry
AU- COBLENTZ, A.; DELOISON, Y.; IGNAZI, G.; PRUDENT, J.
CS- Paris V Univ. (France). Laboratoire d'Anthropologie et d'Ecologie Humaine.
CS- <CODE> PF195621
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 19 p (SEE N79-19605 10-51)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The functional anthropometric characteristics of French land force helicopter pilots were analyzed to define new norms for equipping pilot stations and making them adaptable to the needs of the operators. An apparatus was developed which can be raised by each anatomic point and by each point chosen on the equipment. A simulator of the pilot station was constructed so that the X, Y, Z coordinates could be obtained in a fixed reference geometry. The precise results obtained were used in the simulator and the ergonometric and data and dimensions were integrated. With the use of this three dimensional measurement system, the adjustments necessary to provide comfort to different subjects were measured and pilot positions were analyzed so the variations in pilot attitude could be considered in the simulated pilot performance. (Transl. by A.R.H.)
DE- <MAJOR> *ANALYTIC GEOMETRY; *ANTHROPOMETRY; *COCKPITS; *HELICOPTER
DESIGN; *HUMAN FACTORS ENGINEERING; *SIMULATORS
DE- AIRCRAFT PILOTS; AVIONICS; DUMMIES; MAN MACHINE SYSTEMS; PHYSICAL WORK;
POSTURE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031455
AN- <AEROSPACE> N79-19628
TI- TADRAP: A computer-aided technique for reducing aircrew task analysis data
TI- <EXTENSION> helicopter design considering human factors
AU- GOBUTY, D. E.
CS- Hughes Helicopters, Culver City, Calif. Human Factors Engineering.
CS- <CODE> H5785201
PY- 1978
PD- 197812
RF- 1
NT- In AGARD Operational Helicopter Aviation Med. 9 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- As part of the human factors engineering activity during design of the YAH-64 advanced attack helicopter, a technique was developed for the computer aided reduction of aircrew task analysis data. The Task Analysis Data Reduction and Analysis Program (TADRAP) begins with the processing of raw data from a classical task analysis which was structured around a five-tiered pyramidal scheme for mission description. Once coded and keypunched, TADRAP converts the task analysis data into estimates of operator workload based upon expected task completion time, plus weighted values representing the complexity factors of action cycle, sensory modality, and task position. The

TADRAP facilitates task analysis validation and presents workload data in tabular form. Future plans include expanding TADRAP routines to provide computer graphics illustrations of analyzed mission profiles. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *COMPUTER TECHNIQUES; *DATA REDUCTION; *FLIGHT CREWS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- MAN MACHINE SYSTEMS; OPERATIONS RESEARCH
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031454
AN- <AEROSPACE> N79-19627
TI- Human factors evaluations of today's helicopters as an aid to future systems design
AU- LOVESEY, E. J.
CS- Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
CS- <CODE> R2785060
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605 10-51)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Methods of identifying the shortcomings of helicopter weapon systems and avionics design are discussed in terms of the interface with the operator. Cine filming, eyemark, and voice recording are considered along with structured interviews and questionnaires. Emphasis is placed on discovery of good human features and shortcomings in order to eradicate the bad in future designs. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AVIONICS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *SYSTEMS ENGINEERING; *WEAPON SYSTEMS
DE- MAN MACHINE SYSTEMS; OPERATIONS RESEARCH; OPTIMIZATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031452
AN- <AEROSPACE> N79-19625
TI- Advancements in helicopter cockpit technology
AU- HARPER, H. P.
CS- Sikorsky Aircraft, Stratford, Conn.
CS- <CODE> SL280853
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 7 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- The requirements of future missions are discussed in terms of the need for advanced controls and displays and improvements in cockpit vision, workload, and comfort. A number of technological areas are reviewed as candidates for inclusion in an advanced cockpit. A cockpit design incorporating this technology is presented. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *COCKPITS; *COMFORT; *ENVIRONMENTAL ENGINEERING; *FLIGHT INSTRUMENTS; *HELICOPTERS; *VISIBILITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; TECHNOLOGY ASSESSMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01031450
AN- <AEROSPACE> N79-19623
TI- Changes in the rotary wing aviator's ability to perform an uncommon low altitude rearward hover maneuver as a function of extended flight requirements and aviator fatigue
AU- LEES, M. A.; SIMMONS, R. R.; STONE, L. W.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 14 p (SEE N79-19605

10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Changes in man-helicopter system performance for a variety of flight maneuvers were examined. The system performance changes in the rearward hover maneuver across five days of an extended flight schedule are described. System performance is categorized into measures of the pilot's control performance, measures of the aircraft's stability, and combined measures of total system performance for each primary aircraft control channel. System performance changes across the five flight days and within the flight days were examined using multivariate analysis. Significant changes in each aircraft control channel are presented and the overall changes in system performance are discussed. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT MANEUVERS; *AIRCRAFT PILOTS; *ANIONS; *FLIGHT FATIGUE
; *HELICOPTERS; *HOVERING; *PILOT PERFORMANCE
DE- AEROSPACE MEDICINE; AIRCRAFT STABILITY; HUMAN FACTORS ENGINEERING; MAN
MACHINE SYSTEMS; MULTIVARIATE STATISTICAL ANALYSIS; SYSTEMS ANALYSIS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031449
AN- <AEROSPACE> N79-19622
TI- Evaluation of aircrew fatigue during operational helicopter flight mission
AU- KOCH, C. (Italian Air Force, Rome); MONESI, F.
CS- Advisory Group for Aerospace Research and Development, Paris (France). Aerospace Medical Panel.
CS- <CODE> AD481245
PY- 1978
PD- 197812
NT- In its Operational Helicopter Aviation Med. 2 p (SEE N79-19605 10-51)
LA- English
GL- France
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Monitoring of physiological parameters for the assessment of workload in laboratory and also field studies is described. In-flight recordings of ECG, breathing rate and amplitude, EMG, EEG, EOG and Gz were transmitted telemetrically from the helicopter crew station to the ground receiving station. The investigators were provided with some objective data on the increase in biological cost for an Agusta/Bell 204 helicopter pilot trying to maintain a given level of performance. In fact, the same task was performed by the pilot in two successive phases of an operational flight mission, the latter being more demanding. The crucial question is which physiological parameters prove of practical value in revealing the onset of a state of acute fatigue. Undoubtedly, breathing rate and amplitude show relatively early changes with the increase in workload during helicopter flying (Pettyjohn) as well as EMG and EOG. However, adequate computerized analysis of other physiological and behavioral parameters is necessary to provide the investigator with more subtle tools for the identification of fatigue. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT FATIGUE; *HELICOPTERS; *IN-FLIGHT MONITORING
DE- AEROSPACE MEDICINE; HUMAN FACTORS ENGINEERING; PHYSIOLOGICAL EFFECTS;
WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031448
AN- <AEROSPACE> N79-19621
TI- US Army aviation fatigue-related accidents, 1971 - 1977
AU- KRUEGER, G. P.; JONES, Y. F.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 11 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- An accident data survey was made to determine how frequently aviator crew fatigue may have contributed to US Army aviation accidents from 1971 to 1977. All accident reports in the US Army Agency for Aviation Safety (USAAAVS) data base were reviewed. Aviator fatigue was deemed to be a contributing factor in 42 rotary wing accidents which resulted in a total of 51 fatalities and 63 personnel injuries. Fatigue contributed to 10 fixed wing accidents, resulting in three fatalities and five injuries. These fatigue related accidents are categorized by aircraft and mission type and by time of day and day of week of the accident. Pilots activities prior to the accidents which promote the likelihood of pilot fatigue contributions are described. The personnel and equipment costs of these accidents to the Army are estimated, and the relative importance of such accidents to the total US Army aviation accident picture is assessed. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT ACCIDENTS; *AIRCRAFT PILOTS; *ARMED FORCES (UNITED STATES); *FLIGHT CREWS; *FLIGHT FATIGUE
DE- AIRCRAFT CONFIGURATIONS; FIXED WINGS; HELICOPTERS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE; ROTARY WINGS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01031447
AN- <AEROSPACE> N79-19620
TI- Backache in UH-1D helicopter crews
AU- SCHULTE-WINTROP, H. C. (LTK, Munster, W. Ger.); KNOCHE, H.
CS- German Air Force, Porz-Wahn (West Germany). Helicopter Transportation Wing.
CS- <CODE> GX556780
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 12 p (SEE N79-19605 10-51)
LA- English
GL- Germany, Federal Republic of
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- A questionnaire was prepared and handed to the crews (6). Out of a total of 145 pilots, flight engineers and air rescue medics questioned 40% complained of backache during flight and 51% of backache after flight. The steady RPM setting during normal flight was marked to cause discomfort in 37% of the cases as opposed to only 4% when increasing RPM. In 39% of the cases the pain was described as a lasting one. 29% reported one of short duration. In 34% it was felt in the middle of the back over the dorsal process, in 54% in the lumbar region, and in only 17% in the neck. It is concluded that the following factors are causative to backache in helicopter crews: vibration; seating posture; draft; lack of specific exercises; and vertebral abnormalities. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT STRESS (BIOLOGY); *PHYSIOLOGICAL EFFECTS ; *UH-1 HELICOPTER
DE- AEROSPACE MEDICINE; BACK INJURIES; HUMAN FACTORS ENGINEERING; SEATS; VIBRATIONAL STRESS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01031439
AN- <AEROSPACE> N79-19612
TI- An evaluation of the effects of a stability augmentation system upon aviator performance/workload during a MEDEVAC high hover operation
AU- SANDERS, M. G.; BURDEN, R. T., JR.; SIMMONS, R. R.; LEES, M. A.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 9 p (SEE N79-19605 10-51)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- A method of aiding the MedEvac pilot in performing a hover maneuver while perhaps reducing workloads was investigated. A modular, four-axes stability augmentation system (Ministab) with integrated rate attitude

and heading retention was installed on the USAARL JUH-1H helicopter. Participating personnel for the project were nine US Army aviators with a total average of 1172 flight hours. The aviators hovered at 30 feet above ground level for five minutes under each of the three following flight control conditions: (1) unaided--normal hover with visual flight rules conditions; (2) using Force Trim; and (3) using the Ministab. Continuous information from twenty pilot and aircraft monitoring points was recorded on an incremental digital recorder for all flights. Multivariate analyses were performed on both aircraft status variables and control input workload/activity measures. Under the conditions tested, the stability augmentation system evaluated did not provide a clearcut improvement in flight performance and workload across all flight parameters. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *HOVERING STABILITY; *MEDICAL SERVICES; *PILOT PERFORMANCE;
*RESCUE OPERATIONS; *UH-1 HELICOPTER; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT MANEUVERS; ATTITUDE STABILITY; EMERGENCIES; MULTIVARIATE
STATISTICAL ANALYSIS; OPERATIONS RESEARCH
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01031436
AN- <AEROSPACE> N79-19609
TI- Night rescue operation procedure over sea with bell UH-1D helicopters
AU- KNOCHE, H.
CS- German Air Force, Porz-Wahn (West Germany). Helicopter Transportation Wing.
CS- <CODE> GX556780
PY- 1978
PD- 197812
NT- In AGARD Operational Helicopter Aviation Med. 8 p (SEE N79-19605 10-51)
LA- English
GL- Germany, Federal Republic of
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7910
AB- Flight physiological aspects and disorientation problems of night rescue missions with Bell UH- 1 D helicopters are shown. Countermeasures which have proved to be successful in fighting disorientation are mentioned. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *NIGHT FLIGHTS (AIRCRAFT); *RESCUE OPERATIONS; *UH-1 HELICOPTER

DE- EMERGENCIES; MARINE ENVIRONMENTS; MEDICAL SERVICES; OPERATIONS RESEARCH
; PHYSIOLOGICAL FACTORS; PILOT PERFORMANCE; WEST GERMANY
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01029678
AN- <AEROSPACE> N79-17831
TI- Briefs of accidents involving rotorcraft, US general aviation, 1977
CS- National Transportation Safety Board, Washington, D. C. Bureau of Technology.
CS- <CODE> NN052488
PY- 1978
PD- 197812
PG- 179P.
RN- NTSB-AMM-78-15; PB-293362
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A09/MF A01
JA- STAR7909
AB- There are 276 accidents included, 29 of which involve fatal accidents. The facts, conditions, circumstances, and probable cause(s) for each accident are presented. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, kind of flying, pilot certificates, injuries, and causes and related factors. (S.E.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *GENERAL AVIATION AIRCRAFT;
*ROTORCRAFT AIRCRAFT
DE- CAUSES; CRASH INJURIES; DATA CORRELATION; FACTOR ANALYSIS; FLIGHT CHARACTERISTICS; FLIGHT OPERATIONS; IMPACT DAMAGE; PILOT PERFORMANCE;
PROBABILITY THEORY; STATISTICAL ANALYSIS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01028436
AN- <AEROSPACE> N79-16568
TI- The Helicopter
CS- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CS- <CODE> AD455458
PY- 1978
PD- 197811
NT- In its Optimisation of Pilot Capability and Avionic System Design 9 p (SEE N79-16560 07-54)
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR7907
AB- The main theme of this discussion on helicopters is the optimisation of the balance between human capability and system automation with the object of providing the most effective operational system and the most cost effective designs of both helicopter and equipment. (Author)
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- AUTOMATIC FLIGHT CONTROL; COST EFFECTIVENESS; OPTIMIZATION; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01027489
AN- <AEROSPACE> N79-15619
TI- Lightweight helmet-mounted eye movement measurement system
AU- BARNES, J. A.
CS- Human Engineering Labs., Aberdeen Proving Ground, Md.
CS- <CODE> H6521544
PY- 1978
PD- 197811
NT- In NASA. Ames Res. Center The 14th Ann. Conf. on Manual Control p 437-440 (SEE N79-15588 06-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7906
AB- The helmet-mounted eye movement measuring system, weighs 1,530 grams; the weight of the present aviators' helmet in standard form with the visor is 1,545 grams. The optical head is standard NAC Eye-Mark. This optical head was mounted on a magnesium yoke which in turn was attached to a slide cam mounted on the flight helmet. The slide cam allows one to adjust the eye-to-optics system distance quite easily and to secure it so that the system will remain in calibration. The design of the yoke and slide cam is such that the subject can, in an emergency, move the optical head forward and upward to the stowed and locked position atop the helmet. This feature was necessary for flight safety. The television camera that is used in the system is a solid state General Electric TN-2000 with a charged induced device imager used as the vidicon. (L.S.)
SF- NASA CASI
DE- <MAJOR> *EYE MOVEMENTS; *FLIGHT CREWS; *HELMETS; *MEASURING INSTRUMENTS

DE- HELICOPTERS; HUMAN FACTORS ENGINEERING; STRUCTURAL DESIGN; TELEVISION CAMERAS
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01027475
AN- <AEROSPACE> N79-15605
TI- Analysis of a VTOL hover task with predictor displays using an optimal control model of the human operator
AU- JOHANNSEN, G.; GOVINDARAJ, T.
CS- Illinois Univ., Urbana. Dept. of Mechanical and Industrial Engineering.
CS- <CODE> IB647432
PY- 1978
PD- 197811
NT- In NASA. Ames Res. Center The 14th Ann. Conf. on Manual Control p 237-251 (SEE N79-15588 06-54)
CN- NSG-2119
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A99/MF A01
JA- STAR7906
AB- The influence of different types of predictor displays in a longitudinal VTOL hover task is analyzed in a theoretical study. It was assumed that pitch angle and position are presented to the pilot in separate displays namely the artificial horizon and position display. The predictive information is calculated by means of a Taylor series. From earlier experimental studies it is well known that predictor displays improve human and system performance and result in reducing human workload. In this study, an optimal control model is used to prove this effect theoretically. Several cases with differing amounts of predictive and rate information are compared. (G.Y.)
SF- NASA CASI
DE- <MAJOR> *DISPLAY DEVICES; *HOVERING; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT PERFORMANCE; ANALYSIS (MATHEMATICS); MAN MACHINE SYSTEMS; MATHEMATICAL MODELS; OPTIMAL CONTROL; TASK COMPLEXITY
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01026975
AN- <AEROSPACE> N79-15102
TI- Evaluation of a flight simulator (device 2B24) for maintaining instrument proficiency among instrument-rated army pilots
AU- WEITZMAN, D. O.; FINEBERG, M. L.; COMPTON, G. L.
CS- Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.
CS- <CODE> A2025595
PY- 1978
PD- 197807
PG- 37P.
RN- AD-A060557; ARI-TP-298
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7906
AB- The research aims to evaluate the operational suitability of Device 2B24, which simulates the UH-1H helicopter, for facilitating UH-1H instrument proficiency training and proficiency assessment among instrument rated pilots. The present data indicate that substantial amounts of UH-1H time can be substituted by Device 2B24 time in instrument proficiency training and proficiency assessment. With simulators, the Army has the opportunity to establish an instrument training program that can maintain and assess instrument proficiency year round and at a reasonable cost. A reasonable conclusion from this study is that a realistic instrument training program that includes simulator training would reduce accidents and enhance combat readiness among instrument rated pilots. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT SIMULATORS; *FLIGHT TRAINING; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- COMBAT; FLIGHT INSTRUMENTS; TRAINING SIMULATORS; UH-1 HELICOPTER
SH- <COSATI> 14B Laboratories, Test Facilities, & Test Equipment
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01025584
AN- <AEROSPACE> N79-13692
TI- Honest 1: Personality, heart rate, urinary catecholamine, and subjective fatigue measures related to night nap-of-the-earth flying
TI- <SUPPLEMENT> Final Report, Sep. - Nov. 1976
AU- STAMPER, D. A.; LEIBRECHT, B. C.; LLOYD, A. J.
CS- Letterman Army Inst. of Research, San Francisco, Calif.
CS- <CODE> LM381043
PY- 1978
PD- 197801
PG- 45P.
CN- DA PROJ. 3M1-61102-BS-02
RN- AD-A054888; LAIR-51
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7904
AB- Personality, subjective fatigue, urine catecholamine, and heart rate measures of helicopter pilots that participated in a night nap-of-the-earth training exercise were evaluated. These selected variables provided estimates of normal personality function, subjective

feeling states, and biochemical and physiological changes. According to the hypothesis, these variables are related to night nap-of-the-earth flying. Scores on the Self-acceptance and Achievement via Independence scales of the California Psychological Inventory (CPI) were significantly above the mean for pilots rated as above average ability. Additionally, the CPI scales of Self Control and Good Impression were significantly related to urine catecholamine levels. Heart rate levels were significantly related to epinephrine, but not to norepinephrine. Despite the significant increases in epinephrine within flights and norepinephrine across flights, there were no significant increases in preceived anxiety, as measured by the State-Trait Anxiety Inventory. The lack of increase in perceived anxiety may be explained by the processes of dissociation and the general adaptation syndrome. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FATIGUE (BIOLOGY); *HEART RATE; *NIGHT FLIGHTS (AIRCRAFT); *PILOT PERFORMANCE; *URINALYSIS
DE- FLIGHT FATIGUE; FLIGHT STRESS (BIOLOGY); HELICOPTERS; PERSONALITY; PHYSIOLOGICAL RESPONSES
SH- <COSATI> 6P Physiology
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 01024604
AN- <AEROSPACE> N79-12709
TI- An evaluation of perceptual-motor workload during a helicopter hover maneuver
TI- <SUPPLEMENT> Final Report
AU- SANDERS, M. G.; BURDEN, R. T., JR.; SIMMONS, R. R.; LEES, M. A.; KIMBALL, K. A.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197805
PG- 23P.
RN- AD-A058016; USAARL-78-14
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A02/MF A01
JA- STAR7903
AB- Stability augmentation systems are purported to reduce pilot workload during hover, nap-of-the-earth, and IFR maneuvers. The current research project examines a method of aiding the MEDEVAC pilot in performing a hover maneuver while perhaps reducing workload. A modular, four-axes stability augmentation system (Ministab) with integrated rate attitude and heading retention was installed on the USAARL JUH-1H helicopter. Participating personnel for the project were nine US Army aviators with a total average of 1172 flight hours. The aviators hovered at 30 feet above ground level for five minutes under each of the three following flight control conditions: unaided-normal hover with visual flight rules conditions, using Force Trim, and using the Ministab. Continuous information from twenty pilot and aircraft monitoring points was recorded on an incremental digital recorder for all flights. Multivariate analyses were performed on both aircraft status variables and control input workload/activity measures. Under the conditions tested, the stability augmentation system evaluated did not provide a clearcut improvement in flight performance and workload across all flight parameters. (Author (GRA))
SF- DTIC
DE- <MAJOR> *HELICOPTERS; *HOVERING STABILITY; *STABILITY AUGMENTATION
DE- FEEDBACK CONTROL; FLIGHT CONTROL; MANEUVERABILITY; PILOT PERFORMANCE;
UH-1 HELICOPTER
SH- <COSATI> 1B Aeronautics
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01022760
AN- <AEROSPACE> N79-10843
TI- Helicopter Acoustics, part 2
TI- <EXTENSION> conferences
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CS- <CODE> ND210491
PY- 1978
PD- 197808
PG- 438P.
NT- Presented at the Intern. Specialists Symp., Hampton, Va., 22-24 May 1978; sponsored by the Am. Helicopter Soc. and AROD
RN- NASA-CP-2052-PT-2; L-12339-PT-2
LA- English
GL- United States
CP- United States
DT- COLLOQUIA

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A19/MF A01
JA- STAR7901
AB- Exterior and interior helicopter noise problems are addressed from the physics and engineering as well as the human factors point of view. Noise regulation concepts, human factors and criteria, rotor noise generation and control, design, operations and testing for noise control, helicopter noise prediction, and research tools and measurements are covered. &For individual titles, see N79-10844 through N79-10864.
DE- <MAJOR> *AEROACOUSTICS; *AIRCRAFT NOISE; *CONFERENCES; *HELICOPTERS
DE- AUDITORY FATIGUE; HUMAN FACTORS ENGINEERING; NOISE REDUCTION; PREDICTION ANALYSIS TECHNIQUES; ROTARY WINGS; ROTOR AERODYNAMICS
SH- <COSATI> 20A Acoustics
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 01022628
AN- <AEROSPACE> N79-10711
TI- Effects of vibration and noise on some indices of efficiency of MI-4 helicopter crews
AU- KAMENSKIY, Y. N.; SOKOLOVA, Y. A.
CS- Joint Publications Research Service, Arlington, Va.
CS- <CODE> J1957394
PY- 1978
PD- 197810
NT- In its Space Biol. and Aerospace Med., Vol. 12, No. 5, 1978 (JPRS-72115) p 76-81 (SEE N79-10698 01-51)
NT- Transl. into ENGLISH from Kosm. Biol. i Aviakosm. Med. (Moscow), no. 5, 1978 p 56-59
LA- English
GL- U.S.S.R.
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR7901
AB- The majority of Mi-4 pilots assessed noise (87.9%) and vibration (69.7%) as strong and unpleasant during the flight. Many reported intensification of these factors during take-offs, landings and hovering (there were up to 10-12 take-offs and landings per work day). Subjectively, there was a feeling of fatigue, buzzing in the ears and occasional headache. In the course of the work day, there was an appreciable change in visual function of Mi-4 pilots, with impairment of musculoarticular sensibility, and deterioration of conditioned reflex activity and capacity for fine coordination of movements. A comparison of the findings obtained on Yak-40 pilots warrants the conclusion that these changes in Mi-4 pilots were due primarily to the effects of vibration and noise inherent in that helicopter. The intensity of these changes is apparently related to the prolonged effects of vibration and noise on the pilots. (G.G.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CREWS; *NOISE TOLERANCE; *PILOT PERFORMANCE; *VIBRATIONAL STRESS
DE- AEROSPACE MEDICINE; FLIGHT STRESS (BIOLOGY); HELICOPTERS; LONG TERM EFFECTS; PSYCHOACOUSTICS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01021941
AN- <AEROSPACE> N79-10006
TI- Icing test facilities at the National Gas Turbine Establishment
AU- SWIFT, R. D.
CS- National Gas Turbine Establishment, Pyestock (England).
CS- <CODE> NI473591
PY- 1978
PD- 197808
NT- In AGARD Icing Testing for Aircraft Eng. 22 p (SEE N79-10002 01-01)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A01
JA- STAR7901
AB- The extensive capacity of the NGTE Engine Test Facility enabled a close representation of the conditions encountered during flight in icing conditions achieved on a scale such that tests can be made on complete propulsion units (intake, engine and propelling nozzle) or on full scale aircraft components, such as a helicopter fuselage complete with its engines and air intakes. The compressor/exhauster machinery, the test cells, the water spray equipment and the associated instrumentation and calibration gear are described. Illustrations of its use for icing tests on Pegasus and RB211 engines and on the Sea

King and Lynx helicopters are given. (J.A.M.)
SF- NASA CASI
DE- <MAJOR> *GAS TURBINES; *ICE FORMATION; *TEST FACILITIES
DE- ENGINE TESTS; FUSELAGES; INTAKE SYSTEMS; NOZZLES; PROPULSION SYSTEM
PERFORMANCE
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01021937
AN- <AEROSPACE> N79-10002
TI- Icing testing for aircraft engines
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1978
PD- 197808
PG- 206P.
NT- Presented at the 51st Propulsion and Energetics Panel (A) Spec. Meeting, London, 3-4 Apr. 1978
RN- AGARD-CP-236; ISBN-92-835-0217-5; AD-A059452
LA- MULTIPLE
LA- <NOTE> In ENGLISH and FRENCH
GL- France
CP- International Organization
DT- BOOK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A01
JA- STAR7901
AB- Meteorological icing conditions, the microphysical structure of icing clouds and the measurement of snow concentration were discussed. Icing test facilities and their instrumentation current used in the US, UK, and France were reported. Measurement systems, icing of aircraft engines either installed in aircraft and helicopters, or when taken into test facilities were also considered. &For individual titles, see N79-10003 through N79-10015.
DE- <MAJOR> *CONFERENCES; *ENGINE FAILURE; *ICE FORMATION
DE- DEICING; ENGINE TESTS; HELICOPTERS; SHIELDING
SH- 7501 Aeronautics--General (1975-)

AN- <DIALOG> 01021058
AN- <AEROSPACE> A79-53628
TI- Military considerations for helicopter flight controls
AU- SHALLCROSS, G. W. (U.S. Army, Fort Rucker, Ala.)
SO- In: Specialists Meeting on Helicopter Flight Controls, Arlington, Tex., October 11-13, 1978, Technical Papers. (A79-53626 24-08) Washington, D.C., American Helicopter Society, 1979. 9 p.
PY- 1979
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7924
AB- A review is made of a typical Air Cavalry combat operation in which the flight control system was deficient. The deficiencies of the helicopter flight control systems are discussed along with considerations of what future requirements are needed to improve flight controls. (B.J.)
SF- AIAA
DE- <MAJOR> *CONTROL EQUIPMENT; *FLIGHT CONTROL; *HELICOPTER CONTROL; *MAN
MACHINE SYSTEMS; *MILITARY AIRCRAFT
DE- CONTROLLABILITY; FLIGHT CHARACTERISTICS; HUMAN FACTORS ENGINEERING;
MANEUVERABILITY; PRODUCT DEVELOPMENT; USER REQUIREMENTS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 01019756
AN- <AEROSPACE> A79-52326
TI- The influence of low frequency vibration on pilot performance /as measured in a fixed base simulator/
AU- STAVE, A. M. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, Conn.)
SO- Ergonomics, vol. 22, July 1979, p. 823-835.
PY- 1979
PD- 197907
RF- 11
CN- DAAJ01-72-C-0634
LA- English
GL- United States
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7923
AB- The results of a two-year study on the effects of low-frequency vibration on pilot performance are described. Data on the effects of low-frequency vibration are collected while pilots fly a helicopter simulator and accomplish navigation, approach, hover, and slung load

handling tasks. Performance is measured in terms of flight path and altitude deviations from desired values. Times required to perform load pick-up and drop-off as well as load placement accuracy are also measured. The simulator used is a fixed base device which makes use of analog and digital computers. It is found that the vibration stimuli used do not degrade performance, which tends to improve with increased stress. It is hypothesized that this trend is due to motivation, i.e., as subjects feel the onset of fatigue they compensate by working harder and thus tend to improve their performance. Poor scores (about 6% of the observations) are attributed to lapses in the pilot's ability to respond to display cues. (S.D.)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *LOW FREQUENCIES; *PILOT PERFORMANCE; *VIBRATION
EFFECTS; *VIBRATION SIMULATORS
DE- ANALOG SIMULATION; DIGITAL SIMULATION; FLIGHT ALTITUDE; FLIGHT PATHS;
FLIGHT SIMULATORS; GRAPHS (CHARTS); MOTIVATION; PILOT ERROR
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01017246
AN- <AEROSPACE> A79-49816
TI- The Bell Model 222
AU- GARRISON, J. R. (Bell Helicopter Textron, Fort Worth, Tex.)
SO- (Royal Aeronautical Society, Symposium on A New Generation of Civil Helicopters, London, England, Feb. 7, 1979.) Aeronautical Journal, vol. 83, July 1979, p. 257-268.
PY- 1979
PD- 197907
LA- English
GL- United States
CP- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7922
AB- The design and performance characteristics of the Bell Model 222 are surveyed. Design details covered include the main rotor hub which is designed for reduced maintenance, safety, and long component fatigue lives, the main rotor blade, the tail rotor, and rotor drive system. Attention is also given to the main transmission, the nodal beam's isolation of drivetrain vibrations, the power reserve provided by the twin Lycoming engines, and the impact resistant fuel cells. It is shown that the cockpit has an instrument panel capable of being equipped with an IFR instrumentation array while retaining good visibility for the VFR operator. Finally, flight tests, fatigue tests and noise measurements are described. (M.E.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ENGINES; *BELL AIRCRAFT; *DESIGN ANALYSIS; *HELICOPTER DESIGN
DE- AIRCRAFT SAFETY; FLIGHT TESTS; FUEL SYSTEMS; FUSELAGES; HELICOPTER
PROPELLER DRIVE; HELICOPTER TAIL ROTORS; LANDING GEAR; NOISE MEASUREMENT; ROTARY WINGS; ROTOR BLADES
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 01016511
AN- <AEROSPACE> A79-49081
TI- Handling quality and display requirements for low speed and hover in reduced flight visibility
AU- HOH, R. H.; ASHKENAS, I. L. (Systems Technology, Inc., Hawthorne, Calif.)
SO- In: American Helicopter Society, Annual National Forum, 35th, Washington, D.C., May 21-23, 1979, Proceedings. (A79-49053 21-01) Washington, D.C., American Helicopter Society, 1979. 13 p.
PY- 1979
RF- 24
RN- AHS 79-29
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7921
AB- A classification scheme has been developed to account for outside visual cues and cockpit displays in determining the required equivalent system forms for low speed and hover. Tentative criteria are presented in terms of a visibility scale which quantifies environmental conditions for the intended mission in a more fine-grained manner than simply specifying IMC or VMC. There are indications that rate and attitude systems may be used for partial IMC conditions but that a translational rate command (TRC) system is required for low speed and hover in zero visibility. In general, most experiments indicate that advanced displays are not a substitute for augmentation. Tentative limiting conditions are defined for rate and attitude systems, but more data are required to define handling qualities for TRC systems. Since the existing data base is primarily oriented toward command/response characteristics, definition of the limiting conditions for turbulence

and large discrete wind shears also requires more data. ((Author))
DE- <MAJOR> *CONTROLLABILITY; *DISPLAY DEVICES; *HELICOPTER CONTROL; *HOVERING; *LOW SPEED; *LOW VISIBILITY; *MAN MACHINE SYSTEMS
DE- ATTITUDE CONTROL; BLOCK DIAGRAMS; COMMAND AND CONTROL; DATA CORRELATION
; FLIGHT CONDITIONS; GRAPHS (CHARTS); HUMAN FACTORS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01016496
AN- <AEROSPACE> A79-49066
TI- Helicopter commands at the touch of a hand
AU- GILSON, R. D. (Ohio State University, Columbus, Ohio); SUN, P. S. (U.S. Army, Fort Monmouth, N.J.); DUNN, R. S. (U.S. Army, Air Mobility Research and Development Laboratory, Fort Eustis, Va.)
SO- In: American Helicopter Society, Annual National Forum, 35th, Washington, D.C., May 21-23, 1979, Proceedings. (A79-49053 21-01) Washington, D.C., American Helicopter Society, 1979. 7 p.
PY- 1979
RF- 8
RN- AHS 79-13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7921
AB- The feasibility and utility of Kinesthetic Tactual (K-T) displays to transmit command-type flight information to a pilot was demonstrated in simulated Army flight missions. K-T display indications were given by the relative motion between two basic components - a hollowed-out control handle and an embedded sliding display. Protrusion of the servo-controlled slide corresponded in direction and magnitude to unwanted tracking errors for either a landing task or a hover maneuver. Results from five subject pilots demonstrated that these precision maneuvers could be carried out successfully based solely on the K-T display information. Task performance with K-T displays is considered to be comparable to performance with conventional visual displays; however, K-T displays can increase secondary visual workload capacity (V.T.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS; *MANUAL CONTROL; *SERVOCONTROL
DE- AVIONICS; FLIGHT SIMULATORS; HUMAN FACTORS ENGINEERING; PILOT TRAINING;
SENSORIMOTOR PERFORMANCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01012843
AN- <AEROSPACE> A79-45413
TI- A piloted simulator investigation of helicopter precision decelerating approaches to hover to determine single-pilot IFR /SPIFR/ requirements
AU- PHATAK, A. V. (Analytical Mechanics Associates, Inc., Mountain View, Calif.); PEACH, L. L., JR.; HESS, R. A.; ROSS, V. L.; HALL, G. W.; GERDES, R. M. (NASA, Ames Research Center, Moffett Field, Calif.)
CS- Analytical Mechanics Associates, Inc., Mountain View, Calif.
CS- <CODE> AU945491
SO- In: Guidance and Control Conference, Boulder, Colo., August 6-8, 1979, Collection of Technical Papers. (A79-45351 19-12) New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 594-608.
PY- 1979
RF- 10
RN- AIAA 79-1886
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7919
AB- The results of single-pilot instrument flight rules (SPIFR) experiments conducted on the NASA-Ames V/STOLAND simulator are presented. Several factors having a significant impact on requirements for helicopter SPIFR decelerating, steep approaches to landing are considered: (1) approach weather conditions, (2) flight path geometry, (3) deceleration guidance law, (4) level of stability and command augmentation, (5) cockpit display sophistication, (6) accuracy of navigation aids, and (7) helipad lighting and visual aids. Particular emphasis is placed on the relative effects of deceleration profile, control augmentation, and flight director parameters on pilot performance, workload, and opinion rating. Problems associated with the development of a pilot acceptance analytical methodology are outlined. (V.T.)
SF- AIAA
DE- <MAJOR> *CONTROL STABILITY; *DECELERATION; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *HOVERING STABILITY; *INSTRUMENT FLIGHT RULES
DE- AIRCRAFT GUIDANCE; BLOCK DIAGRAMS; GRAPHS (CHARTS); HOVERING; SYSTEMS
ANALYSIS; SYSTEMS ENGINEERING; TABLES (DATA)

SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 01008195
AN- <AEROSPACE> A79-40764
TI- Contribution of the engine R & D community to reduced cost of ownership of Army helicopters
AU- CALE, D. B. (U.S. Army, Applied Technology Laboratory, Fort Eustis, Va.)
SO- AIAA, SAE, and ASME, Joint Propulsion Conference, 15th, Las Vegas, Nev., June 18-20, 1979, AIAA 7 p.
PY- 1979
PD- 197906
RF- 8
RN- AIAA PAPER 79-1360
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7917
AB- The three basic categories of helicopter ownership cost and the contributions of the engine R&D community to cost reductions are examined. Development cost covers the aircraft engineering development through the fabrication and testing of prototypes and the government pays the cost directly. Acquisition cost includes production budgets, and operational costs are for fuel, lubricants, repair and maintenance parts, and personnel. The Army engine R&D programs aimed at improvements in component performance, reliability, and maintenance, new specification requirements, new manufacturing methods and technology, and design-to-unit production cost (DTUPC) efforts are discussed, with their impact on the T700 engine development. The experience acquired during the T700 program was applied to the Army 800 hp Advanced Technology Demonstrator Engine (ATDE) program to reduce its ownership cost, and it provided inputs in areas of technology level, instrumentation, hardware, testing, specifications, and reliability and maintainability. During the course of the ATDE evaluation, the Material Index Factor (MIF) method was used as a tool for estimating the production cost and it is concluded that the MIF method can be used to track the DTUPC effort during the development phase. (A.T.)
SF- AIAA
DE- <MAJOR> *COST REDUCTION; *GAS TURBINE ENGINES; *HELICOPTER ENGINES; *LIFE CYCLE COSTS; *MILITARY AIRCRAFT; *RESEARCH AND DEVELOPMENT
DE- MAINTAINABILITY; PRODUCT DEVELOPMENT; PROTOTYPES; RELIABILITY; TURBOSHAFTS; USER REQUIREMENTS; WEIGHT REDUCTION
SH- 7507 Aircraft Propulsion & Power (1975-)

AN- <DIALOG> 01005795
AN- <AEROSPACE> A79-38364
TI- Visual workload of the copilot/navigator during terrain flight
AU- SANDERS, M. G.; SIMMONS, R. R.; HOFMANN, M. A. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.)
SO- Human Factors, vol. 21, June 1979, p. 369-383.
PY- 1979
PD- 197906
RF- 8
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7916
AB- The visual workload of the navigator/copilot during terrain flight in a UH-1H helicopter is investigated. Oculomotor performance during nap of the earth, contour and low level flight was recorded by a modified NAC Eye Mark Recorder in conjunction with a 16 mm high speed motion picture camera. Data indicate little variation between time spent at each visual area for different flight tasks. Visual cues needed for navigation were primarily obtained from terrain viewed from the copilot's windscreen, with frequent reference to the handheld map. It is found that the duty of navigating required 92.2% of the copilot's visual time, while the engine and flight instruments were utilized only 4.0% of the time; a visual free time task was utilized only 3% of the time, mostly during hover periods. (A.L.W.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *PILOT PERFORMANCE; *TERRAIN FOLLOWING AIRCRAFT; *VISUAL FLIGHT; *VISUAL TASKS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FLIGHT CONDITIONS; LOW ALTITUDE; TIME RESPONSE; VISUAL FIELDS; VISUAL FLIGHT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 01005794
AN- <AEROSPACE> A79-38363

TI- Methodological considerations of visual workloads of helicopter pilots
AU- SIMMONS, R. R. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.)
SO- Human Factors, vol. 21, June 1979, p. 353-367.
PY- 1979
PD- 197906
RF- 14
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7916
AB- Modifications to and applications of the Eye Mark Recorder corneal reflection apparatus for the assessment of the visual performance and workload of pilots during helicopter operations are presented. The Eye Mark Recorder allows the detection and recording of the viewing point and eye movements by means of an illuminated reticle focused on the cornea and reflected by mirrors. Modifications accomplished to ensure compatibility with the helicopter flight environment include adjustments to the face mask for comfort and stability, a variable power supply, a special mount for the recording camera inside the helicopter and the addition of a blue template to the instrument panel to allow for proper image contrast inside and outside the aircraft. Test and data reduction procedures for use with the apparatus are outlined. The apparatus has been used in simulated instrument flight, actual instrument and visual flights, and nap of the earth and terrain flights and data have been collected on visual, psychomotor and aircraft performance. (A.L.W.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *EYE MOVEMENTS; *HELICOPTERS; *PILOT PERFORMANCE; *VISUAL TASKS; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- DATA REDUCTION; EQUIPMENT SPECIFICATIONS; FLIGHT CONDITIONS; MASKS; MIRRORS; SIGNAL REFLECTION; VISUAL FLIGHT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 01003810
AN- <AEROSPACE> A79-36379
TI- Model verification of force determination for measuring vibratory loads
TI- <EXTENSION> of rotors on helicopters
AU- BARTLETT, F. D., JR. (U.S. Army, Structures Laboratory, Hampton, Va.); FLANNELLY, W. G. (Kaman Aerospace Corp., Bloomfield, Conn.)
SO- American Helicopter Society, Journal, vol. 24, Apr. 1979, p. 10-18. Army-supported research.
PY- 1979
PD- 197904
RF- 11
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7915
AB- The method of force determination for measuring vibratory forces and moments experienced by helicopters is verified by means of laboratory tests of a dynamic helicopter model. The method was used to determine vibratory hub loads on a helicopter with the rotor removed from dynamic calibration data and fuselage accelerometer measurements. The mobility matrix is obtained by direct shaking at the hub and modal acceleration testing in order to calibrate the model. Errors of force determination predictions are found to lie within the accuracy limits of the instrumentation. Results of an application of the force determination method to the flight testing of a UH-1H helicopter fitted with a dynamic antiresonant vibration isolator indicate the potential of force determination for in-flight predictions. (A.L.W.)
SF- AIAA
DE- <MAJOR> *DYNAMIC MODELS; *HELICOPTERS; *STRUCTURAL VIBRATION; *VIBRATION MEASUREMENT; *VIBRATION TESTS; *VIBRATORY LOADS
DE- FLIGHT TESTS; KAMAN AIRCRAFT; PERFORMANCE PREDICTION; SHAKING; TABLES (DATA); TEST EQUIPMENT; VIBRATION ISOLATORS
SH- 7539 Structural Mechanics (1975-)

AN- <DIALOG> 01003354
AN- <AEROSPACE> A79-35923
TI- A flyable suspended model helicopter for the investigation of the human pilot behaviour
TI- <ORIGINAL> Ein flugfaehig eingespannter Modellhubschrauber zur Untersuchung des menschlichen Reglerverhaltens
AU- OESTERLIN, W. (Darmstadt, Technische Hochschule, Darmstadt, West Germany)
SO- Zeitschrift fuer Flugwissenschaften und Weltraumforschung, vol. 3, Mar.-Apr. 1979, p. 98-108. In German.
PY- 1979
PD- 197904

RF- 12
LA- German
GL- Germany, Federal Republic of
CP- Germany, Federal Republic of
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7914
AB- This paper describes the design and control of a servo-control mechanism with a model helicopter for the investigation of the human pilot behavior as a multi-loop control component. A simple multi-loop model for the behavior of a human pilot is presented for the hovering state. The correspondence of the model with the human pilot behavior has been confirmed by simulation. ((Author))
DE- <MAJOR> *AIRCRAFT MODELS; *HELICOPTER CONTROL; *PILOT PERFORMANCE; *SERVOCONTROL
DE- COMPUTERIZED SIMULATION; FEEDBACK CONTROL; FLIGHT PATHS; FREE FLIGHT; MAN MACHINE SYSTEMS; SERVOMECHANISMS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 01000624
AN- <AEROSPACE> A79-33193
TI- Human error accidents - Some case studies
TI- <EXTENSION> for aircraft
AU- CHELLAPPA, V. (Civil Aviation Department, New Delhi, India)
SO- Aviation Medicine, vol. 22, June 1978, p. 50-52.
PY- 1978
PD- 197806
LA- English
GL- India
CP- India
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7913
AB- A study is made of about 250 aircraft accidents that occurred during the period 1967-1977 in India. The discussion covers classification of pilot error accidents, accident rates, public transport aircraft accidents, serial operation aircraft accidents, and training flight aircraft accidents. It is suggested that it would be beneficial to set up a representative body of experts from the Air Force, civil aviation and airlines for an in-depth study of the human factors involved in Air Force and civil aviation aircraft accidents in the context of environment, training facilities, working and climatic conditions, and national customs with a view toward making adequate recommendations. (S.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *FLIGHT CREWS; *HUMAN PERFORMANCE; *PILOT ERROR
DE- FLIGHT OPERATIONS; ROTARY WING AIRCRAFT; TRAINING AIRCRAFT; TRANSPORT AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00996917
AN- <AEROSPACE> A79-29486
TI- Displays for Army combat aviation
AU- FOSTER, M., JR. (U.S. Army, Human Engineering Laboratory, Aberdeen Proving Ground, Md.)
SO- In: Advanced Aircrew Display Symposium, 4th, Patuxent River, Md., May 10, 1978, Proceedings. (A79-29476 11-06) Patuxent River, Md., U.S. Navy, Naval Air Test Center, 1978, p. 181-250.
PY- 1978
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7911
AB- A brief description is provided of the more demanding aspects of the employment of Army combat aviation, specifically the attack helicopter. Attention is also given to the display media currently programmed for existing and future attack helicopters, the possible impact of state-of-the-art technology on these media, and the Army's approach to solve the problem, focused on electrooptical displays. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *ATTACK AIRCRAFT; *DISPLAY DEVICES; *HELICOPTER DESIGN; *MILITARY AVIATION
DE- ELECTRO-OPTICS; FLIGHT CONTROL; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; MILITARY AIRCRAFT; TECHNOLOGY ASSESSMENT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00986124
AN- <AEROSPACE> A79-18693

TI- Cabin noise reduction for the Agusta A-109 helicopter
AU- BELLAVITA, P. (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy); SMULLIN, J. (Cambridge Collaborative, Inc., Cambridge, Mass.)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 4th, Stresa, Italy, September 13-15, 1978, Proceedings. Volume 2. (A79-18637 06-01) Gallarate, Italy, Costruzioni Aeronautiche Giovanni Agusta S.p.A., 1978, p. 61-0 to 61-29.
PY- 1978
RF- 5
LA- English
GL- Italy
CP- Italy
DT- CONFERENCE PAPER
JA- IAA7906
AB- The Agusta A-109 is one of the first mid-1970s helicopters designed to provide high performance for the civil air market. For maximum civil use acceptance, a noise reduction program was initiated to develop interior nonstructural 'carpet hanging' treatments and also to investigate noise sources and transmission paths which might be treated during later development. This paper describes methods of noise control by cabin treatments developed for the Agusta A-109 and presents some preliminary prototype flight test results. (B.J.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMPARTMENTS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *NOISE REDUCTION
DE- ABSORBERS (MATERIALS); ACOUSTIC ATTENUATION; CIVIL AVIATION; NOISE GENERATORS; NOISE SPECTRA
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00986118
AN- <AEROSPACE> A79-18687
TI- Helicopter noise standards - Another point of view: A national approach to rotorcraft noise regulation
AU- LYNN, R. R.; COX, C. R. (Bell Helicopter Textron, Fort Worth, Tex.)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 4th, Stresa, Italy, September 13-15, 1978, Proceedings. Volume 2. (A79-18637 06-01) Gallarate, Italy, Costruzioni Aeronautiche Giovanni Agusta S.p.A., 1978, p. 55-1 to 55-19.
PY- 1978
RF- 47
LA- English
GL- United States
CP- Italy
DT- CONFERENCE PAPER
JA- IAA7906
AB- Contrasts between subsonic CTOL and rotorcraft regarding operational characteristics, economic base, and state of technology are examined. Noise requirements being considered for helicopters within the United States and the ICAO are reviewed. The economic and safety consequences of these requirements are discussed for new and derivative designs. A noise index is defined and used to compare the relative impact of noise produced by various transportation systems. An alternate approach to noise regulation is suggested that makes use of a maximum noise index and employs flight path and operational controls to achieve it. (B.J.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *CIVIL AVIATION; *ENVIRONMENT PROTECTION; *HELICOPTER PERFORMANCE; *NOISE POLLUTION
DE- BLADE TIPS; COST ANALYSIS; ECONOMIC FACTORS; HELICOPTER TAIL ROTORS; HUMAN FACTORS ENGINEERING; STANDARDS; SURFACE VEHICLES; TRANSPORT AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00986099
AN- <AEROSPACE> A79-18668
TI- An operators viewpoint on future rotorcraft R & D criteria
AU- VAN DER HARTEN, R. J. (KLM Noordzee Helikopters, Schiphol Airport, Netherlands)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 4th, Stresa, Italy, September 13-15, 1978, Proceedings. Volume 1. (A79-18637 06-01) Gallarate, Italy, Costruzioni Aeronautiche Giovanni Agusta S.p.A., 1978, p. 35-1 to 35-14.
PY- 1978
RF- 10
LA- English
GL- Netherlands
CP- Italy
DT- CONFERENCE PAPER
JA- IAA7906
AB- An attempt is made to identify future civil rotorcraft requirements and to develop certain criteria for present and future helicopter R & D programs. Positive as well as negative factors influencing civil rotorcraft development are reviewed. Emphasis is placed on economic

factors, all-weather capability, passenger and environmental acceptance, and engine fuel economy and one-engine-out performance. (B.J.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *PILOT PERFORMANCE; *RESEARCH AND DEVELOPMENT; *ROTORCRAFT AIRCRAFT; *TECHNOLOGICAL FORECASTING
DE- ALL-WEATHER AIR NAVIGATION; CIVIL AVIATION; ECONOMIC FACTORS; USER REQUIREMENTS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00986098
AN- <AEROSPACE> A79-18667
TI- Correlation aspects of helicopter flight mechanics and pilot behaviour
AU- STENNER, K.-H.; PAUSDER, H.-J.; SANDERS, K. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmechanik, Braunschweig, West Germany)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 4th, Stresa, Italy, September 13-15, 1978, Proceedings. Volume 1. (A79-18637 06-01) Gallarate, Italy, Costruzioni Aeronautiche Giovanni Agusta S.p.A., 1978, p. 33-0 to 33-13.
PY- 1978
RF- 13
LA- English
GL- Germany, Federal Republic of
CP- Italy
DT- CONFERENCE PAPER
JA- IAA7906
AB- Simulation investigations using a moving base simulator to examine the correlations of helicopter dynamics and pilot behaviour for specified maneuvers are presented. The tracking task simulation design of two helicopter configurations is described. Measured parameters including a subjective pilot rating are related. Obtained results from spectral and statistical analysis demonstrate the interrelationships between task-performance precision, control activity and subjective pilot opinions. Correlation analysis suggest subdivision of pilot rating into a configuration dependent part connected with control activity and a pilot dependent part connected with tracking precision. ((Author))
DE- <MAJOR> *FLIGHT MECHANICS; *HELICOPTER PERFORMANCE; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- CONTROL SIMULATION; CORRELATION; FLIGHT SIMULATION; HELICOPTER DESIGN
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00986094
AN- <AEROSPACE> A79-18663
TI- Helicopter simulation in atmospheric turbulence
AU- DAHL, H.-J.; FAULKNER, A. J. (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany)
SO- In: European Rotorcraft and Powered Lift Aircraft Forum, 4th, Stresa, Italy, September 13-15, 1978, Proceedings. Volume 1. (A79-18637 06-01) Gallarate, Italy, Costruzioni Aeronautiche Giovanni Agusta S.p.A., 1978, p. 29-0 to 29-18.
PY- 1978
RF- 8
LA- English
GL- Germany, Federal Republic of
CP- Italy
DT- CONFERENCE PAPER
JA- IAA7906
AB- This paper reviews the topic of helicopter flight in wind turbulence, a topic of primary importance since it is a leading factor in pilot work load, passenger comfort and structural loadings. Whilst much has been done in the areas of turbulence and vehicle modelling for fixed wing aircraft, this is not always applicable to rotary wing aircraft since different flight regimes and principles (low speed, rotating aerofoil) require specialised models. Part of this paper is devoted to the integration of wind gust models to helicopter simulations, highlighting their limitations and particular helicopter requirements. The options for the helicopter model are discussed, ranging from linearised to individual integrated blade response models, and exemplified with test simulation results, with the inclusion of a pilot model in the closed control loop. Results for a helicopter flying through a 2-dimensional turbulence field are presented, with particular attention to the influence of flapping stiffness. ((Author))
DE- <MAJOR> *ATMOSPHERIC TURBULENCE; *FLIGHT SIMULATION; *GUST LOADS; *HELICOPTER PERFORMANCE
DE- MATHEMATICAL MODELS; PILOT PERFORMANCE; ROTOR AERODYNAMICS; WIND PRESSURE
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00985646
AN- <AEROSPACE> A79-18215

TI- Night vision goggles and in-flight evaluation of the inside/outside refocusing problems in a UH-1H helicopter
AU- STONE, L. W.; SANDERS, M. G.; GLICK, D. D.; WILEY, R. W.; KIMBALL, K. A. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.)
SO- In: Human Factors Society, Annual Meeting, 22nd, Detroit, Mich., October 16-19, 1978, Proceedings. (A79-18201 05-54) Santa Monica, Calif., Human Factors Society, Inc., 1978, p. 230-234.
PY- 1978
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- Eight U.S. Army aviators hovered an instrumented Army JUH-1H helicopter 10 feet above the ground at night under four visual conditions using the unaided eye (normal night vision) and three configurations of the AN/PVS-5 night vision goggles (NVG). The NVG configurations included: (1) 40-deg FOV plano tubes focused at infinity; (2) a bifocal arrangement in which the bottom 14% of the field was focused at approximately 22 inches; and (3) a bifocal arrangement with the bottom 24% focused at 22 inches. Analysis of the data indicates no significant difference between configurations in terms of control movements. In terms of aircraft status variables, radio measured altitude indicated a large variability under the 40-deg plano NVG. (B.J.)
SF- AIAA
DE- <MAJOR> *FOCUSING; *GOGGLES; *HELICOPTER CONTROL; *NIGHT VISION; *PILOT PERFORMANCE; *UH-1 HELICOPTER
DE- AIRCRAFT INSTRUMENTS; HUMAN FACTORS ENGINEERING; IN-FLIGHT MONITORING; VISUAL TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00985637
AN- <AEROSPACE> A79-18206
TI- The importance of providing stereoscopic vision in training for nap-of-the-earth /NOE/ flight
AU- ERWIN, D. E. (U.S. Army, Research Institute for the Behavioral and Social Sciences, Alexandria, Va.)
SO- In: Human Factors Society, Annual Meeting, 22nd, Detroit, Mich., October 16-19, 1978, Proceedings. (A79-18201 05-54) Santa Monica, Calif., Human Factors Society, Inc., 1978, p. 81-86.
PY- 1978
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- Results are presented from two preliminary studies which investigated the importance of binocular disparity for the perception of three-dimensional layout of the terrain in NOE flight. In the first experiment, it was found that stereoscopic movies taken from the cockpit of a helicopter in NOE flight produce more compelling impressions of three-dimensionality than a nondisparate bioptic display. The results of the second experiment show that simple reaction times for detection of the three-dimensionality in static binocular displays were substantially longer than for detection of fusibility of otherwise identical bioptic displays. In addition, it was found that detection of fusibility required much more time than detection of a light flash. (B.J.)
SF- AIAA
DE- <MAJOR> *BINOCULAR VISION; *DISPLAY DEVICES; *HELICOPTER DESIGN; *PILOT TRAINING; *SPACE PERCEPTION; *STEREOSCOPIC VISION
DE- COCKPITS; EARTH SURFACE; FLIGHT TRAINING; HUMAN FACTORS ENGINEERING; MOTION PICTURES; REACTION TIME; SURFACE GEOMETRY; TERRAIN ANALYSIS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00985633
AN- <AEROSPACE> A79-18202
TI- Quantifying operator preference during human factors test and evaluation
TI- <EXTENSION> in helicopter design
AU- FINEBERG, M. L. (BDM Corp., McLean, Va.)
SO- In: Human Factors Society, Annual Meeting, 22nd, Detroit, Mich., October 16-19, 1978, Proceedings. (A79-18201 05-54) Santa Monica, Calif., Human Factors Society, Inc., 1978, p. 24-28.
PY- 1978
RF- 9
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

JA- IAA7905
AB- A human factors evaluation instrument was constructed the goal of which was the quantification of operator preference in helicopter design within four major areas of human factors consideration: handling qualities, comfort/discomfort, human engineering design, and safety. Each area had a common scale against which 10 specific parameters were evaluated. The ten items within each area were chosen using system operators' expertise, human factors standards, and human factors experimental literature. The instrument was validated using a sample of 16 aviators during the conduct of an actual operational test, indicating that the instrument provides an effective method of quantifying the preference of operational aviators. (B.J.)
SF- AIAA
DE- <MAJOR> *CONTROLLABILITY; *EVALUATION; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *PERFORMANCE TESTS; *PILOT PERFORMANCE
DE- COMFORT; DESIGN ANALYSIS; FLIGHT SAFETY; OPERATIONAL PROBLEMS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00985586
AN- <AEROSPACE> A79-18155
TI- A piloted simulator investigation of augmentation systems to improve helicopter nap-of-the-earth handling qualities
AU- CHEN, R. T. N.; TALBOT, P. D.; GERDES, R. M.; DUGAN, D. C. (NASA, Ames Research Center, Moffett Field, Calif.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CS- <CODE> NC473657
SO- In: American Helicopter Society, Annual National Forum, 34th, Washington, D.C., May 15-17, 1978, Proceedings. (A79-18126 05-01) Washington, D.C., American Helicopter Society, 1978. 23 p.
PY- 1978
RN- AHS 78-29
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- A piloted simulation study assessed various levels of stability and control augmentation designed to improve the handling qualities of several helicopters in nap-of-the-earth (NOE) flight. Five basic single rotor helicopters - one teetering, two articulated, and two hingeless - which were found to have a variety of major deficiencies in a previous fixed-based simulator study were selected as baseline configurations. The stability and control augmentation systems (SCAS) include simple control augmentation systems (CAS) to decouple pitch and yaw responses due to collective input and to quicken the pitch and roll control responses; SCAS of rate command type designed to optimize the sensitivity and damping and to decouple the pitch-roll due to aircraft angular rate; and attitude command type SCAS. Pilot ratings and commentary are presented as well as performance data related to the task. SCAS control usage and their gain levels associated with specific rotor type are also discussed. ((Author))
DE- <MAJOR> *CONTROLLABILITY; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *STABILITY AUGMENTATION; *TERRAIN FOLLOWING AIRCRAFT
DE- ATTITUDE CONTROL; FEEDBACK CONTROL; HELICOPTER DESIGN; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; RIGID ROTORS; ROTARY WINGS; SYSTEMS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00985585
AN- <AEROSPACE> A79-18154
TI- Simulation of automatic flight control system failures
AU- BATRA, N. N.; BUILTA, K. E. (Bell Helicopter Textron, Fort Worth, Tex.) ; DAVIS, J. M. (U.S. Army, Research and Technology Laboratories, St. Louis, Mo.)
SO- In: American Helicopter Society, Annual National Forum, 34th, Washington, D.C., May 15-17, 1978, Proceedings. (A79-18126 05-01) Washington, D.C., American Helicopter Society, 1978. 11 p.
PY- 1978
RF- 7
CN- DAAJ01-75-C-1126; DAAJ01-76-C-0389
RN- AHS 78-28
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- A piloted simulation program was conducted to establish the effects of a runaway automatic flight control system and to determine the longest time a pilot could delay before initiating corrective action and still maintain control of the aircraft. Simulation was performed on a six-degree-of-freedom moving-base simulator. To authenticate the simulator's response with respect to the actual 214 helicopter, an

extensive validation test was conducted, comprising open loop tests, qualitative piloted tests, and quantitative piloted tests. The effect of hardover in a single axis is compared with failures in two of the three axes simultaneously. The effect of airspeed was also noted. The simulations confirmed the credibility of a mathematical model for a generalized single rotor helicopter. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *SYSTEM FAILURES
DE- BELL AIRCRAFT; COMPUTER SYSTEMS DESIGN; DETECTION; FLIGHT SIMULATORS; FLIGHT TESTS; MATHEMATICAL MODELS; PILOT PERFORMANCE; TIME LAG
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00985575
AN- <AEROSPACE> A79-18144
TI- Development of a solid state vertical instrument display system
TI- <EXTENSION> for helicopters
AU- MEEK, T. B., JR. (United Technologies Corp., Sikorsky Aircraft Div., Stratford, Conn.)
SO- In: American Helicopter Society, Annual National Forum, 34th, Washington, D.C., May 15-17, 1978, Proceedings. (A79-18126 05-01) Washington, D.C., American Helicopter Society, 1978. 7 p.
PY- 1978
RN- AHS 78-18
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- The rationale for the selection of vertical instrument displays for the BLACK HAWK helicopter is briefly presented as background. The instrument system is described. The paper then describes the problems encountered with integrating the state-of-art solid state indicator system into the helicopter during its design and development program. Problems specifically described are: uniformity of displays, insufficient cues from the triple tachometer and engine torque indicators, misreading of indicator scales and digital readouts, lamp reliability, and interfaces between the indicator displays and the sensors. ((Author))
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *DISPLAY DEVICES; *HELICOPTER DESIGN; *SOLID STATE DEVICES
DE- CONTROL EQUIPMENT; ENGINE CONTROL; HUMAN FACTORS ENGINEERING; TACHOMETERS; TEMPERATURE MEASURING INSTRUMENTS; UH-60A HELICOPTER
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00985570
AN- <AEROSPACE> A79-18139
TI- Helicopter combat mission simulator
AU- MILELLI, R. J.; MONROE, R. D. (Martin Marietta Aerospace, Orlando, Fla.)
SO- In: American Helicopter Society, Annual National Forum, 34th, Washington, D.C., May 15-17, 1978, Proceedings. (A79-18126 05-01) Washington, D.C., American Helicopter Society, 1978. 11 p.
PY- 1978
RN- AHS 78-13
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- A helicopter simulator has been developed by Martin Marietta to support in-house development efforts on the advanced attack helicopter and other advanced helicopter systems. The simulator is designed to provide a realistic environment, including low-level flight at night, which is required to effectively evaluate advanced avionic and fire control systems in man-in-the-loop studies. The mechanization of the simulation is described as well as its capabilities and limitations. Qualitative results and observations from the initial simulation conducted during the months of September and October of 1977 are presented. In addition, future plans for the simulation facility are noted. ((Author))
DE- <MAJOR> *COMBAT; *FLIGHT SIMULATORS; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS
DE- ATTACK AIRCRAFT; AVIONICS; COCKPIT SIMULATORS; COMPUTER PROGRAMS; DISPLAY DEVICES; PILOT PERFORMANCE; TERRAIN FOLLOWING AIRCRAFT
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 00985015
AN- <AEROSPACE> A79-17583
TI- A new approach to helicopter rotor blade research instrumentation

AU- KNIGHT, V. H., JR. (NASA, Langley Research Center, Flight Electronics Div., Hampton, Va.)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CS- <CODE> ND210491
SO- In: International Instrumentation Symposium, 24th, Albuquerque, N. Mex., May 1-5, 1978, Proceedings. Part 1. (A79-17576 05-35) Pittsburgh, Pa., Instrument Society of America, 1978, p. 103-111.
PY- 1978
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- A rotor-blade-mounted telemetry instrumentation system developed and used in flight tests by the NASA/Langley Research Center is described. The system uses high-speed digital techniques to acquire research data from miniature pressure transducers on advanced rotor airfoils which are flight tested using an AH-1G helicopter. The system employs microelectronic PCM multiplexer-digitizer stations located remotely on the blade and in a hub-mounted metal canister. The electronics contained in the canister digitizes up to 16 sensors, formats this data with serial PCM data from the remote stations, and transmits the data from the canister which is above the plane of the rotor. Data is transmitted over an RF link to the ground for real-time monitoring and to the helicopter fuselage for tape recording. (B.J.)
SF- AIAA
DE- <MAJOR> *DATA ACQUISITION; *FLIGHT TESTS; *HELICOPTER DESIGN; *IN-FLIGHT MONITORING; *ROTARY WINGS; *ROTOR BLADES
DE- AIRFOIL PROFILES; DATA TRANSMISSION; DIGITAL TECHNIQUES; MULTIPLEXING; PRESSURE SENSORS; PROPELLER BLADES; PULSE CODE MODULATION; REAL TIME OPERATION
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00984662
AN- <AEROSPACE> A79-17230
TI- The determination of measured dispersion parameters for plumes from tall stacks in Canada
AU- WHALEY, H. (Department of Energy, Mines and Resources, Canadian Combustion Research Laboratory, Ottawa, Canada)
SO- In: International Clean Air Conference, Brisbane, Australia, May 15-19, 1978, Proceedings. (A79-17226 05-45) Ann Arbor, Mich., Ann Arbor Science Publishers, Inc., 1978, p. 49-63. Research supported by the Department of Energy, Mines and Resources of Canada.
PY- 1978
RF- 15
LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
JA- IAA7905
AB- The CCRL (Canadian Combustion Research Laboratory) plume dispersion research program is described. An immersion probing methodology has been developed which uses synchronized helicopter- and automobile-carried instrumentation and provides three-dimensional data on plume dispersion along with atmospheric temperature and wind vector profiles within the dispersion zone. A rigorous finite-difference model allows the determination of plume axis elevations and downwind distances along with horizontal and vertical standard deviations of plume spread from the measured plume concentration profiles. This methodology improves the precision of dispersion modeling for specifying stack heights, selecting new plant locations, and predicting ground-level impingement profiles. (B.J.)
SF- AIAA
DE- <MAJOR> *AIR POLLUTION; *ATMOSPHERIC DIFFUSION; *DISPERSING; *INDUSTRIAL PLANTS; *PLUMES; *POLLUTION MONITORING
DE- AEROSOLS; ATMOSPHERIC TEMPERATURE; CANADA; ESTIMATING; FINITE DIFFERENCE THEORY; HELICOPTERS; MATHEMATICAL MODELS; STACKS; STANDARD DEVIATION; WIND PROFILES
SH- 7545 Environment Pollution (1975-)

AN- <DIALOG> 00982589
AN- <AEROSPACE> A79-15156
TI- Multiple laser tracker operations
AU- STEELE, W. W. (U.S. Army, Yuma Proving Ground, Ariz.)
SO- In: Electro-Optics/Laser Conference and Exposition, Anaheim, Calif., October 25-27, 1977, Proceedings. (A79-15134 04-36) Chicago, Industrial and Scientific Conference Management, Inc., 1977, p. 151-158.
PY- 1977
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER

JA- IAA7904
AB- Three laser tracking systems called precision aircraft tracking systems (PATS) comprise the basic position or trajectory measuring instrumentation in the described real-time data collection system. PATS are discussed with attention to maintenance, safety, calibration, major sources of errors, and data reduction techniques. Real-time and batch data reduction schemes are characterized. PATS is found to be a useful tracking device for helicopters, fixed wing aircraft, and ground vehicles. Applications to the Navstar Global Positioning System, artillery projectile tracking, and tracking at different wave lengths are considered. (M.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DETECTION; *DATA ACQUISITION; *LASER RANGER/TRACKER; *TRACKING (POSITION)
DE- CALIBRATING; DATA REDUCTION; GLOBAL POSITIONING SYSTEM; POSITION ERRORS ; PROJECTILES; REAL TIME OPERATION; SAFETY; SURFACE VEHICLES
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00982404
AN- <AEROSPACE> A79-14971
TI- Design and evaluation of flight directors for V/STOL aircraft
AU- HESS, R. A. (NASA, Ames Research Center, Moffett Field, Calif.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CS- <CODE> NC473657
SO- In: Conference on Decision and Control, and Symposium on Adaptive Processes, 16th, and Special Symposium on Fuzzy Set Theory and Applications, New Orleans, La., December 7-9, 1977, Proceedings. Volume 1. (A79-14957 04-63) Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 241-246.
PY- 1977
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7904
AB- A brief review of model-based techniques for the design of aircraft flight directors is undertaken. An analytical director design technique which utilizes an optimal control model of the human pilot is then discussed in more detail. The analytical and experimental results of three specific director design studies are discussed, all involving control of a light utility helicopter. Finally, a general design methodology is discussed which can aid in the specification of pilot-centered display requirements. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *COMPENSATORY TRACKING; *CONTROLLERS; *OPTIMAL CONTROL; *SYSTEMS ENGINEERING; *V/STOL AIRCRAFT
DE- AIRCRAFT LANDING; AIRCRAFT MANEUVERS; APPROACH CONTROL; DESIGN ANALYSIS ; DISPLAY DEVICES; HELICOPTER CONTROL; LONGITUDINAL CONTROL; PILOT PERFORMANCE; STABILITY AUGMENTATION; TRANSFER FUNCTIONS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00981854
AN- <AEROSPACE> A79-14421
TI- Oxygen systems for Army helicopters
AU- BUDIG, S. R. (U.S. Army, Supply Management Office, Fort Carson, Colo.)
SO- In: SAFE Association, Annual Symposium, 15th, Las Vegas, Nev., December 5-8, 1977, Proceedings. (A79-14401 03-03) Canoga Park, Calif., SAFE Association, 1977, p. 136-139.
PY- 1977
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7903
AB- The paper deals with the design requirements for oxygen systems in tactical helicopters, noting that supplemental oxygen is required for missions over 10,000 ft, for night vision in altitudes over 4,000 ft, and during nap-of-the-earth flights. The requirements are discussed with reference to Fort Carson, Colorado where four types of helicopters need oxygen systems: the OH-58 'Kiowa', UH-1 'Huey', AH-1G 'Cobra', and CH-47 'Chinook' models. The selection of components for these aircraft was made on the basis of the combat environment. A gaseous oxygen system was chosen along with a diluter demand system, high-pressure bottles and low-pressure lines. The MBU-5/P mask will be the standard mask. (S.C.S.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *HIGH ALTITUDE BREATHING; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *OXYGEN SUPPLY EQUIPMENT
DE- COMBAT; NIGHT VISION; OXYGEN MASKS; RESCUE OPERATIONS; SYSTEMS ENGINEERING

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00981850
AN- <AEROSPACE> A79-14417
TI- Explosive removal of egress panels for emergency escape from helicopters underwater
AU- HINDS, J. L. (U.S. Navy, Ordnance Systems Command, Indian Head, Md.); MOORE, D. B. (Explosive Technology, Inc., Fairfield, Calif.)
SO- In: SAFE Association, Annual Symposium, 15th, Las Vegas, Nev., December 5-8, 1977, Proceedings. (A79-14401 03-03) Canoga Park, Calif., SAFE Association, 1977, p. 116-119.
PY- 1977
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7903
AB- In 1973, a study was conducted to determine the cause of a high number of passenger fatalities occurring in what appeared to be routine egress from helicopters after water ditchings. Survivors of these accidents reported in-rushing water as the main problem in escaping from the aircraft. Based on the findings of the study, it was recommended that large troop carrying helicopters need more escape routes. A program was in this connection initiated to ascertain the feasibility of using explosive severance techniques in close proximity to human beings underwater. The conducted investigations demonstrated conclusively that explosive charges may be used to obtain large egress hatches in submerged and flooded aircraft compartments with no significant damage to human occupants. (G.R.)
SF- AIAA
DE- <MAJOR> *DITCHING (LANDING); *ESCAPE SYSTEMS; *EXPLOSIVE DEVICES; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *UNDERWATER EXPLOSIONS
DE- HUMAN TOLERANCES; PERFORMANCE TESTS; RECTANGULAR PANELS; SHAPED CHARGES
; SHOCK WAVE PROPAGATION
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00981841
AN- <AEROSPACE> A79-14408
TI- An inflatable restraint system
TI- <EXTENSION> for helicopter crash protection
AU- MCELHENNEY, J. R. (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.)
SO- In: SAFE Association, Annual Symposium, 15th, Las Vegas, Nev., December 5-8, 1977, Proceedings. (A79-14401 03-03) Canoga Park, Calif., SAFE Association, 1977, p. 49-53. Navy-supported research.
PY- 1977
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7903
AB- The considered system has been designed with the objective to prevent fatalities and reduce occupant injuries during a potentially survivable helicopter crash. A description is presented of an investigation which shows that an automatically inflatable restraint is feasible and provides increased crash protection over the conventional restraint. The inflatable restraint system is composed of three major subsystems, including the bladder/restraint, the inflator, and the crash sensor. The inflator is initiated by an electrical pulse to a squib which ignites a charge of ignition powder that generates heat and glowing particles to ignite the surrounding gas generant. The gas generant is composed of a nitrogen producing compound based on sodium azide. Attention is given to static preinflated testing, preinflated dynamic tests, automatically inflated dynamic tests, and an experimental crash drop. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *CRASH LANDING; *GAS BAGS; *HELICOPTER
PERFORMANCE; *INFLATABLE STRUCTURES; *SAFETY DEVICES
DE- DROP TESTS; DUMMIES; HUMAN FACTORS ENGINEERING; PERFORMANCE TESTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00981834
AN- <AEROSPACE> A79-14401
TI- SAFE Association, Annual Symposium, 15th, Las Vegas, Nev., December 5-8, 1977, Proceedings
SO- Canoga Park, Calif., SAFE Association, 1977. 308 p (For individual items see A79-14402 to A79-14439)
PY- 1977
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS

JA- IAA7903
AB- The human factor in safety is considered along with USAF life support equipment costs, problems in contracting for system safety, the development of an automatic nerve agent alarm for chemical defense, regenerative life support systems for nuclear shelters, a pyrotechnic air generator, heat transfer principles in personal protection applications, and design considerations for inflatable head/neck restraint systems. Attention is given to the design of aircraft emergency devices for emergency use, an objective look at disaster exercises, an inflatable restraint system, a microwave radiometric attitude reference system for a rocket-powered pilot escape seat, a relative motion analysis of horizontal collision avoidance, the effectiveness of pilot warning instruments, a performance evaluation of the experimental beacon collision avoidance system, the prevention of helicopter mid-air collisions with the proximity warning device, the development of anti-G valves for high performance aircraft, and an economical approach to an accident information retrieval system. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SAFETY; *CONFERENCES; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING; *SAFETY DEVICES
DE- AIR BAG RESTRAINT DEVICES; AIRCRAFT ACCIDENTS; AIRPORT PLANNING; CIVIL DEFENSE; COLLISION AVOIDANCE; DISASTERS; ESCAPE SYSTEMS; FLYING EJECTION SEATS; HELICOPTER DESIGN; LIFE SUPPORT SYSTEMS; PARACHUTES; PROTECTIVE CLOTHING; SAFETY MANAGEMENT; SPACECRAFT DESIGN
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00980654
AN- <AEROSPACE> A79-13221
TI- The assessment of rotary wing aviator precision performance during extended helicopter flights
AU- LEES, M. A.; KIMBALL, K. A.; STONE, L. W. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.)
SO- In: Human Factors Society, Annual Meeting, 21st, San Francisco, Calif., October 17-20, 1977, Proceedings. (A79-13181 03-54) Santa Monica, Calif., Human Factors Society, Inc., 1977, p. 426-430.
PY- 1977
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7903
AB- A description is presented of changes in aviators' precision hovering skills observed during the extended flight operations conducted in connection with a large scale field investigation of the effects of fatigue and extended flight on rotary wing flight performance. Subjects for this investigation were six rotary wing aviators in excellent health, between the ages of 21 and 26. Each pilot had approximately 200 flight hours prior to his participation in the investigation. In-flight performance data was obtained through the use of a monitoring system which provides for the real time acquisition of all major aircraft motion, and pilot control parameters. The results of the analysis on pilot control variables are presented in a table. It was found that there were significant differences across flight days and within the days of flight. The effect of fatigue and extended flight, on pilot control, was found to be consistent throughout the days of in-flight testing. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *FATIGUE (BIOLOGY); *HELICOPTER PERFORMANCE; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- HOVERING STABILITY; LEARNING; MULTIVARIATE STATISTICAL ANALYSIS; TIME DEPENDENCE
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00976225
AN- <AEROSPACE> N78-32816
TI- Helicopter Acoustics
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CS- <CODE> ND210491
PY- 1978
PD- 197808
PG- 399P.
NT- Presented at the Intern. Specialists Symp., Hampton, Va., 22-24 May 1978; sponsored by the Am. Helicopter Soc. and AROD
RN- NASA-CP-2052-PT-1; L-12339
LA- English
GL- United States
CP- United States
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

AV- <OTHER> NTIS HC A17/MF A01
JA- STAR7823
AB- Exterior and interior noise problems are addressed both from the physics and engineering as well as the human factors point of view. The role of technology in closing the gap between what the customers and regulating agencies would like to have and what is available is explored. Noise regulation concepts, design, operations and testing for noise control, helicopter noise prediction, and research tools and measurements are among the topics covered. &For individual titles, see N78-32817 through N78-32835.
DE- <MAJOR> *AEROACOUSTICS; *AIRCRAFT NOISE; *CONFERENCES; *HELICOPTERS
DE- AIR TRANSPORTATION; AIRFOIL PROFILES; HELIPORTS; NOISE POLLUTION; NOISE REDUCTION; POLLUTION CONTROL; PREDICTION ANALYSIS TECHNIQUES; REGULATIONS; ROTARY WINGS; ROTOR AERODYNAMICS; URBAN DEVELOPMENT; WIND TUNNEL TESTS
SH- <COSATI> 20A Acoustics
SH- 7571 Acoustics (1975-)

AN- <DIALOG> 00975175
AN- <AEROSPACE> N78-31754
TI- Use of Inspiratory Minute Volumes in evaluation of rotary and fixed wing pilot workload
TI- <EXTENSION> respiratory response to flight conditions
AU- PETTYJOHN, F. S.; MCNEIL, R. J.; AKERS, L. A.; FABER, J. M.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1978
PD- 197806
NT- In AGARD Methods to Assess Workloads 3 p (SEE N78-31745 22-54)
LA- English
GL- United States
CP- International Organization
DT- OTHER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR7822
AB- Inspiratory minute volume (IMV) measurements were utilized in the evaluation of US Army aircrew workload and stress in helicopter and fixed wing aircraft. The IMV data demonstrated a significant stress and/or workload level of the aviator in performance of helicopter day nap-of-the-earth NOE), night nap-of-the-earth flight (NNOE) and with the use of night vision devices (NVD). IMV 20.05 to 38.11 liters per minute NTPD were obtained during the performance of these combat operational techniques. IMV determination in-flight is considered a valuable clinical tool in the assessment of aircrew stress and/or workload. (G.G.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT STRESS; *PILOT PERFORMANCE; *RESPIRATORY RATE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- FIXED WINGS; FLIGHT CREWS; HUMAN FACTORS ENGINEERING; MILITARY AVIATION ; MILITARY HELICOPTERS; OXYGEN CONSUMPTION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00975169
AN- <AEROSPACE> N78-31748
TI- Use of eye-movement measures to establish design parameters for helicopter instrument panels
AU- BARNES, J. A.
CS- Human Engineering Labs., Aberdeen Proving Ground, Md.
CS- <CODE> H6521544
PY- 1978
PD- 197806
NT- In AGARD Methods to Assess Workloads 9 p (SEE N78-31745 22-54)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A07/MF A01
JA- STAR7822
AB- The pilot's eye-scan path and fixation point recordings during actual helicopter flight provided an accurate measure of the visual workload imposed by a particular panel design. Initial work was done in the UH-1 helicopter using experienced instrument-rated pilots flying actual maneuvers on instruments. The knowledge gained from these data was used to design a helicopter instrument panel in which the most referred to instruments were placed so that the eye-scan paths were minimized. This design considerably lessens the pilot's visual workload, cuts fatigue and allows him more time for other tasks. (G.G.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *OPTIMIZATION; *PANELS; *PILOT PERFORMANCE; *UH-1 HELICOPTER

DE- DISPLAY DEVICES; EYE MOVEMENTS; HUMAN FACTORS ENGINEERING; STRUCTURAL
DESIGN CRITERIA; VISUAL PERCEPTION; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00974729
AN- <AEROSPACE> N78-31305
TI- Applications of a charge coupled device sensor for Nap-of-the-Earth helicopter operations
AU- KLEIDER, A.
CS- Army Electronics Command, Fort Monmouth, N. J.
CS- <CODE> A0057764
PY- 1978
PD- 197806
NT- In AGARD Impact of Charge Coupled Devices and Surface Acoustic Wave Devices on Signal Process. and Imagery in Advanced Systems 16 p (SEE N78-31279 22-31)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A21/MF A01
JA- STAR7822
AB- The geometric characteristic of a wire obstacle was conceptually integrated with the discrete elemental structure of a charge couple device (CCD). This quantized detector structure provides a means for formulating a wire obstacle warning system (WOWS) utilizing advances in technology to arrive at a low cost system for use by helicopters flying Nap-of-the-Earth (NOE). The WOWS employs a CCD detector array and other monolithic semiconductor devices to achieve small size, lightweight, and low cost. The video information is logically processed to provide a symbolic display of the range and location of the wire obstacle relative to the aircraft heading as well as an audio visual alarm for the pilot. The concept of single site activation (SSA) provides a means of achieving wire pattern recognition which removes the requirement of having a human observer in the detection recognition loops. (B.B.)
SF- NASA CASI
DE- <MAJOR> *CHARGE COUPLED DEVICES; *HELICOPTER PERFORMANCE; *IMAGE
PROCESSING; *SIGNAL PROCESSING; *WIRE
DE- AIRCRAFT ACCIDENTS; DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; PATTERN
RECOGNITION; WARNING SYSTEMS
SH- 7533 Electronics & Electrical Engineering (1975-)

AN- <DIALOG> 00972251
AN- <AEROSPACE> N78-28810
TI- Physiological parameters associated with extended helicopter flight missions: An assessment of pupillographic data
TI- <SUPPLEMENT> Final Report
AU- ANDERSON, D. B.; CHIOU, W. C.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1977
PD- 197709
PG- 22P.
CN- DA PROJ. 3A1-61102-B-71P
RN- AD-A052771; USAARL-77-21
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A02/MF A01
JA- STAR7819
AB- Six Army aviators served as subjects in a study of various psychological and physiological parameters associated with extended helicopter flight missions. This report presents the results of the initial pupillographic data collected in this study as well as the problems encountered and the recommended solutions. It was shown that the waveform characteristics of the pupillary reflex response to light were irregular. Furthermore, the blinking frequency increased and the pupillary amplitude varied as a function of loaded flight task. Results also revealed that the average pupillary diameter was smaller in the morning than in the evening. This report recommends the future use of pupillography in which an evaluation of pilot alertness is needed. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT FATIGUE; *HELICOPTERS; *PUPILLOMETRY
DE- EYE MOVEMENTS; PILOT PERFORMANCE; PUPIL SIZE
SH- <COSATI> 6P Physiology
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00969522

AN- <AEROSPACE> N78-26055
TI- Flight performance and pilot workload in helicopter flight under simulated IMC employing a forward looking sensor
AU- BEYER, R.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. Fuer Flugfuehrung.
CS- <CODE> DO696666
PY- 1978
PD- 197804
NT- In AGARD Guidance and Control Design Considerations for Low-Altitude and Terminal-Area Flight 9 p (SEE N78-26049 17-01)
LA- English
GL- Germany, Federal Republic of
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A14/MF A01
JA- STAR7817
AB- A study was made giving particular emphasis to flight performance and pilot workload in flights under simulated IMC, employing a forward looking sensor, as well as to the layout of the display and the sensor system. The experiments were flown in a Bell UH-ID helicopter. The technical approach and some results are presented. (J.A.M.)
SF- NASA CASI
DE- <MAJOR> *FLIR DETECTORS; *HELICOPTERS; *INSTRUMENT FLIGHT RULES; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- ELECTRO-OPTICS; FLIGHT CONTROL; GUIDANCE (MOTION); LOW ALTITUDE; PILOT PERFORMANCE
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00962691
AN- <AEROSPACE> N78-19111
TI- Survey of piloting factors in V/STOL aircraft with implications for flight control system design
AU- RINGLAND, R. F.; CRAIG, S. J.
CS- Systems Technology, Inc., Hawthorne, Calif.
CS- <CODE> S9710660
PY- 1977
PD- 197708
NT- In Naval Postgraduate School Proc. of the Navy/NASA VSTOL Flying Qualities p 269-292 (SEE N78-19099 10-05)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A23/MF A01
JA- STAR7810
AB- Flight control system design factors involved for pilot workload relief are identified. Major contributors to pilot workload include configuration management and control and aircraft stability and response qualities. A digital fly by wire stability augmentation, configuration management, and configuration control system is suggested for reduction of pilot workload during takeoff, hovering, and approach. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *FLIGHT CONTROL; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *V/STOL AIRCRAFT
DE- CONFIGURATION MANAGEMENT; FLY BY WIRE CONTROL; MAN MACHINE SYSTEMS; TECHNOLOGY ASSESSMENT
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00962690
AN- <AEROSPACE> N78-19110
TI- Pilot centered requirements in control/display design
AU- HESS, R. A.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CS- <CODE> NC473657
PY- 1977
PD- 197708
NT- In Naval Postgraduate School Proc. of the Navy/NASA VSTOL Flying Qualities p 237-258 (SEE N78-19099 10-05)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A23/MF A01
JA- STAR7810
AB- A method developed for predicting pilot opinion ratings for particular vehicles and tasks using optimal control pilot model is described and an outline of a flight director design procedure based upon the optimal

control pilot model is given. Longitudinal and lateral control of a helicopter in hover and in a -6 deg constant ground speed-command landing approach are considered. Emphasis is placed on display design for optimum V/STOL control. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *MAN MACHINE SYSTEMS;
*V/STOL AIRCRAFT
DE- HUMAN FACTORS ENGINEERING; OPTIMAL CONTROL; PILOT PERFORMANCE
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00962682
AN- <AEROSPACE> N78-19102
TI- V/STOL hover stability impact on hover control task
AU- WHITAKER, A. B.; KELLY, C. P.; WITTMAN, R. B.; MARTORELLA, R. P.
CS- Grumman Aerospace Corp., Bethpage, N.Y.
CS- <CODE> G6919090
PY- 1977
PD- 197708
RF- 1
NT- In Naval Postgraduate School Proc. of the Navy/NASA VSTOL Flying Qualities p 53-70 (SEE N78-19099 10-05)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A23/MF A01
JA- STAR7810
AB- Longitudinal static stability requirements for V/STOL aircraft are discussed in terms of vertical landing on a small ship at night, response of the aircraft to air turbulence, and hovering flight. The increased pilot workload encountered under these flight conditions is considered. Results of a flight simulation study performed to evaluate a specific hover control task, two control systems - attitude rate command and translational velocity command, and the pilots' performance with and without turbulence are reported. It is concluded that the translational velocity command system provides the control requirements for good spot hovering capability and reduced pilot workload. (J.M.S.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *FLIGHT CONTROL; *HOVERING STABILITY;
*V/STOL AIRCRAFT
DE- COMMAND AND CONTROL; DYNAMIC RESPONSE; FLIGHT SIMULATION; LONGITUDINAL
STABILITY; LOW SPEED STABILITY; PILOT PERFORMANCE; TURBULENCE
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00960668
AN- <AEROSPACE> N78-17046
TI- Toxicologic gas evaluation of the utility tactical transport aircraft system (UH-60)
TI- <SUPPLEMENT> Final Report
AU- SCHUMAKER, R. L.; POLLARD, G. D.
CS- Army Aeromedical Research Lab., Fort Rucker, Ala.
CS- <CODE> AY826435
PY- 1977
PD- 197707
PG- 13P.
RN- AD-A047801; USAARL-77-18
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A02/MF A01
JA- STAR7808
AB- The accumulation of toxic gases in US Army combat and combat support aircraft presents a significant hazard for the aircrew in addition to the combat forces and aeromedical evacuation patients being transported. The US Army Aeromedical Research Laboratory is conducting an on-going evaluation of the cockpit and cabin environment of current and future helicopter and fixed wing aircraft. Toxic product accumulation evaluation during actual flight with weapons firing presents a difficult technicologic challenge. This study of toxic gases due to aircraft engine operation and weapons firing demonstrates adequate ventilation for the compounds carbon monoxide, nitrogen dioxide, nitric oxide, sulfur dioxide, and hydrogen cyanide. Single samples of hydrogen sulfide demonstrate instantaneous toxic levels. Biochemical and analytical techniques are being refined to further evaluate on-line, in-flight hydrogen sulfide levels in US Army aircraft under actual combat conditions. (Author (GRA))
SF- DTIC

DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT COMPARTMENTS; *GAS ANALYSIS;
*MILITARY HELICOPTERS; *TOXICITY; *TRANSPORT AIRCRAFT
DE- COCKPITS; CONCENTRATION (COMPOSITION); FIGHTER AIRCRAFT; HUMAN FACTORS
ENGINEERING; TOXIC HAZARDS; VENTILATION
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00960250
AN- <AEROSPACE> N78-16627
TI- A study on pilot's workload in helicopter operation under simulated IMC employing a forward looking sensor
AU- BEYER, R.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehring.
CS- <CODE> DO696666
PY- 1977
PD- 197711
NT- In AGARD Studies on Pilot Workload 11 p (SEE N78-16621 07-54)
LA- English
GL- Germany, Federal Republic of
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR7807
AB- Various measures of pilot workload are known which are presently applied to human engineering investigations. It is difficult, however, to find a measure which has proved to be universally applicable and adequately validated. Measures tailored to a specific application may be less flexible but can provide relevant and sufficient information on pilot workload. Some aspects of workload measurement are discussed, and some workload measurements and the results are presented by referring to flight tests with advanced displays for the helicopter. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIR DETECTORS; *HELICOPTERS; *MAN MACHINE
SYSTEMS; *PILOT PERFORMANCE; *TASK COMPLEXITY
DE- AEROSPACE MEDICINE; DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; MEASURE
AND INTEGRATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00960247
AN- <AEROSPACE> N78-16624
TI- In-flight recording of helicopter pilot activity
TI- <EXTENSION> head and hand movements
AU- LOVESEY, E. J.
CS- Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
CS- <CODE> R2785060
PY- 1977
PD- 197711
NT- In AGARD Studies on Pilot Workload 11 p (SEE N78-16621 07-54)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR7807
AB- A fully portable cine camera fitted with a wide angle lens was used to record pilots' head and hand movements in 6 different helicopters and 2 fixed wing aircraft types during nap-of-the-earth, low level and other flight phases. Apart from highlighting problem areas in the cockpit, the film records show that activity patterns depend more upon the flight profile than upon the helicopter type or the individual pilot. Subsequent film analysis has shown that the pilot time tends to increase with decreasing height above the ground. During nap-of-the-earth tactical flying, a pilot may spend over a third of the time looking inside the cockpit at maps, instruments and radios. This is precisely the time when he needs to spend the maximum time looking outside to detect and evade potential hazards such as wires, trees, enemy positions etc. Reasons for the apparently paradoxical behaviour and the effect upon pilot work-load are discussed. Typical pilot activity patterns are presented, together with an example of how poor cockpit design can obviously increase work-load and reduce efficiency. (Author)
DE- <MAJOR> *AEROSPACE MEDICINE; *AIRCRAFT PILOTS; *IN-FLIGHT MONITORING;
*PILOT PERFORMANCE; *SENSORIMOTOR PERFORMANCE
DE- MAN MACHINE SYSTEMS; TASK COMPLEXITY; VISUAL ACCOMMODATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00960245

AN- <AEROSPACE> N78-16622
TI- Workload and operational fatigue in helicopter pilots
AU- ROTONDO, G.
CS- Italian Air Force Medical Service H. Q., Rome.
CS- <CODE> I7307109
PY- 1977
PD- 197711
NT- In AGARD Studies on Pilot Workload 11 p (SEE N78-16621 07-54)
LA- English
GL- Italy
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR7807
AB- The possible causes of the operational fatigue to which flight crews are subject during the performance of their duties are reviewed. The influence of the physical, psychic, and emotive components of the stress factor associated with the professional activities of helicopter pilots are analyzed and their effects in the genesis of flight fatigue is assessed. On the basis of this analytical survey, it is possible to conclude that the piloting of helicopters involves a psycho-physical workload that is not inferior to the one experienced by the pilots of faster and more powerful aircraft. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT FATIGUE; *FLIGHT STRESS (BIOLOGY); *HELICOPTERS; *PILOT PERFORMANCE; *STRESS (PHYSIOLOGY); *STRESS (PSYCHOLOGY); *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- EMOTIONAL FACTORS; PHYSIOLOGICAL EFFECTS; PSYCHOACOUSTICS; PSYCHOLOGICAL EFFECTS; PSYCHOPHYSIOLOGY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00960244
AN- <AEROSPACE> N78-16621
TI- Studies on Pilot Workload
TI- <EXTENSION> psychophysiological factors
AU- AUFFRET, R., ed. (Centre d'Essais en Vol, Bretigny-sur-Orge, France)
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1977
PD- 197711
PG- 125P.
NT- Presented at the Aerospace Med. Panel Specialists' Meeting, Cologne, 18-22 Apr. 1977
RN- AGARD-CP-217; ISBN-92-835-0205-1; AD-A049381
LA- MULTIPLE
LA- <NOTE> Partly in ENGLISH and FRENCH
GL- France
CP- International Organization
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A06/MF A01
JA- STAR7807
AB- The different variables which can influence human performance during the operational use of helicopters or other aircraft having high acceleration loads are assessed to quantify the sum of work which can be provided at each moment during flight. 4 &For individual titles, see N78-16622 through N78-16632.
DE- <MAJOR> *AIRCRAFT PILOTS; *CONFERENCES; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *TASK COMPLEXITY; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AEROSPACE MEDICINE; FLIGHT FATIGUE; FLIGHT STRESS (BIOLOGY); HELICOPTERS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00959650
AN- <AEROSPACE> N78-16024
TI- Evaluation of slimpack style parachute in CT4A airtrainer aircraft
CS- Aircraft Research and Development Unit, Laverton (Australia).
CS- <CODE> AL501002
PY- 1976
PD- 197611
PG- 31P.
RN- AD-A047083; TI-556
LA- English
GL- Australia
CP- Australia
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7807
AB- The Slimpak style parachute was being evaluated, under Technical Investigation 517, for use in place of the standard 'Flexible Back' parachute which had proven unsatisfactory in helicopter operations when worn by large crew members. Some instructors and students of No 1 Flying Training School, of rather large build, were unable to wear the Flexible Back parachute in the CT4A Airtrainer because of restriction

to control column deflection. Headquarters Support Command considered that the Slimpak style parachute might be suitable for use in the Airtrainer by the large crew members and ARDU was directed to investigate this possibility. Ground and flight trials were conducted using a wide range of aircrew sizes. Dropping trials were carried out under Technical Investigation 517. The 'Slimpak' model parachute as tested was found to be unacceptable for use in the Airtrainer by aircrew with a buttock to heel length of less than about 1.02 m. It was also found to have major deficiencies in design and operation of the harness and associated buckles that would render it unsuitable in its present form for use by the RAAF in any other aircraft. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ACCEPTABILITY; *FLIGHT TESTS; *HELICOPTERS; *PARACHUTES; *TRAINING AIRCRAFT
DE- BODY MEASUREMENT (BIOLOGY); HUMAN FACTORS ENGINEERING
SH- <COSATI> 1C Aircraft
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 00957701
AN- <AEROSPACE> N78-14058
TI- Three-cue helicopter flight director evaluation
CS- Instrument Flight Center, Randolph AFB, Tex.
CS- <CODE> IP938983
PY- 1977
PD- 197707
PG- 89P.
RN- AD-A046261; USAFIFC-TR-77-3
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR7805
AB- This report covers the work accomplished during an inflight investigation concerning the evaluation of the changes in pilot performance, control activity and biochemical changes while flying with various display configurations of a helicopter Three-Cue Flight Director System. Flights were conducted in the TH-1F helicopter. The subject pilots participating in the study consisted of both instructor pilots and pilots attending the Instrument Pilot Instructor School (IPIS). (GRA)
SF- DTIC
DE- <MAJOR> *FLIGHT CONTROL; *HELICOPTER CONTROL
DE- ATTITUDE CONTROL; FLIGHT INSTRUMENTS; IN-FLIGHT MONITORING; PILOT PERFORMANCE
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00953719
AN- <AEROSPACE> N78-10038
TI- Crew escape capsule retrorocket concept. Volume 1: Demonstration program
TI- <SUPPLEMENT> Final Technical Report, May 1972 - Oct. 1975
AU- WHITNEY, M. C.
CS- Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
CS- <CODE> AI058438
PY- 1977
PD- 197705
PG- 78P.
VO- 2
CN- AF PROJ. 6065
RN- AD-A042337; AFFDL-TR-76-107-VOL-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR7801
AB- The retrorocket demonstration program was conducted to evaluate an alternative to the inflatable airbags that are currently used with crew escape capsules to attenuate the landing impact forces. In-house tests indicated that if the vertical impact velocity was ten feet per second or less, the impact forces would be within human tolerances. Analyses revealed that the retrorocket concept could meet this criteria, therefore, a demonstration test program was established. A structural steel test vehicle that was configured to simulate the B-1 capsule (weight, center of gravity location, footprint, size and parachute bridle system) was used for the test program. A cluster of four rocket motors with a high level primary thrust and a low level sustainer, that had been developed for the NASA Gemini Program, was installed at the confluence of the three 69.8 foot diameter slotted ring sail recovery chutes and the vehicle bridle system. A mechanical altimeter or telescoping probe was developed to extend down below the vehicle to trigger the rocket ignition at the correct time so as to decelerate the

vehicle from 30 ft/sec down to 10 ft/sec or less before ground impact. Eight tests were conducted in developing the demonstration system with the last test a complete retrorocket system test. Test results and the rocket performance computer program indicated the demonstration program met design requirements. (Author (GRA))
SF- DTIC
DE- <MAJOR> *DROP TESTS; *ESCAPE CAPSULES; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *IMPACT TESTS; *RETROROCKET ENGINES
DE- B-1 AIRCRAFT; COMPUTER PROGRAMS; HELICOPTERS; LANDING LOADS; TOLERANCES (PHYSIOLOGY)
SH- <COSATI> 1B Aeronautics
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00949923
AN- <AEROSPACE> A78-50160
TI- Flight controls of Army/Hughes YAH-64 advanced attack helicopter
AU- LANE, R. E. (Hughes Helicopters, Culver City, Calif.)
SO- In: Guidance and Control Conference, Palo Alto, Calif., August 7-9, 1978, Technical Papers. (A78-50159 22-01) New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 1-8.
PY- 1978
RN- AIAA 78-1237
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7822
AB- The flight controls of the YAH-64 have been designed to meet strict requirements in performance, maintainability, survivability, weight, human factors and cost. To achieve these requirements a blend of mechanical, hydraulic and electronic flight controls has been used which provides the necessary handling qualities to perform day or night missions in the critical NOE environment. ((Author))
DE- <MAJOR> *AH-64 HELICOPTER; *ATTACK AIRCRAFT; *FLIGHT CONTROL; *HELICOPTER CONTROL; *HELICOPTER DESIGN
DE- AIRCRAFT MAINTENANCE; AIRCRAFT RELIABILITY; CONTROLLABILITY; COST EFFECTIVENESS; DIRECTIONAL CONTROL; ELECTRONIC CONTROL; HELICOPTER PERFORMANCE; HUMAN FACTORS ENGINEERING; HYDRAULIC CONTROL; WEIGHT REDUCTION
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00949096
AN- <AEROSPACE> A78-49333
TI- Use of the U.S. interim standard microwave landing system in Canada
AU- REED, W. C.
SO- (Canadian Aeronautics and Space Institute, Canadian Symposium on Navigation, 3rd, Ottawa, Canada, Nov. 16, 17, 1977.) Canadian Aeronautics and Space Journal, vol. 24, July-Aug. 1978, p. 217-227.
PY- 1978
PD- 197808
LA- English
CP- Canada
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7822
AB- A general description of the Tull Microwave ILS serving as the US Interim Standard ILS is given. The system operates at 5.0-5.25 GHz and uses a scanning beam technique for ease of installation and siting. The system uses the ILS signal format of 90 Hz and 150 Hz in order to provide compatibility with aircraft ILS/VOR receivers. Principal ground elements are the localizer and glide-path subsystems. By the principle of beating, the 20 standard ILS frequency pairs can be produced by means of a single converter frequency. MLS airborne equipment interfaces with existing ILS receivers and instrumentation are illustrated. The installation of the system in a first application at the heliports of a helicopter shuttle service is described. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *LANDING INSTRUMENTS; *MICROWAVE LANDING SYSTEMS
DE- AIRBORNE EQUIPMENT; AIRPORT SURFACE DETECTION EQUIPMENT; APPROACH CONTROL; APPROACH INDICATORS; CANADA; CONVERTERS; DIAGRAMS; FREQUENCY SCANNING; GROUND SUPPORT EQUIPMENT; RUNWAYS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00946718
AN- <AEROSPACE> A78-46955
TI- Deterioration of human performance resulting from mechanical vibrations
TI- <ORIGINAL> Degradation de la performance humaine sous vibrations

mecaniques
AU- POIRIER, J. L.; BEAUGENDRE, J. (Centre d'Essais en Vol, Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge, Essonne, France)
SO- Medecine Aeronautique et Spatiale, Medecine Subaquatique et Hyperbare, vol. 17, 1st Quarter, 1978, p. 32-35. In French.
PY- 1978
PD- 197803
RF- 8
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7821
AB- The effect of 18 Hz sinusoidal frequency on human subjects was studied to gain information on the deterioration of pilot performance caused by helicopter vibrations. The sinusoidal frequency is along the x axis and has an effective acceleration of 0.4 g. Each experiment lasted 10 minutes and investigated a complex visual pursuit task involving recognition of light signals placed at the periphery of vision. It is found that the vibrations affect reaction time, but it is suggested that the experiment should be repeated with conditions modified to correspond more closely to actual flight conditions. (M.L.)
SF- AIAA
DE- <MAJOR> *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE; *STRUCTURAL VIBRATION; *VIBRATION EFFECTS
DE- EYE MOVEMENTS; HELICOPTERS; HUMAN FACTORS ENGINEERING; REACTION TIME; VISUAL TASKS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00946328
AN- <AEROSPACE> A78-46565
TI- Piloting and control systems for airplanes and helicopters
TI- <ORIGINAL> Pilotazhnye kompleksy i sistemy upravleniia samoletov i vertoletov
TI- <EXTENSION> Russian book
AU- BORODIN, V. T.; RYLSKII, G. I.
SO- Moscow, Izdatel'stvo Mashinostroenie, 1978. 216 p. In Russian.
PY- 1978
RF- 122
LA- Russian
CP- U.S.S.R.
DT- BOOK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7820
AB- Aircraft piloting and control systems including both manual and automatic control and information display systems are described in this book. The discussion specifically concerns non-Soviet systems. The ergonomic aspects of pilot system design are investigated. Mechanical and electric systems of stick control for airplanes are considered. The automatic control systems of various light and heavy airplanes, helicopters, and VTOL aircraft are studied. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- ALGORITHMS; AUTOMATIC CONTROL; COCKPITS; DIGITAL SYSTEMS; DISPLAY DEVICES; FLIGHT CREWS; HEAD-UP DISPLAYS; MATHEMATICAL MODELS; MILITARY HELICOPTERS; REMOTELY PILOTED VEHICLES
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00946314
AN- <AEROSPACE> A78-46551
TI- Simulator studies of powered-lift aircraft handling qualities in the presence of naturally-occurring and computer-generated atmospheric disturbances
AU- JEWELL, W. F.; HEFFLEY, R. K.; CLEMENT, W. F. (Systems Technology, Inc., Mountain View, Calif.); WEST, T. C. (FAA, Washington, D.C.)
SO- In: Atmospheric Flight Mechanics Conference, Palo Alto, Calif., August 7-9, 1978, Technical Papers. (A78-46526 20-08) New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 238-242. U.S. Department of Transportation
PY- 1978
RF- 8
CN- DOT-FA77WA-3936
RN- AIAA 78-1362
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7820
AB- Selected results are presented from a two-phased experimental program

to investigate powered-lift aircraft handling quality degradation due to both naturally-occurring and computer-generated atmospheric turbulence. In Phase I a variable stability helicopter was flown to simulate a powered-lift aircraft on final approach. In Phase II a ground-based simulator with a moving cockpit and a colored visual display was used to represent the same powered-lift aircraft. During Phase II, a Dryden model of atmospheric turbulence was used as well as actual wind profiles recorded during Phase I. This paper focuses on the Phase II results, which demonstrate that the naturally-occurring atmospheric turbulence yields handling quality ratings and pilot-vehicle performance inferior to those obtained with the Dryden model. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *CONTROL SIMULATION; *CONTROLLABILITY; *FLIGHT SIMULATORS; *POWERED LIFT AIRCRAFT
DE- ATMOSPHERIC TURBULENCE; COMPUTERIZED SIMULATION; DISPLAY DEVICES; PILOT PERFORMANCE; RATINGS; TURBULENCE EFFECTS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00941183
AN- <AEROSPACE> A78-41419
TI- Measurement of forces on aircraft rudders
TI- <ORIGINAL> Mesure d'efforts sur palonniers d'avions
AU- PORTAT, M. (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France)
SO- (Mesures, Regulation, Automatisme, vol. 43, Feb. 1978, p. 45-52.) ONERA, TP no. 1978-34, 1978. (p. 45-52) 9 p. In French. Research supported by the Direction Technique des Constructions Aeronautiques.
PY- 1978
RN- ONERA, TP NO. 1978-34
LA- French
GL- France
CP- France
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7817
AB- The paper describes a dynamometric setup designed for in-flight measurements of the forces exerted on an aircraft rudder during various stages of flight. The dynamometer measures simultaneously two orthogonal forces, and the signals are processed in such a way that, regardless of the point of application of the force and its direction in a reference plane, the absolute value and direction of the force can measured. The dynamometer is attached to the petals. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AERIAL RUDDERS; *AIRCRAFT INSTRUMENTS; *DYNAMOMETERS; *FLIGHT TESTS; *HUMAN FACTORS ENGINEERING
DE- ANALOG CIRCUITS; HELICOPTER PERFORMANCE; PEDALS; PILOT PERFORMANCE; SIGNAL PROCESSING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00937266
AN- <AEROSPACE> A78-37501
TI- Modern millimeter wave instrumentation radar development and research methodology
AU- SCHEER, J. A.; EAVES, J. L.; CURRIE, N. C. (Georgia Institute of Technology, Atlanta, Ga.)
SO- In: EASCON-77; Electronics and Aerospace Systems Convention, Arlington, Va., September 26-28, 1977, Record. (A78-37476 15-33) New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 16-6A to 16-6H.
PY- 1977
RF- 11
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7815
AB- A millimeter-wave radar is described, and its various modes of operation are related to the research associated with signal processing techniques. The new system is based on a K-sub-a band radar characterized as state-of-the-art, solid-state, self-contained, portable, coherent, frequency-agile, dual-polarized, and polarization-agile. Preliminary hard target and clutter data and analyses are presented and related to the determination of appropriate processing algorithms for target discrimination. (M.L.)
SF- AIAA
DE- <MAJOR> *AIRBORNE EQUIPMENT; *EXTREMELY HIGH FREQUENCIES; *MILLIMETER WAVES; *RADAR EQUIPMENT
DE- CLUTTER; HELICOPTERS; MICROWAVE EQUIPMENT; MISSILES; RADAR NAVIGATION
SH- 7532 Communications (1975-)

AN- <DIALOG> 00936713
AN- <AEROSPACE> A78-36948
TI- A theoretical study of the effect of blade ice accretion on the power-off landing capability of a Wessex helicopter
AU- YOUNG, C. (Royal Aircraft Establishment, Farnborough, Hants., England)
SO- (European Rotorcraft and Powered Lift Aircraft Forum, 3rd, Aix-en-Provence, France, Sept. 7-9, 1977.) Vertica, vol. 2, no. 1, 1978, p. 11-25.
PY- 1978
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7815
AB- The effect of rotor blade icing on helicopter performance is investigated; calculations are presented to indicate the maximum torque rise which can be tolerated in forward flight before the helicopter autorotational performance is seriously degraded. Various decreases in the lift curve slope, together with increases in the drag of the blade section, are employed to simulate the effects of blade ice. The excess torque at engine failure provides a measure of the ability of the helicopter to make a successful power-off landing with iced blades (J.M.B.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *HELICOPTER PERFORMANCE; *ICE FORMATION; *ROTARY WINGS; *ROTOR AERODYNAMICS
DE- AIRFOILS; CONTROL THEORY; EMERGENCIES; PILOT PERFORMANCE; TORQUE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00935923
AN- <AEROSPACE> A78-36158
TI- Inflight measurement of pilot workload - A panel discussion
AU- GERATHEWOHL, S. J.; BROWN, E. L.; BURKE, J. E.; KIMBALL, K. A.; LOWE, W. F.; STACKHOUSE, S. P. (FAA, Office of Aviation Medicine, Washington, D.C.)
SO- Aviation, Space, and Environmental Medicine, vol. 49, June 1978, p. 810-822.
PY- 1978
PD- 197806
RF- 10
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7814
AB- A panel discussion considering the inflight measurement of pilot workload is presented. Improvements to cockpit design through crew workload measurements are suggested. Methods for measuring flight crew workload are proposed, including pilot opinion, physiological measures, secondary task loading, and videotapes of cockpit activity. Determinations of pilot workload by a helicopter-vision-requirements program is discussed and an eye-mark recording technique for assessing pilot visual workload is described. Procedures for measuring the visual workload of helicopter pilots during low-altitude flight are outlined. Comments on an information processing workload and the physical and physiological aspects of operator workload are presented. (S.C.S.)
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- COCKPITS; HEAD-UP DISPLAYS; PSYCHOLOGICAL FACTORS; VISUAL TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00930551
AN- <AEROSPACE> A78-30786
TI- Study of the work capability of helicopter crews during a long stay on warships
TI- <ORIGINAL> Izuchenie rabotosposobnosti ekipazhei vertoletov pri dlitel'nom ikh bazirovanii na korabliach VMF
AU- KOLTSOV, A. N.; SERGEEV, V. A.
SO- Voenno-Meditsinskii Zhurnal, Jan. 1978, p. 55-58. In Russian.
PY- 1978
PD- 197801
LA- Russian
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7812
AB- The paper describes psychophysiological changes which occurred among helicopter crew members during a long stay on warships. Several visual, auditory, and motor characteristics were examined, and the results are surveyed. Exercises were found to reduce deleterious changes that

occurred during the second half of the voyage. Characteristics considered include lability of the visual analyzer, the threshold of electrical sensitivity of the eye, the sensorimotor response to sound, static tremor, maximum muscle force, and static muscle endurance. (M.L.)
SF- AIAA
DE- <MAJOR> *HELICOPTERS; *OPERATOR PERFORMANCE; *PHYSICAL FITNESS; *PILOT PERFORMANCE; *PSYCHOPHYSIOLOGY; *WORK CAPACITY
DE- ACOUSTIC FATIGUE; CARDIOVASCULAR SYSTEM; CENTRAL NERVOUS SYSTEM; MUSCULAR FUNCTION; OSMOSIS; PHYSIOLOGICAL RESPONSES; THRESHOLDS (PERCEPTION)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00929438
AN- <AEROSPACE> A78-29673
TI- Aircraft and helicopter cockpit noise
TI- <ORIGINAL> Halas w kabinach samolotow i smiglowcow
AU- RUDIUK, A. (Instytut Lotnictwa, Warsaw, Poland)
SO- Technika Lotnicza i Astronautyczna, vol. 33, Feb. 1978, p. 10-14. In Polish.
PY- 1978
PD- 197802
RF- 6
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7811
AB- In the present paper, the detrimental influence of cockpit noise on pilot hearing and reactions is studied as a function of noise duration and intensity. The acoustic spectrum is analyzed, and an attempt is made to establish acceptable noise level standards. The need for reducing noise in crop-duster cockpits is noted. (V.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMPARTMENTS; *AIRCRAFT NOISE; *COCKPITS; *NOISE TOLERANCE; *PILOT PERFORMANCE
DE- BACKGROUND NOISE; GRAPHS (CHARTS); HELICOPTERS; NOISE MEASUREMENT; NOISE REDUCTION; NOISE SPECTRA; OCTAVES; TABLES (DATA)
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00918565
AN- <AEROSPACE> A78-18800
TI- Recent flight test results using an electronic display format on the NASA B-737
AU- MORELLO, S. A. (NASA, Langley Research Center, Flight Research Div., Hampton, Va.)
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CS- <CODE> ND210491
SO- NATO, AGARD, Symposium on Guidance and Control Design Considerations for Low Altitude and Terminal Area Flight, 25th, Dayton, Ohio, Oct. 17-20, 1977, Paper. 11 p.
PY- 1977
PD- 197710
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7806
AB- This paper presents results of a flight evaluation of two electronic display formats for the approach-to-landing under instrument conditions. The evaluation was conducted for a baseline electronic display format and for the same format with runway symbology and track information added; its evaluation was conducted during 3-deg manual straight-in approaches with and without initial localizer offsets. Flight-path tracking performance data and pilot subjective comments were examined with regard to pilot's ability to capture and maintain the localizer and glide slope using both display fomats. The results of the flight tests agree with earlier simulation results and show that the addition of a perspective runway symbol with an extended centerline and relative track information to a baseline electronic display format improved both lateral and vertical flight-path tracking. Pilot comments indicated that the mental workload required to assess the approach situation was reduced as a result of integrating the perspective runway with extended centerline along with relative track information into the vertical situation display. The limited flight-test results also show that the flight-path performance with the integrated situation display format meets Category II Flight-Director performance criteria. ((Author))

DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *BOEING 737 AIRCRAFT; *DISPLAY DEVICES;
*FLIGHT TESTS; *LANDING INSTRUMENTS; *PILOT PERFORMANCE; *TRACKING (POSITION)
DE- APPROACH CONTROL; FLIGHT PATHS; MAN MACHINE SYSTEMS; NASA PROGRAMS;
RESEARCH AIRCRAFT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00918193
AN- <AEROSPACE> A78-18428
TI- An electronic integrated pilot display is evaluated in North Sea operations
AU- VAN DER HARTEN, R. J. (KLM Helikopters, Amsterdam, Netherlands); COOPER, P. G. (Kaiser Aerospace and Electronics Corp., Palo Alto, Calif.)
SO- (American Helicopter Society, Annual National Forum, 32nd, Washington, D.C., May 10-12, 1976.) Vertica, vol. 1, no. 4, 1977, p. 271-279.
PY- 1977
RF- 12
LA- English
GL- Netherlands
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7805
AB- An electronic integrated pilot display has been under operational evaluation in a Sikorsky S-61N helicopter since November 1975. This instrument, using a cathode ray tube as a display device, combines the data from all instruments normally scanned by the S-61 pilot during instrument takeoffs and landings. It is installed in place of the conventional artificial horizon in the right-hand instrument panel. Modes of operation under evaluation include instrument takeoff (adaptive to aircraft gross weight and density altitude), cruise, and approach modes. The air direction finder and over-water, radar altitude hold modes are expected to contribute to improvement of limits for oil rig radar approaches. Instrument landing system approaches have been satisfactorily performed to below 100 feet and 40 kt. Engine parameters are continually analyzed to predict major emergencies, and situation data permit cross-check of flight director performance. ((Author))
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS; *INSTRUMENT FLIGHT RULES
DE- HUMAN FACTORS ENGINEERING; INSTRUMENT APPROACH; INSTRUMENT LANDING
SYSTEMS; NORTH SEA; RADAR APPROACH CONTROL; S-61 HELICOPTER; TAKEOFF
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00917833
AN- <AEROSPACE> A78-18068
TI- Aircraft display design using analytical pilot models
AU- HESS, R. A.
SO- In: Annual Asilomar Conference on Circuits, Systems, and Computers, 10th, Pacific Grove, Calif., November 22-24, 1976, Conference Record. (A78-18051 05-59) North Hollywood, Calif., Western Periodicals Co., 1977, p. 463-470.
PY- 1977
RF- 17
LA- English
CP- United States
DT- CONFERENCE PAPER
JA- IAA7805
AB- A relatively straightforward procedure for deriving model-based, pilot-centered display requirements is presented. A pilot model based on modern control theory serves as the backbone of the design methodology, which is specifically directed toward the synthesis of head-down, electronic cockpit display formats. An analytical design example is discussed which aids in the definition of a format for the electronic display to be used in a UH-1H helicopter in a landing approach task involving longitudinal and lateral degrees of freedom. ((Author))
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *HELICOPTER CONTROL;
*HUMAN FACTORS ENGINEERING; *MATHEMATICAL MODELS; *PILOT PERFORMANCE
DE- AIRCRAFT LANDING; COCKPITS; CONTROL THEORY; HELICOPTER DESIGN; MAN
MACHINE SYSTEMS; MANUAL CONTROL; TASK COMPLEXITY; UH-1 HELICOPTER
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00915146
AN- <AEROSPACE> A78-15381
TI- Reversing the trend of cockpit complexity with smart displays

TI- <EXTENSION> for helicopters
AU- FOX, E. I. (A-T-O, Inc., Hartman Systems Div., Huntington Station, N.Y.)
SO- Vertiflite, vol. 23, Sept.-Oct. 1977, p. 4-7.
PY- 1977
PD- 197710
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7804
AB- An integrated management panel has been developed as a multisystem control unit to set up and monitor helicopter avionic units and subsystems. The panel unit, which consists of a minimal keyboard, a cathode ray tube display, and a microcomputer, is used to control other equipment. The components and functioning of the panel unit are described. The microcomputer consists of a 16 bit word size microprocessor and a solid-state memory. One purpose of the integrated management panel is to reduce cockpit complexity and dial-face miniaturization found necessary in some helicopters. A diagram showing the organization of integrated management panels suitable for a search, rescue, and recovery helicopter is presented. Advantages of integrated management panels are said to include the easy modification of operating options, the facilitation of status monitoring, and quick reaction time. (M.L.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *COCKPITS; *DISPLAY DEVICES; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- CATHODE RAY TUBES; DIGITAL SYSTEMS; MAN MACHINE SYSTEMS; RESCUE OPERATIONS; UTILITY AIRCRAFT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00913849
AN- <AEROSPACE> A78-14084
TI- Analysis of aviation accidents with light planes and helicopters
TI- <ORIGINAL> Analiza wypadkow lotniczych lekkich samolotow i smiglowcow
AU- KOSTIA, T. (Instytut Lotnictwa, Warsaw, Poland)
SO- Technika Lotnicza i Astronautyczna, vol. 31, Sept. 1977, p. 11-15. In Polish.
PY- 1977
PD- 197709
RF- 7
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7803
AB- The present analysis of aircraft accident statistics is based primarily on data of the Civil Aeronautics Board and the Bureau of Safety Investigation. Particular attention is given to problems essential to flight safety, which require special consideration in the design and operation of small planes, crop dusters, etc. Means of improving the safety aspects of light-plane and helicopter pilots by upgrading cockpit design are suggested. (V.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *FLIGHT SAFETY; *HELICOPTER PERFORMANCE; *LIGHT AIRCRAFT
DE- ACCIDENT PREVENTION; CIVIL AVIATION; COCKPITS; PILOT PERFORMANCE; UTILITY AIRCRAFT
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00912212
AN- <AEROSPACE> A78-12447
TI- A design procedure for control/display systems
TI- <EXTENSION> performance-workload relations for CH-47 helicopter longitudinal response
AU- CURRY, R. E. (NASA, Ames Research Center, Moffett Field, Calif.); KLEINMAN, D. L. (Connecticut, University, Storrs, Conn.); HOFFMAN, W. C. (Aerospace Systems, Inc., Burlington, Mass.)
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CS- <CODE> NC473657
SO- Human Factors, vol. 19, Oct. 1977, p. 421-436.
PY- 1977
PD- 197710
RF- 11
CN- NAS1-13653
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7802

AB- This paper proposes a design procedure for control and display systems in which levels of automation vary over a significant range. The elements of the primary analysis tool (the Optimal Control Model of the Human Operator) are briefly reviewed, and the use of the model at three levels of specification (information level, display-element level, and display-format level) is discussed. Based on observation and pilot commentary, it is assumed that the pilot allocates his attention to control the aircraft to the desired level of performance, and then, with remaining capacity, to monitor displays. This facet of behavior is incorporated into the design procedure so that regardless of the level of control automation, all systems are compared at the same level of control performance. The design procedure is applied to the longitudinal control of a CH-47 helicopter. The procedure points out the need for performance-workload relations for control, which are fairly well understood, and performance-workload relations for monitoring, about which little is known. ((Author))
DE- <MAJOR> *CONTROL; *DISPLAY DEVICES; *PILOT PERFORMANCE; *SYSTEMS ENGINEERING; *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- AIRCRAFT PERFORMANCE; CH-47 HELICOPTER; DESIGN ANALYSIS; HEURISTIC METHODS; LONGITUDINAL CONTROL; OPTIMAL CONTROL; TASK COMPLEXITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00910272
AN- <AEROSPACE> A78-10507
TI- Plume dispersion in a mountainous river valley during spring
AU- WHALEY, H.; LEE, G. K. (Department of Energy, Mines and Resources, Canadian Combustion Research Laboratory, Ottawa, Canada)
SO- Air Pollution Control Association, Journal, vol. 27, Oct. 1977, p. 1001-1005.
PY- 1977
PD- 197710
RF- 9
LA- English
GL- Canada
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7801
AB- The dispersion of hot plumes emitted from a smelter complex located in the Columbia River Valley, British Columbia, was evaluated under stable and neutral conditions during two mornings in spring. Spatial measurements of SO2 and temperature within the plume were obtained by immersion probing using fast response helicopter and automobile mounted instrumentation. In addition, meteorological measurements of vertical wind and temperature profiles at, and downwind from, the smelter were obtained from minisonde balloon releases. With weak down-valley winds, it was found that the plume axis elevations were generally lower during both stable and neutral conditions than would be predicted by Briggs plume-rise formulae. In contrast, plume dispersion, although confined in the horizontal by the steep valley walls during both stability regimes, was significantly enhanced by exceptionally good lateral mixing, particularly close to the source. ((Author))
DE- <MAJOR> *AIR POLLUTION; *ATMOSPHERIC DIFFUSION; *PLUMES; *POLLUTION MONITORING; *VALLEYS
DE- COLUMBIA RIVER BASIN (ID-OR-WA); FLOW GEOMETRY; METEOROLOGICAL PARAMETERS; SMELTING; SULFUR DIOXIDES; TEMPERATURE DISTRIBUTION; TOPOGRAPHY
SH- 7545 Environment Pollution (1975-)

AN- <DIALOG> 00909964
AN- <AEROSPACE> A78-10199
TI- Human engineering data for aircraft design. III - Aircrew station vision requirement for military aircraft
AU- MIZUMOTO, K. (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Japan)
SO- Japan Air Self Defence Force, Aeromedical Laboratory, Reports, vol. 17, Mar. 1977, p. 195-210. In Japanese, with abstract in English.
PY- 1977
PD- 197703
LA- Japanese
GL- Japan
CP- Japan
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7801
AB- Requirements for providing adequate vision outside from within the aircrew stations of military aircraft are set down in MIL-STD 8503. Topics covered in the standard include: definitions, requirements specifically for fighter/attack aircraft, bomber/transport aircraft, ASW and patrol aircraft, helicopters, V/STOL aircraft, trainer aircraft, and reconnaissance aircraft. Attention is given to flight deck vision problems for inflight refueling aircraft, and vision from noncockpit crew stations. (R.D.V.)
SF- AIAA

DE- <MAJOR> *AIRCRAFT DESIGN; *COCKPITS; *FLIGHT CREWS; *HUMAN FACTORS
ENGINEERING; *MILITARY AIRCRAFT; *STANDARDS; *VISUAL PERCEPTION
DE- BOMBER AIRCRAFT; FIGHTER AIRCRAFT; HELICOPTERS; HUMAN PERFORMANCE;
RECONNAISSANCE AIRCRAFT; V/STOL AIRCRAFT; VISUAL ACUITY
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00908263
AN- <AEROSPACE> N94-18296
TI- Analysis of seating and restraint limitations restricting total body weight for aircrew and passengers on US Army helicopters
AU- BRUCKHART, JAMES E.; LICINA, JOSEPH R.; SHANNON, SAMUEL G.; HALEY, JOSEPH L.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1993
PD- 199307
PG- 23P.
CN- DA PROJ. 3M1-62787-A-878
RN- AD-A269117; USAARL-93-26
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A01
JA- STAR9404
AB- Aviation Life Support Equipment (ALSE) and crashworthy seating protect the crew and passengers in military aircraft. If the user exceeds the design weight or size range for personal protective equipment, it may not function properly. The distribution and changes in body weight and relevant anthropometric measures were evaluated for soldier and aviator groups. Current ALSE and aircraft restraints were surveyed to determine the largest available sizes. Each aircraft seat was evaluated to determine the crash strength and maximum allowable weight for a given crash pulse. The 99th percentile male soldier and aviator weigh 237.5 and 228.2 pounds, respectively. The average body weight increases with age for the male aviator population. The largest available flight suit (size 48L), SRU-21/P survival vest, and webbing restraints accommodate a 47-inch waist circumference. (DTIC)
SF- DTIC
DE- <MAJOR> *ANTHROPOMETRY; *BODY WEIGHT; *CRASHWORTHINESS; *FLIGHT
CLOTHING; *FLIGHT SAFETY; *HUMAN FACTORS ENGINEERING; *LIFE SUPPORT
SYSTEMS; *SEATS
DE- CONSTRAINTS; FLIGHT CREWS; HELICOPTERS; MALES; PASSENGERS; PROTECTION;
SAFETY DEVICES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00907427
AN- <AEROSPACE> N94-17460
TI- Predicting radiation induced performance decrements of AH-1 helicopter crews. Volume 1: Predicted veersus actual performance of AH-1 crews induced with symptoms simulating radiation sickness
TI- <SUPPLEMENT> Technical Report, 25 Sep. 1986 - 30 Nov. 1991
AU- INMAN, VAUGHN W.; PEREZ, WILLIAM A.; PETERS, JOSEPH I.; SANCHEZ, ROBERT
R.; YOUNG, ROBERT W.
CS- Science Applications International Corp., McLean, VA.
CS- <CODE> SD708880
PY- 1993
PD- 199307
PG- 213P.
NT- Limited Reproducibility: More than 20% of this document may be affected by microfiche quality
CN- DNA001-86-C-0308
RN- AD-A268376; DNA-TR-92-54-VOL-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity (Defense Technical Information Center (DTIC))
JA- STAR9403
AB- The purpose of this study was to assess the utility of the Performance Decrement Questionnaire (PDO) technique for prediction of radiation induced performance decrements in Army personnel. Twenty AH-1 pilots participated in an experiment in which they (1) predicted the effects of various symptom complexes on their performance, (2) went through a 36-hour protocol to induce symptoms similar to those that are followed by intermediate doses of radiation exposure, and (3) performed a

simulated AH-1 mission before and after symptom induction. The participants' performance time predictions were compared to actual performance times. The comparisons between predicted and actual performance were conducted with correlational and modeling (MicroSAINT) techniques. The modeling analysis suggested greater concordance between predicted and actual performance than did the correlational analysis. (DTIC)
SF- DTIC
DE- <MAJOR> *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *RADIATION DOSAGE;
*RADIATION EFFECTS; *RADIATION SICKNESS; *SIGNS AND SYMPTOMS
DE- FLIGHT CREWS; FLIGHT SIMULATION; HEALTH PHYSICS; HELICOPTERS; SICKNESSES
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00906763
AN- <AEROSPACE> N94-16793
TI- Evaluation of Night Vision Goggles (NVG) for maritime search and rescue (HH-3/HH-60) comparison report
TI- <SUPPLEMENT> Final Report, Mar. 1989 - Jan. 1993
AU- ROBE, R. Q.; PLOURDE, J. V.
CS- Analysis and Technology, Inc., New London, CT.
CS- <CODE> AU894869
PY- 1993
PD- 199301
PG- 97P.
NT- Limited Reproducibility: More than 20% of this document may be affected by microfiche quality
CN- DTCG39-89-C-E10G56
RN- AD-A266493; USCG-D-09-93
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Issuing Activity (Defense Technical Information Center (DTIC))
JA- STAR9403
AB- Eight experiments, including seven involving helicopters, have been conducted by the U.S. Coast Guard Research and Development (R and D) Center to evaluate night vision goggles (NVG's) for their effectiveness in detecting small targets at night. Three types of NVG's have been evaluated. The AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) was evaluated onboard U.S. Coast Guard HH-3F, CH-3E, and HH-60J helicopters and HU-25C and RG-8A fixed-wing aircraft. The AN/PVS-5C and AN/PVS-7A NVG's were evaluated onboard U.S. and Canadian Coast Guard Search and Rescue Units (SRU's) in the 200-foot size range and onboard U.S. Coast Guard 41-foot utility boats (UTB's). A total of 3029 target detection opportunities were generated during searches from helicopters for all the target types employed during the eight experiments. These data were first analyzed to determine whether a statistically significant difference existed in the detection performance of the HH-3/CH-3 and HH-60 helicopters. The data were then analyzed to determine which of 25 search parameters of interest exerted a statistically significant influence on target detection probability. Lateral range curves and sweep width estimates are presented for SRU/target type combinations that contained sufficient data to support this detailed analysis. Human factors data are presented and discussed.(DTIC)
SF- DTIC
DE- <MAJOR> *GOGGLES; *H-60 HELICOPTER; *HUMAN FACTORS ENGINEERING; *MYSTERE 20 AIRCRAFT; *NIGHT VISION; *RESCUE OPERATIONS; *SH-3 HELICOPTER
DE- AIRCRAFT PILOTS; IMAGING TECHNIQUES; LIFE RAFTS; PROBABILITY THEORY;
TARGET ACQUISITION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00905799
AN- <AEROSPACE> N94-15824
TI- Center for Rotorcraft Education and Research progress report, 1987 - 1992
TI- <SUPPLEMENT> Final Report, 1 Jan. 1988 - 31 Dec. 1992
AU- CHOPRA, INDERJIT
CS- Dayton Univ., OH. Dept. of Chemistry.
CS- <CODE> DE333333
PY- 1993
PD- 199306
PG- 133P.
CN- DAAL03-88-C-0002
RN- AD-A266760; ARO-25467.74-EG-RW
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A07/MF A02

JA- STAR9403
AB- Established in 1981, the Center for Rotorcraft Education and Research at the University of Maryland has achieved international recognition as a center of excellence in rotorcraft engineering based on the quality and quantity of its research output and advanced-degree recipients. In the process of growth, it has built an integrated team of rotorcraft dedicated research faculty and staff, a pipeline of high quality graduate students, and a group of specialized rotorcraft research facilities and instrumentation unmatched by any other university. The center carried out interdisciplinary research program built around four interrelated areas that advanced understanding and predictive capability in: Aerodynamics-unsteady aerodynamics, dynamic stall, and rotor/airframe interaction tests and analyses; Dynamics and Aeroelasticity-bearingless and composite rotor tests and analyses, and minimization of rotor/body vibrations by optimization techniques; Flight Dynamics and Control-control of the dynamic behavior of highly coupled rotor-fuselage configurations; and Structures and Materials-structural integrity, energy absorption, and modeling of composite blades. (Author (revised))
DE- <MAJOR> *AEROELASTICITY; *AERONAUTICAL ENGINEERING; *COMPOSITE STRUCTURES; *ROTARY WING AIRCRAFT; *ROTOR AERODYNAMICS; *ROTOR DYNAMICS
DE- BEARINGLESS ROTORS; FLIGHT CONTROL; GROUND RESONANCE; RESEARCH FACILITIES; RESONANT VIBRATION; ROTOR BODY INTERACTIONS; UNSTEADY AERODYNAMICS
SH- 7502 Aerodynamics (1975-)

AN- <DIALOG> 00903287
AN- <AEROSPACE> N94-13310
TI- Improvements in hover display dynamics for a combat helicopter
AU- ESHOW, MICHELLE M. (Army Aviation Systems Command, Moffett Field, CA.); SCHROEDER, JEFFERY A.
CS- National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CS- <CODE> NC473657
PY- 1993
PD- 199307
NT- In its Piloting Vertical Flight Aircraft: A Conference on Flying Qualities and Human Factors p 235-250 (SEE N94-13294 02-08)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> CASI HC A03/MF A04
JA- STAR9402
AB- This paper describes a piloted simulation conducted on the NASA Ames Vertical Motion Simulator. The objective of the experiment was to investigate the handling qualities benefits attainable using new display law design methods for hover displays. The new display laws provide improved methods to specify the behavior of the display symbol that predicts the vehicle's ground velocity in the horizontal plane; it is the primary symbol that the pilot uses to control aircraft horizontal position. The display law design was applied to the Apache helmet-mounted display format, using the Apache vehicle dynamics to tailor the dynamics of the velocity predictor symbol. The representations of the Apache vehicle used in the display design process and in the simulation were derived from flight data. During the simulation, the new symbol dynamics were seen to improve the pilots' ability to maneuver about hover in poor visual cuing environments. The improvements were manifested in pilot handling qualities ratings and in measured task performance. The paper details the display design techniques, the experiment design and conduct, and the results. (Author)
DE- <MAJOR> *CONTROLLABILITY; *DISPLAY DEVICES; *FLIGHT CHARACTERISTICS; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *HELICOPTER PERFORMANCE; *HELMET MOUNTED DISPLAYS; *HOVERING; *MILITARY HELICOPTERS; *PILOT PERFORMANCE
DE- AH-64 HELICOPTER; CUES; RATINGS; SYMBOLS; TASKS; VERTICAL MOTION SIMULATORS; WORKLOADS (PSYCHOPHYSIOLOGY)
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00893182
AN- <AEROSPACE> N77-32727
TI- Computing internal cockpit reflections of external point-light sources for the Model 209 Ah-1-S helicopter flat-plate canopy design
TI- <SUPPLEMENT> Final Report
AU- SMYTH, C.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1977
PD- 197706
PG- 52P.
RN- AD-A043120; HEL-TM-20-77

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR7723
AB- The US Army Human Engineering Laboratory (HEL) has developed a computer program for computing the internal cockpit reflections of external point light sources. Computations have been completed for the Model 209 AH-1S COBRA helicopter with the flat-plate canopy design. The results indicate that internal reflections are possible for a wide range of external source locations. A computer graphics output is included in the program to show the reflection points on a perspective drawing of the cockpit canopy as seen from the pilot's position. This report contains hard copies of such perspectives and describes the program and routines. (Author (GRA))
SF- DTIC
DE- <MAJOR> *CANOPIES; *COCKPITS; *HUMAN FACTORS ENGINEERING
DE- COMPUTER GRAPHICS; COMPUTER PROGRAMS; HELICOPTERS; REFLECTION
SH- <COSATI> 1C Aircraft
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00892602
AN- <AEROSPACE> N77-32135
TI- Three-axis dynamic simulation of helicopter angular motion for testing fire control material
TI- <SUPPLEMENT> Final Engineering Report
AU- FLORENCE, E., JR.
CS- Frankford Arsenal, Philadelphia, PA.
CS- <CODE> F4331335
PY- 1977
PD- 197704
PG- 86P.
RN- AD-A041201; FA-TR-77012
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A05/MF A01
JA- STAR7723
AB- This report describes a program which was conducted to develop improved testing methods for helicopter fire control acceptance testing by providing meaningful simulation of angular motions within the laboratory. Tests were conducted on a Flight Motion Simulator (FMS), which is hydraulically actuated, operable in both manual and tape modes, and constructed to handle individual test specimens no larger than twenty inches in diameter. Using a pre-recorded tape of angular motion measurements were made in the AH-1G 'Cobra' helicopter. Data was obtained of the machine's operation in both the tape and manual operating modes. The data indicates that it is possible to simulate helicopter motion (of up to 50 Hertz) on the table of the FMS by playing a pre-recorded tape of helicopter motion through the FMS's tape input. It is also possible to reproduce manually the displacement and acceleration curves of motions (limited by frequencies up to 50 Hertz) that are presently specified for helicopter mounted instrumentation. (DTIC)
SF- DTIC
DE- <MAJOR> *ANGULAR VELOCITY; *FIRE CONTROL; *FLIGHT SIMULATORS; *MILITARY HELICOPTERS
DE- ACCEPTABILITY; FLIGHT SIMULATION; PERFORMANCE TESTS
SH- <COSATI> 19D Explosions, Ballistics, & Armor
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00886676
AN- <AEROSPACE> N77-26130
TI- Aeromedical evaluation of UH-1 internal advanced personnel rescue hoists, Western Gear Corporation hoist models 42277R1 and 42305R1, Breeze Corporation hoist ECP-720 modification
AU- PETTYJOHN, F. S.; GEE, T. E.; AKERS, L. A.; RICE, G. P.; CARROLL, W. F. ; ALLEMOND, P.; BAILEY, S. M.; BURDEN, R. T.; HARRISON, T. G.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1977
PD- 197702
PG- 57P.
RN- AD-A037621; USAARL-77-7
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01

JA- STAR7717
AB- The U.S. Army Aeromedical Research Laboratory was tasked to provide aeromedical evaluation of advanced high performance helicopter personnel rescue hoists. Physiologic effects of increased hoist speed were evaluated and proven to be minimal at speeds of 500 feet per minute. Available helicopter electrical power provides speed up to 250 feet per minute under load limitation. State-of-the-art 'off the shelf' rescue hoists were sought to provide immediate relief of the current 'life or death' restriction of the U.S. Army Helicopter Air Ambulance units. Safety, continuous cycle function, improved speed and increased operational capabilities were specifically evaluated. (DTIC)
SF- DTIC
DE- <MAJOR> *EVACUATING (TRANSPORTATION); *MEDICAL SERVICES; *PHYSIOLOGICAL EFFECTS; *RESCUE OPERATIONS; *UH-1 HELICOPTER
DE- AIRCRAFT EQUIPMENT; HIGH SPEED; HUMAN FACTORS ENGINEERING; SAFETY DEVICES
SH- <COSATI> 6G Escape, Rescue, & Survival
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00885718
AN- <AEROSPACE> N77-25166
TI- Army aviation RDT and E plan
CS- Army Aviation Systems Command, Saint Louis, MO.
CS- <CODE> AZ155219
PY- 1976
PD- 197610
PG- 347P.
RN- AD-A035334
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A15/MF A02
JA- STAR7716
AB- Contents: Airmobile Systems Introduction -- Army Aviation Systems Requirements, Threat, Land Combat Functions, Major Thrusts, and IOC Dates; Airmobile Systems -- Mobility, Intelligence, Firepower, Combat Service Support, and Command, Control and Communications; Technology Introduction -- Analysis of Aircraft Concepts, Technological Requirements, Analysis of R and D Tasks, Analysis of Required Resources, Laboratory Project Selection Process, and Responsiveness to Science and Technical Objectives; Aerodynamics; Structures; Propulsion; Reliability Maintainability; Safety and Survivability; Mission Support; Aircraft Subsystems; Aircraft Weaponization; Human Factors, Remotely Piloted Vehicles; Aviation Electronics; Manufacturing Technology; Advanced Technology Demonstration; Tilt Rotor Air Vehicle, Rotor System Research Aircraft, Advancing and Blade Concept, and Advanced Structures Technology Demonstrator; Mathematical Science; Aircraft Systems Synthesis; Fundamental Sciences; and Resources Required. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIR DROP OPERATIONS; *AIR TRANSPORTATION; *MILITARY TECHNOLOGY

DE- AVIONICS; COMMAND AND CONTROL; TELECOMMUNICATION
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00884734
AN- <AEROSPACE> N77-24156
TI- Cost and training effectiveness analysis (CTEA) of the CH-47 flight simulator (CH47FS)
CS- Army Aviation Center, Fort Rucker, AL.
CS- <CODE> AZ096625
PY- 1976
PD- 197612
PG- 48P.
RN- AD-A033972
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7715
AB- The CH47FS CTEA Study Plan presents the purpose of the study and the terms of reference, including the problem statement, the objectives, scope, limits and assumptions, and the Essential Elements of Analysis (EEA). The alternative training packages selected for analysis and the Measures of Training Effectiveness (MOTE) are defined. The support and resource requirements for the study are listed and control procedures and the study schedule established. Included are also the methodology for analyzing training effectiveness, the operational test plan for

generating effectiveness data, and the methodology for cost analysis. (
Author (GRA))
SF- DTIC
DE- <MAJOR> *CH-47 HELICOPTER; *COST EFFECTIVENESS; *FLIGHT SIMULATORS;
*FLIGHT TRAINING; *PILOT PERFORMANCE
DE- ARMED FORCES (UNITED STATES); OPERATIONS RESEARCH; PERSONNEL; TRAINING
DEVICES
SH- <COSATI> 14B Laboratories, Test Facilities, & Test Equipment
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 00883405
AN- <AEROSPACE> N77-22817
TI- Analysis of pilot-aircraft performance and reliability via the
application of man-machine models
AU- KLEINMAN, D. L.
CS- Connecticut Univ., Storrs.
CS- <CODE> C1597339
PY- 1975
PD- 197500
NT- In NASA. Ames Res. Center Systems Reliability Issues for Future
Aircraft p 141-156 (SEE N77-22808 13-59)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A10/MF A02
JA- STAR7713
AB- The present approach to analytic modeling, which utilizes human
response theory together with modern control theory, is discussed.
Analytic modeling of human performance has progressed to the point
where it can be used with some confidence in the design and performance
analysis of man-machine systems. An example of its use in helping
design a flight director for the hover control of a VTOL vehicle is
described. How the method could be used for analysis of human response
to system failure is sketched. (Author)
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *AIRCRAFT RELIABILITY; *MAN MACHINE
SYSTEMS; *PILOT PERFORMANCE
DE- CONTROL THEORY; DECISION MAKING; HOVERING; HUMAN PERFORMANCE;
MATHEMATICAL MODELS; VERTICAL TAKEOFF AIRCRAFT
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00883393
AN- <AEROSPACE> N77-22805
TI- In-flight performance with night vision goggles during reduced
illumination
TI- <SUPPLEMENT> Final Report
AU- LEES, M. A.; GLICK, D. D.; KIMBALL, K. A.; SNOW, A. C., JR.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1976
PD- 197608
PG- 39P.
RN- AD-A031991; USAARL-76-27
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7713
AB- At the present time the U.S. Army is striving to attain
around-the-clock operational capability for its tactical forces. The
Night Vision Goggles have been developed to aid the Army pilot in
attaining near-daytime capability at night. Previous research at the
U.S. Army Aeromedical Research Laboratory has demonstrated the
requirement for an investigation of the effects of low illuminance
levels on aviator performance while wearing night vision goggles. (
Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT PILOTS; *GOGGLES; *HELICOPTERS; *NIGHT VISION;
*VISUAL PERCEPTION
DE- EVALUATION; MULTIVARIATE STATISTICAL ANALYSIS; PERFORMANCE TESTS; PILOT
PERFORMANCE
SH- <COSATI> 17H Optical Detection
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00879402
AN- <AEROSPACE> N77-18754
TI- Aircrew training requirements for nap-of-the-earth flight

TI- <SUPPLEMENT> Final Report
AU- GAINER, C. A.; SULLIVAN, D. J.
CS- Anacapa Sciences, Inc., Santa Barbara, CA.
CS- <CODE> AU848790
PY- 1976
PD- 197608
PG- 57P.
CN- DAHC19-73-C-0059; DA PROJ. 2Q1-62107-A-745; DA PROJ. 2Q7-64715-A-757
RN- AD-A030420; ARI-RR-1190; REPT-203-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A04/MF A01
JA- STAR7709
AB- In nap-of-the-earth (NOE) flight a helicopter moves at less than treetop height and at variable airspeeds, using natural features for concealment--a dangerous procedure requiring great skill in flying and in navigation. This report identifies specific areas in which NOE training might be improved. Information from agencies and operational units provided data for analysis of NOE mission requirements, aircrew task analyses, and performance requirements for emergencies. Training objectives derived from the analyses were verified, compared with existing NOE training programs, and used to suggest improvements. Problems in navigation and orientation are the major hazard in NOE flight, and training improvements should concentrate in these areas. Suggestions for ground-based training aids are visual (cinematic) simulation, a map-interpretation manual for NOE use, and techniques of ground-level orienteering. Suggestions for flight-based training are procedures such as more practice in re-orientation, equipment such as map displays, and policies such as flying over more varied terrain. Results of the analyses were validated by ARI's field research program and used as the basis for developing the experimental Map Interpretation Terrain Analysis Course (MITAC) now being evaluated at the Army Aviation School, Fort Rucker, Alabama. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ARMED FORCES (UNITED STATES); *NAVIGATION; *PILOT PERFORMANCE
DE- EDUCATION; MISSION PLANNING; PILOTS (PERSONNEL)
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00877723
AN- <AEROSPACE> N77-17047
TI- Vibration measurements on the rotor shaft of the UH-1 helicopter
AU- GOLDMAN, H. I.
CS- Frankford Arsenal, Philadelphia, PA.
CS- <CODE> F4331335
PY- 1976
PD- 197602
PG- 21P.
CN- DA PROJ. 1F2-63206-D-043
RN- AD-A028924; FA-TR-76009
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7708
AB- This report describes a program of in-flight vibration measurements carried out on a platform mounted atop the rotor mast on the UH-1M helicopter. Results of a real time analysis of the data are presented which reveal that a low level of vibration exists at that site making it a good location for the future placement of fire control instrumentation. A mechanical impedance study is also presented which shows that much of the high frequency present in the acceleration-time histories is a result of resonances in the tested platform. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ROTORS; *UH-1 HELICOPTER; *VIBRATION MEASUREMENT
DE- FIRE CONTROL; FLIGHT TESTS; SHAFTS (MACHINE ELEMENTS)
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00876074
AN- <AEROSPACE> N77-15385
TI- Laser terminal homing engagement simulator (eye-safe)
AU- GLEASON, T. J.; SWORD, M. E.
CS- Harry Diamond Labs., Adelphi, MD.
CS- <CODE> HE740602
PY- 1976
PD- 197600
PG- 15P.
RN- AD-A026002

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7706
AB- The Laser Terminal Homing Engagement Simulator (LATHES) was developed for the U.S. Army Operational Test and Evaluation Agency by the Harry Diamond Laboratories (Army Materiel Development and Readiness Command) for use in test and training exercises involving laser terminal homing systems. In the U.S. Army these systems include the Cannon Launched Guided Projectile (CLGP), Helicopter Laser Fire and Forget Missile (HELLFIRE), Ground Laser Locator/Designator (GLLD), Airborne Target Acquisition and fire control systems (ATAFCS), Light Weight Laser Designator (LWLD), and Airborne Laser Tracker (ALT). The most important feature of LATHES is that it makes it possible to conduct a realistic field simulation of a tactical laser terminal homing engagement without using any components that pose a hazard to the eyes of user or bystander personnel. All LATHES components are eyesafe at zero range. (DTIC)
SF- DTIC
DE- <MAJOR> *EYE PROTECTION; *HOMING DEVICES; *LASER RANGER/TRACKER; *TERMINAL GUIDANCE; *TRAINING SIMULATORS
DE- HUMAN FACTORS ENGINEERING; MILITARY TECHNOLOGY; SAFETY FACTORS; WEAPON SYSTEMS
SH- <COSATI> 6R Radiobiology
SH- 7536 Lasers & Masers (1975-)

AN- <DIALOG> 00874371
AN- <AEROSPACE> N77-13661
TI- Dynamic visual acuity in fatigued pilots
TI- <SUPPLEMENT> Final Report
AU- BEHAR, I.; KIMBALL, K. A.; ANDERSON, D. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1976
PD- 197606
PG- 15P.
CN- DA PROJ. 3A0-62110-A-819
RN- AD-A027663; USAARL-76-24
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HC A03/MF A01
JA- STAR7704
AB- Six rotary wing aviators were subjects in a continuous operation regimen involving some 12 hours of flying and 3.5 hours sleep daily for five days. Estimates of performance on a dynamic visual acuity (DVA) task were obtained several times each day during the study using target velocities of 25 deg. and 40 deg./sec. DVA performance varied significantly during the fatigue regimen when measurements were made with target velocities of 40 deg./sec; with lower velocity targets differences in DVA scores were not significant. This indicates the need to tax the oculomotor system to demonstrate fatigue effects. Fatigue effects were partially obscured by practice effects which are considerable in the DVA task. DVA scores correlated only modestly with subjective estimates of fatigue intensity and flying performance, and IP ratings of performance, but the cluster of correlations provided a consistent picture. (Author (GRA))
SF- DTIC
DE- <MAJOR> *OPTICAL TRACKING; *PILOT PERFORMANCE; *SLEEP DEPRIVATION; *VISUAL ACUITY
DE- FLIGHT FATIGUE; HELICOPTERS; TARGET RECOGNITION; VISUAL PERCEPTION
SH- <COSATI> 17H Optical Detection
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00868805
AN- <AEROSPACE> N76-32164
TI- Lightweight Doppler navigation system
TI- <EXTENSION> design analysis and performance prediction
AU- CHAPMAN, R. E.
CS- Teledyne Ryan Aeronautical Co., San Diego, CA.
CS- <CODE> TL092197
PY- 1976
PD- 197608
NT- In AGARD Medium Accuracy Low Cost Navigation 22 p (SEE N76-32148 23-04)
LA- English
GL- United States

CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7623
AB- A self contained, low cost, lightweight, accurate, and reliable navigation system for military helicopters was designed. The system consists of a Doppler Radar Velocity Sensor (DRVS) and a Computer Display Unit (CDU) with a combined mean time difference between failures of more than a 1000 hours, and a .38 percent circular error probability. The capability of the system to be integrated with radio-aided navigation systems such as LORAN and OMEGA is described. An important feature of the system is the capability of rapidly isolating failures to a replacable module, and ease of replacement of the 'failed' module. The use of a special modulation form in the DRVS to develop a coherent local oscillator is described. Also described is an IMPATT solid state transmitter, time duplexed travelling wave array antenna, and digital frequency tracker. Use of a single chip microprocessor in the CDU is described; emphasis on the human factors engineering aspects of the man-machine interface. Results indicate that system meets the requirements that it was designed for. (J.R.T.)
SF- NASA CASI
DE- <MAJOR> *DESIGN ANALYSIS; *DOPPLER NAVIGATION; *HELICOPTERS; *PERFORMANCE PREDICTION
DE- AIRCRAFT CONTROL; ANTENNAS; DISPLAY DEVICES; ERRORS; HUMAN FACTORS ENGINEERING; LORAN; LOW COST; MICROPROCESSORS; TRACKING (POSITION); TRANSMITTERS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00865975
AN- <AEROSPACE> N76-29301
TI- Simulation of a visual aid system used for the piloting of helicopters in formation flying
AU- LLAREUS, J. H.; FOSSARD, A. J.; CLIQUE, M. (Centre d'Etudes et de Recherches, Toulouse); IMBERT, N. (Centre d'Etudes et de Recherches, Toulouse)
CS- Ecole Nationale Superieure de l'Aeronautique et de l'Espace, Toulouse (France).
CS- <CODE> ED120150
PY- 1976
PD- 197606
NT- In AGARD Flight Simulation/Guidance Systems Simulation 14 p (SEE N76-29287 20-09)
LA- French
GL- France
CP- International Organization
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7620
AB- Real time simulation of a system used to aid the piloting of a helicopter, permitting it to fly in formation in hazardous weather conditions is presented. The leader arranges the navigation paths; the crew plots the distance and level of the preceding helicopter with the aid of a radar detection system. The simulation introduces the requirement of a human pilot who, with the help of a micromanipulator, provides orders of cyclic paths, longitudinal and lateral, determining the evolutions of a helicopter crew stationed at a digital computer. (Transl. by B.B.)
DE- <MAJOR> *FLIGHT PATHS; *FLIGHT SIMULATION; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *NAVIGATION AIDS; *PILOT PERFORMANCE
DE- DIGITAL COMPUTERS; DISPLAY DEVICES; FLIGHT CHARACTERISTICS; FLIGHT HAZARDS
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00864713
AN- <AEROSPACE> N76-28010
TI- Aviator performance measurement during low altitude rotary wing flight with the AN/PVS-5 night vision goggles
TI- <SUPPLEMENT> Final Report
AU- SANDERS, M. G.; KIMBALL, K. A.; FREZELL, T. L.; HOFMANN, M. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1975
PD- 197512
PG- 71P.
RN- AD-A020631; USAARL-76-10
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7618

AB- Aviators were required to fly a UH-1 helicopter at night with and without night vision goggles (AN/PVS-5). Three types of goggles were used: 40 deg field-of-view (FOV), 60 deg FOV, and 40 deg FOV with a 30% bifocal cut. During flight, data were acquired on over twenty aircraft status and control input variables. These data, for purposes of performance comparison, were subjected to both univariate and multivariate analyses. The six subjects (instructor pilots) also responded to a questionnaire regarding preference, training and estimated capabilities of each type intensification system. The major findings of both the subjective and objective measures are provided. (DTIC)
SF- DTIC
DE- <MAJOR> *HELICOPTERS; *NIGHT VISION; *PILOT PERFORMANCE
DE- GOGGLES; LOW ALTITUDE; STATISTICAL ANALYSIS
SH- <COSATI> 17H Optical Detection
SH- 7574 Optics (1975-)

AN- <DIALOG> 00864550
AN- <AEROSPACE> N76-27846
TI- Fourth Advanced Operational Aviation Medicine Course
AU- NICHOLSON, A. N.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1976
PD- 197605
PG- 105P.
NT- Course held at Farnborough, England, 17-26 Jun. 1975
RN- AGARD-R-642
LA- English
GL- France
CP- International Organization
DT- COLLOQUIA
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7618
AB- Various aspects of aviation medicine was studied in detail. Topics included the training of aircrew in aviation medicine, medical aspects of naval helicopter operations on the northern flank, developments in personal equipment with special reference to helmet developments, high speed escape and thermal problems, and the use of hypnotics in air operations. &For individual titles, see N76-27847 through N76-27870.
DE- <MAJOR> *AEROSPACE MEDICINE; *DISPLAY DEVICES; *EMERGENCY LIFE SUSTAINING SYSTEMS; *ESCAPE SYSTEMS; *HUMAN FACTORS ENGINEERING; *PSYCHOLOGICAL FACTORS
DE- AIRBORNE EQUIPMENT; EJECTION INJURIES; ESCAPE SYSTEMS; MILITARY AVIATION; OPERATIONAL PROBLEMS; PROTECTIVE CLOTHING
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00864532
AN- <AEROSPACE> N76-27827
TI- Aviator performance: Biomedical, physiological, and psychological assessment of pilots during extended helicopter flight
AU- KIMBALL, K. A.; ANDERSON, D. B.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1976
PD- 197605
NT- In AGARD The Role of the Clin. Lab. in Aerospace Med. 15 p (SEE N76-27819 18-52)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7618
AB- The physiological, psychological, and performance effects of extended helicopter flight are investigated. Measurements of biochemical, physiological, and psychological parameters were obtained and compared with inflight performance measures obtained by the USAARL Helicopter Inflight Monitoring System. Six rotary wing aviators performed extended daily flight missions for a period of five days. In addition, when not flying, various psychological tests were administered. Physiological and biochemical monitoring were conducted throughout the five day period. The aviators were on a controlled diet and slept approximately three hours each night. Preliminary findings are presented in relation to performance, biochemical, physiological, and psychological parameters. (Author)
DE- <MAJOR> *BIOMEDICAL DATA; *HELICOPTERS; *PHYSIOLOGICAL EFFECTS; *PILOT PERFORMANCE; *PSYCHOLOGICAL EFFECTS
DE- AEROSPACE MEDICINE; BIOCHEMISTRY; FLIGHT FATIGUE; FLIGHT STRESS (BIOLOGY)
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00860984

AN- <AEROSPACE> N76-24229
TI- The development of an advanced anti-icing/deicing capability for US Army helicopters. Volume 1: Design criteria and technology considerations
TI- <SUPPLEMENT> Final Report, 30 Jun. 1973 - 30 Jun. 1975
AU- WERNER, J. B.
CS- Lockheed-California Co., Burbank.
CS- <CODE> L0372000
PY- 1975
PD- 197511
PG- 255P.
CN- DAAJ02-73-C-0107; DA PROJ. 1F2-62209-AH-76
RN- AD-A019044; LR-27180-VOL-1; USAAMRDL-TR-75-34A
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7615
AB- The work which has been accomplished under this program is reported in two volumes. Volume 1 discusses (1) icing severity level analysis and recommended design criteria, (2) adverse weather protection technology, (3) a trade-off comparison of different types of ice protection systems for various categories of helicopters, and (4) a technology development program for an advanced electrothermal deicing system. Volume 2, Ice Protection System Application to the UH-1H Helicopter, describes the application of the recommended electrothermal deicing system to a UH-1H test aircraft. It provides a detailed description of the modifications to the basic aircraft (including the flight test-instrumentation) and the results of the ground and flight test program for that aircraft conducted in the winter of 1975-75. (DTIC)
SF- DTIC
DE- <MAJOR> *DEICING; *ICE PREVENTION; *MILITARY HELICOPTERS
DE- FLIGHT TESTS; SYSTEMS ENGINEERING; TECHNOLOGY ASSESSMENT
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00860074
AN- <AEROSPACE> N76-23289
TI- The HITVAL program instrumentation
TI- <EXTENSION> performance of antiaircraft gun systems
AU- CHANEY, R. L.
CS- Edgerton, Germeshausen and Grier, Inc., Albuquerque, NM. Test and Evaluation Dept.
CS- <CODE> ED828710
PY- 1976
PD- 197602
NT- In AGARD Range Instrumentation, Weapons Systems Testing and Related Techniques 8 p (SEE N76-23283 14-09)
LA- English
GL- United States
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7614
AB- The HITVAL Program, a joint U. S. Army and Air Force test sponsored by the Director of Defense Research and Engineering (DDR&E), was conducted to determine the probability of hit by antiaircraft gun systems firing at fixed-and rotary-wing aircraft. The HITVAL test was one element of a larger program to validate and improve mathematical aircraft attrition models. The HITVAL Program tested five gun systems and produced a large and comprehensive empirical data base from over two thousand gun-aircraft engagements. These data also have possible application to problems of tactics, gun system and crew performance, and training. Instrumentation and techniques developed for the HITVAL Program contributed significantly to the state-of-the-art in the measurement of gun performance parameters and represent advances in resolution, accuracies, and data handling for these and other generic systems and for evaluation test programs. (Author)
DE- <MAJOR> *ANTIAIRCRAFT MISSILES; *IMPACT PREDICTION; *PERFORMANCE; *TERMINAL BALLISTICS
DE- MATHEMATICAL MODELS; MILITARY TECHNOLOGY; TACTICS; WEAPON SYSTEMS
SH- 7509 Research & Support Facilities--Air (1975-)

AN- <DIALOG> 00858691
AN- <AEROSPACE> N76-21888
TI- Perceived velocity and altitude judgments during rotary wing aircraft flight
TI- <SUPPLEMENT> Final Report
AU- ARMSTRONG, R. N.; HOFMAN, M. A.; SANDERS, M. G.; STONE, L. W.; BOWEN, C. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1975

PD- 197509
PG- 30P.
CN- DA PROJ. 3A7-62758-A-819
RN- AD-A016870; USAARL-76-3
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7612
AB- Eight Army rotary wing aviators made judgments concerning the ground speed and altitude of a UH-1 helicopter. Combinations of three ground speeds and four altitudes were used across four visual conditions including daylight and simulated night environments. In general, the results indicate: (1) absolute error in ground speed estimations increased as altitude increased; (2) at ground speeds above 50 knots there was a tendency to underestimate ground speeds, and below 50 knots ground speed estimates were dependent upon visual conditions, (3) absolute error in altitude judgment increases with aircraft altitude; and (4) at low altitudes the trend is toward underestimation and as altitude and airspeed increase the tendency is to overestimate altitude. These and other results are discussed as well as their possible implications for conduct of safe flight. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ALTITUDE; *GROUND SPEED; *ROTARY WING AIRCRAFT; *VISUAL PERCEPTION
DE- FLIGHT SAFETY; FLIGHT SIMULATION; MAN MACHINE SYSTEMS; PILOT PERFORMANCE
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00856625
AN- <AEROSPACE> N76-19794
TI- Helicopter flight performance with the AN/PVS-5, night vision goggles
TI- <EXTENSION> used by aircraft pilots
AU- SANDERS, M. G.; KIMBALL, K. A.; FREZELL, T. L.; HOFMANN, M. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1976
PD- 197602
NT- In AGARD The Use of In-Flight Evaluation for the Assessment of Aircrew Fitness 15 p (SEE N76-19789 10-52)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7610
AB- Rotary wing flight at night in an instrumented UH-1H with aviators utilizing night vision goggles was studied. These devices restrict field of view, provide monochromatic imagery, and weight, and with the exception of bifocals require manual refocus to gain inside visual capability. These second generation image intensification systems were used during low level and nap-of-the-earth flight profiles in addition to various maneuver sets. Three intensification systems were compared to the unaided eye over these conditions. These systems included 40 deg field of view (FOV), 60 deg FOV and 40 deg FOV with a 30 percent bifocal cut. Over twenty aircraft state variables and aviator control inputs were measured and submitted to analysis. In addition to descriptive and univariate techniques, the data were subjected to a multiple discriminant analysis. The subjects (instructor pilots) also responded to questionnaires regarding the preference, training and estimated capabilities of each type of intensification system. The major findings of both the subjective and objective measures are summmarized. (Author)
DE- <MAJOR> *AIRCRAFT PILOTS; *GOGGLES; *HELICOPTER PERFORMANCE; *NIGHT VISION; *PERFORMANCE PREDICTION; *UH-1 HELICOPTER
DE- AIRCRAFT MANEUVERS; ARMED FORCES (UNITED STATES); PILOT PERFORMANCE; STATISTICAL ANALYSIS; VISUAL PERCEPTION
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00853993
AN- <AEROSPACE> N76-17108
TI- The impact of modern electronic airborne displays in future aviation
AU- BRAULT, Y.
CS- Thomson-CSF, Malakoff (France). Div. des Equipements Avioniques.
CS- <CODE> TY605712
PY- 1975
PD- 197512
NT- In AGARD Electron. Airborne Displays 8 p (SEE N76-17107 08-06)
LA- French
GL- France
CP- International Organization

DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7608
AB- The expected impact of modern electronic airborne display systems on future aircraft was presented, with emphasis on the need to improve man-machine interactions, especially in military aviation. The need is imposed by the following factors: (1) the setting of more and more complex operational flying missions, (2) the introduction of aircraft (interceptors, fixed and rotating wing attack models) with ever higher performance, (3) the introduction of more and more diversified weapon systems, (4) the existence of an extremely lethal and complex environment. Future applications to civil aviation were also briefly mentioned. (Transl. by Y.J.A.)
DE- <MAJOR> *AERONAUTICS; *AVIONICS; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS;
*HUMAN FACTORS ENGINEERING; *LONG TERM EFFECTS
DE- FIGHTER AIRCRAFT; MAN MACHINE SYSTEMS; MILITARY AVIATION; MILITARY HELICOPTERS; WEAPON SYSTEMS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00851965
AN- <AEROSPACE> N76-15055
TI- Ultra-heavy vertical lift system: The Heli-Stat
TI- <EXTENSION> helicopter - airship combination for materials handling
AU- PIASECKI, F. N.
CS- Piasecki Aircraft Corp., Philadelphia, PA.
CS- <CODE> PR999892
PY- 1975
PD- 197501
NT- In MIT Proc. of the Interagency Workshop on Lighter than Air Vehicles p 465-476 (SEE N76-15015 06-01)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7606
AB- A hybrid VTOL airship which is combined with helicopters is evaluated. The static lift of the airship supports approximately the full empty weight of the entire assembly. The helicopter rotors furnish the lift to support the payload as well as the propulsion and control about all axes. Thus existing helicopters, with no new technology required, can be made to lift payloads of ten times the capacity of each one alone, and considerably more than that of any airship built so far. A vehicle is described which has a 75-ton payload, based on four existing CH-53D helicopters and an airship of 3,600,000 cu. ft. The method of interconnection is described along with discussion of control, instrumentation, drive system and critical design conditions. The vertical lift and positioning capabilities of this vehicle far exceed any other means available today, yet can be built with a minimum of risk, development cost and time. (Author)
DE- <MAJOR> *AIRSHIPS; *HEAVY LIFT HELICOPTERS; *MATERIALS HANDLING
DE- CONTROL EQUIPMENT; COST ESTIMATES; DESIGN ANALYSIS; PAYLOADS
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00851039
AN- <AEROSPACE> N76-14118
TI- Pilot factors for helicopter refined ADI/HSI and supporting displays evaluation
TI- <SUPPLEMENT> Final Report
AU- ARMSTRONG, G. C.; MCCOWELL, J. W.; SAMS, D. D.; WINTER, F. J., JR.
CS- Instrument Flight Center, Randolph AFB, TX.
CS- <CODE> IP938983
PY- 1975
PD- 197506
PG- 210P.
RN- AD-A013796; IFC-TR-74-5
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7605
AB- This investigation was conducted to document pilot acceptance of improved displays for the standard light helicopter. Twenty-one helicopter pilots were given a technical briefing on the new displays and filled out a preflight questionnaire concerning their firsthand impressions. Sixteen of the twenty-one pilots received a familiarization flight with the new displays and filled out a postflight questionnaire giving their judgments and opinions. Five of the sixteen pilots were used as data collection pilots. These pilots flew profiles representing typical helicopter instrument maneuvers. Objective and subjective data were obtained through the use of video,

audio, and oscillograph recording equipment. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT INSTRUMENTS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING
DE- DISPLAY DEVICES; FLIGHT TESTS; LIGHT HELICOPTERS; PILOT PERFORMANCE
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00847725
AN- <AEROSPACE> N76-10723
TI- SEEKVAL project IA1: Effects of target number and clutter on static target acquisition
TI- <SUPPLEMENT> Final Report
AU- HILGENDORF, R. L.; MILENSKI, J.
CS- Aerospace Medical Research Labs., Wright-Patterson AFB, OH.
CS- <CODE> AG749748
PY- 1974
PD- 197407
PG- 50P.
CN- AF PROJ. 7184
RN- AD-A011546; AMRL-TR-74-14
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7601
AB- The report covers an experiment to determine the effects of number of targets and background clutter on static, low altitude, target detection performance by the unaided eye, as would be experienced in a helicopter-type target acquisition environment. The data consist mainly of whether or not single or groups of tank targets (1, 3, or 9) within controlled clutter configurations were detected, and the corresponding times to detect them. Statistical methods are employed to assess the effects of target and clutter factors on detection performance. (DTIC)
SF- DTIC
DE- <MAJOR> *PILOT PERFORMANCE; *TARGET ACQUISITION; *VISUAL ACUITY
DE- BACKGROUND NOISE; CLUTTER; HELICOPTERS; SURFACE VEHICLES
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00846486
AN- <AEROSPACE> A77-51091
TI- Helicopter rotor aerodynamic and aeroacoustic environments
AU- COX, C. R. (Bell Helicopter Textron, Fort Worth, Tex.)
SO- American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 4th, Atlanta, Ga., Oct. 3-5, 1977, 11 p.
PY- 1977
PD- 197710
RF- 11
RN- AIAA PAPER 77-1338
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7724
AB- Results of flight tests are presented in which a helicopter rotor's blade surface pressure, leading edge stagnation point, surface flow magnitude and direction, and external noise were measured simultaneously. Aerodynamic instrumentation installed at five radial blade stations is described and unsteady aerodynamic phenomena observed on the blades are identified. Measured and theoretical normal force coefficients and angle of attack are compared. General agreement is found for the azimuthal variation of each parameter. Regions where theory and test disagree are identified and their importance to rotor performance design is discussed. Airload fluctuations and acoustic signals are used to locate and define the origin of rotor noise during high speed flight and in operating regimes of strong wake interaction. ((Author))
DE- <MAJOR> *AEROACOUSTICS; *AERODYNAMIC NOISE; *HELICOPTER PERFORMANCE; *HELICOPTER WAKES; *NOISE MEASUREMENT; *ROTOR AERODYNAMICS
DE- AERODYNAMIC CHARACTERISTICS; ANGLE OF ATTACK; DATA ACQUISITION; FLIGHT TESTS; FORCE DISTRIBUTION; PRESSURE SENSORS; UNSTEADY AERODYNAMICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00846151
AN- <AEROSPACE> A77-50756
TI- Evaluation and disposition of Army helicopter aviators with finger

amputations
AU- HUMBERT, P. V. (U.S. Army, Aeromedical Center, Fort Rucker, Ala.)
SO- (Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine, vol. 48, Oct. 1977, p. 949-952.
PY- 1977
PD- 197710
RF- 8
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7724
DE- <MAJOR> *AIRCRAFT PILOTS; *FINGERS; *PERSONNEL SELECTION; *PILOT PERFORMANCE
DE- AEROSPACE MEDICINE; FLIGHT TESTS; HELICOPTER CONTROL
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00837535
AN- <AEROSPACE> A77-42140
TI- Thermal data from helicopters operating in a sub-arctic environment
AU- HIGENBOTTAM, C.; MARCUS, P.; WADDELL, J. (RAF, Institute of Aviation Medicine, Farnborough, Hants., England)
SO- Aviation, Space, and Environmental Medicine, vol. 48, July 1977, p. 640-644.
PY- 1977
PD- 197707
LA- English
GL- United Kingdom
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7719
AB- Using automatic and observer-operated equipment for monitoring thermal data, observations have been made during Royal Navy Wessex 5 helicopter operations in a sub-Arctic climate. Measurements were taken in flight of front and rear cabin temperatures and aircrew deep body and skin temperatures. The results indicate that the 'arcticised' aircraft used had more than enough cabin heating to alleviate cold stress on the aircrew. ((Author))
DE- <MAJOR> *BODY TEMPERATURE; *COLD WEATHER TESTS; *FLIGHT CREWS; *HELICOPTERS; *THERMAL COMFORT
DE- AIRCRAFT COMPARTMENTS; COMFORT; HUMAN FACTORS ENGINEERING; SKIN TEMPERATURE (BIOLOGY); SYSTEM EFFECTIVENESS; THERMAL ENVIRONMENTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00835467
AN- <AEROSPACE> A77-40068
TI- Helicopter vibration requirements
AU- SCHRAGE, D. P.; PESKAR, R. E. (U.S. Army, Aviation Systems Command, St. Louis, Mo.)
SO- In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. (A77-40048 18-01) Washington, D.C., American Helicopter Society, Inc., 1977. 10 p.
PY- 1977
PD- 197700
RF- 18
RN- AHS 77-33-33
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7718
AB- Data on human responses to helicopter vibration and flight vibration surveys are used to evaluate the validity of current helicopter human factor requirements and to recommend new ones. Attention is given to problem areas during UTTAS/AAH development with emphasis on the calculation of hub loads, the location of airframe modes, and engine vibration installation limits. (B.J.)
SF- AIAA
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *HELICOPTER PERFORMANCE; *HUMAN FACTORS ENGINEERING; *VIBRATION TESTS
DE- AIRFRAMES; ENGINE TESTS; FLUTTER; HELICOPTER DESIGN; MAN MACHINE SYSTEMS; STRUCTURAL VIBRATION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00835463
AN- <AEROSPACE> A77-40064
TI- A versatile display system for NOE operation
TI- <EXTENSION> Nap-of-the-Earth helicopter flight
AU- KEANE, W. P.; SHUPE, N. K.; SUN, P. B.; ROBBINS, T.; CAMPAGNA, R. W.

(U.S. Army, Avionics Laboratory, Fort Monmouth, N.J.)
SO- In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. (A77-40048 18-01) Washington, D.C., American Helicopter Society, Inc., 1977. 11 p.
PY- 1977
PD- 197700
RF- 5
RN- AHS 77-33-24
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7718
AB- A display system has been developed to aid the military-helicopter pilot in carrying out nap-of-the-earth (NOE) night pilotage and navigation tasks. A system of digitally generated symbology, superimposed on the terrain background video, has been designed to address these tasks. The four modes of pilotage display enable the pilot to perform low level high speed flight, NOE terrain following/avoidance tasks, precision hover, and bob-up maneuvers. All display quantities are driven by signals derived from basic onboard sensors available in AAH/ASH type aircraft. (B.J.)
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *MILITARY HELICOPTERS; *MILITARY OPERATIONS; *PILOT PERFORMANCE; *TERRAIN FOLLOWING AIRCRAFT
DE- AIRCRAFT MANEUVERS; ATTACK AIRCRAFT; AVIONICS; HELICOPTER DESIGN; HELICOPTER PERFORMANCE; MISSION PLANNING; NIGHT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00835462
AN- <AEROSPACE> A77-40063
TI- A flight director/FLIR helicopter night landing system
AU- COOPER, P. G. (Kaiser Aerospace and Electronics Corp., Palo Alto, Calif.)
SO- In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. (A77-40048 18-01) Washington, D.C., American Helicopter Society, Inc., 1977. 6 p.
PY- 1977
PD- 197700
RN- AHS 77-33-23
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7718
AB- A CRT Integrated Pilot Display using a unique variant of three-cue flight director techniques has been coupled with a forward-looking infrared (FLIR) imaging system to provide night landing capability for helicopters, and the entire system was flight tested in a USMC CH-53D helicopter. The concept under evaluation is the use of flight director technology to maintain a real world line-of-sight approach to and termination at an unlit, uninstrumented, remote landing zone without visual contact with the ground. Problem constraints include low pilot workload, situation display as a backup to pilot commands, and a deceleration profile. (B.J.)
SF- AIAA
DE- <MAJOR> *CATHODE RAY TUBES; *DISPLAY DEVICES; *HELICOPTER DESIGN; *INFRARED IMAGERY
DE- AIRBORNE/SPACEBORNE COMPUTERS; HELICOPTER PERFORMANCE; NIGHT; PILOT PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00835461
AN- <AEROSPACE> A77-40062
TI- A kinesthetic-tactual display concept for helicopter-pilot workload reduction
AU- GILSON, R. D. (Ohio State University, Columbus, Ohio); DUNN, R. S. (U.S. Army, Air Mobility Research and Development Laboratory, Moffett Field, Calif.); SUN, P. (U.S. Army, Electronics Command, Fort Monmouth, N.J.)
CS- Ohio State Univ., Columbus.
CS- <CODE> OM593208
SO- In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. (A77-40048 18-01) Washington, D.C., American Helicopter Society, Inc., 1977. 9 p. Research supported by the Ohio State University, U.S. Army, and NASA.
PY- 1977
PD- 197700
RF- 16
RN- AHS 77-33-22
LA- English
GL- United States
CP- United States

DT- CONFERENCE PAPER
JA- IAA7718
AB- A kinesthetic-tactual (K-T) display concept is now under research and development (R & D) at the Ohio State University. It appears to offer considerable promise for useful application in helicopters by conveying control information via the sense of touch. This is a review of the overall R & D program including the original K-T display design, initial studies in automobile and fixed-wing vehicles, and feasibility experiments in a helicopter simulator. In addition to investigations of control and potential workload reduction, present efforts are directed toward establishing optimal design requirements for K-T helicopter displays. Potential applications, modes of usage, and the kinds of information that may be displayed in helicopter applications are discussed along with a brief forecast of future R & D. A brief description of the latest multi-axis laboratory prototype K-T display is also provided. ((Author))
DE- <MAJOR> *DISPLAY DEVICES; *HELICOPTER DESIGN; *KINESTHESIA; *PILOT PERFORMANCE; *TACTILE DISCRIMINATION
DE- FLIGHT SIMULATORS; HELICOPTER PERFORMANCE; MAN MACHINE SYSTEMS; RESEARCH AND DEVELOPMENT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00833442
AN- <AEROSPACE> A77-38043
TI- Subjective stress assessment - A new, simple method to determine pilot workload
AU- GOERRES, H. P. (German Air Force Institute of Aviation Medicine, Fuerstenfeldbruck, West Germany)
SO- Aviation, Space, and Environmental Medicine, vol. 48, June 1977, p. 558-564.
PY- 1977
PD- 197706
RF- 6
LA- English
GL- Germany
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7717
AB- A group comprised of 117 jet pilots, 41 multiple-engine prop pilots, 14 single-engine prop pilots, and 45 helicopter pilots was interviewed and asked to complete questionnaires to provide subjective assessments of workload. The pilots placed the effect of individual stressors and the severity of tension symptoms during different types of missions on a scale of zero to six. They were then asked to respond to the same questions from the point of view of pilots flying different types of aircraft. A combined scoring table was constructed for all inter- and intra-group assessments regarding all specific strain factors and overall workload. On a percentage scale, with 100% assigned to jet pilots, who had the highest strain and workload scores, the relative workload for instructor pilots (regardless of aircraft type) is 95%; helicopter pilots, 90%, multiple-engine prop pilots, 75%, and single-engine prop pilots, 60%. (C.K.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT STRESS; *PILOT PERFORMANCE; *STRESS (PHYSIOLOGY); *STRESS (PSYCHOLOGY); *WORKLOADS (PSYCHOPHYSIOLOGY)
DE- EVALUATION; HELICOPTERS; SIGNS AND SYMPTOMS; WORK CAPACITY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00833419
AN- <AEROSPACE> A77-38020
TI- Instrumentation for an air-to-ground target acquisition experiment
AU- BRIGHAM, P. B. (Martin Marietta Aerospace, Orlando, Fla.)
SO- In: The many disciplines of flight test; Proceedings of the Seventh Annual Symposium, Eastsound Orcas Island, Wash., August 4-6, 1976. (A77-38003 17-05) Lancaster, Calif., Society of Flight Test Engineers, 1976, p. 19-1 to 19-20.
PY- 1976
PD- 197600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7717
AB- A description is presented of the SEEKVAL program which in its first phase was to investigate methods for evaluating alternative systems and techniques for target acquisition in combat air support missions. Two basic simulation methods were selected for evaluation. In the terrain table simulation both fixed- and rotary-wing profiles were simulated, and several search methods were employed. In the motion picture simulation employed only rotary wing profiles were used. Attention is given to the instrumentation task, the organizational approach, questions of test preparation, installation problems, and the flight

test. (G.R.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *COMBAT; *FLIGHT TESTS; *TARGET ACQUISITION
DE- AIRCRAFT INSTRUMENTS; ENVIRONMENT SIMULATION; MILITARY OPERATIONS;
OH-58 HELICOPTER; T-39 AIRCRAFT
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00828370
AN- <AEROSPACE> A77-32971
TI- Physiological changes in the pilots of ship helicopters
TI- <ORIGINAL> K voprosu o fiziologicheskikh sdvigakh u letchikov palubnykh vertoletov
AU- KULESHOV, V. I.
SO- Voenno-Meditsinskii Zhurnal, Feb. 1977, p. 60-62. In Russian.
PY- 1977
PD- 197702
LA- Russian
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7714
AB- Two flight crews of ship helicopters were tested for pulse at rest, arterial pressure, maximum muscular exertion, and static muscular endurance during hydrodynamometry, and critical flicker fusion frequency. The results of the investigation reveal a definite development of fatigue among the flight crews during training flights.(B.J.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *FLIGHT FATIGUE; *HELICOPTERS; *PHYSIOLOGICAL
EFFECTS; *PILOT PERFORMANCE
DE- ARTERIES; BLOOD PRESSURE; CRITICAL FLICKER FUSION; FLIGHT CREWS; FLIGHT
TRAINING; HEART RATE; HUMAN BEHAVIOR; MUSCULAR FUNCTION; PHYSIOLOGICAL
TESTS; PULSE RATE; SHIPS
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00823617
AN- <AEROSPACE> A77-28217
TI- Recirculation air cycle environmental control system for helicopters
AU- BUSS, L. B. (AiResearch Manufacturing Company of California, Torrance, Calif.)
SO- Society of Automotive Engineers, Aerospace Engineering and Manufacturing Meeting, San Diego, Calif., Nov. 29-Dec. 2, 1976, 7 p.
PY- 1976
PD- 197611
RN- SAE PAPER 760902
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7711
AB- Environmental control systems for helicopters are desirable to increase comfort, promote cooling of electronic gear, and enhance pilot effectiveness. An optimized design is important to minimize weight, power extraction, and operating costs. This paper discusses a unique type of small, lightweight air cycle environmental control unit that has been developed specifically for helicopters. In comparison to other units, it offers the advantages of a lower power penalty, lower fuel energy and maintenance requirements, and increased reliability. ((Author))
DE- <MAJOR> *AIR CONDITIONING; *ENVIRONMENTAL CONTROL; *HELICOPTER DESIGN;
*SYSTEMS ENGINEERING
DE- COST EFFECTIVENESS; ELECTRONIC EQUIPMENT; OPTIMIZATION; PILOT PERFORMANCE; POWER EFFICIENCY; RECYCLING; SYSTEMS STABILITY; WEIGHT
REDUCTION
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00822286
AN- <AEROSPACE> A77-26885
TI- Helicopter aerodynamics and structural loads survey
AU- SHOCKEY, G. A.; WILLIAMSON, J. W.; COX, C. R. (Bell Helicopter Textron, Forth Worth, Tex.)
SO- In: American Helicopter Society, Annual National Forum, 32nd, Washington, D.C., May 10-12, 1976, Proceedings. (A77-26851 11-01) Washington, D.C., American Helicopter Society, 1976, p. 1060-1 to 1060-10.
PY- 1976
PD- 197600
RF- 9
CN- DAAJ02-73-C-0105

LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7711
AB- This paper describes a flight test program on an AH-1G helicopter where airfoil surface pressure, leading edge stagnation point, local flow magnitude and direction, blade accelerations, bending moments, and the attendant responses in the control system and airframe were measured simultaneously. The hardware development, instrumentation techniques, test conditions, and initial data analyses are discussed. Instrumentation was installed at five radial stations to obtain chordwise and spanwise pressure distributions, samples of pressure distributions, leading edge stagnation point versus azimuth and surface flow magnitude and direction. Acoustic signals and airload fluctuations are used to locate and define the origin of rotor noise during high-speed flight and in operating regimes of strong wake interaction. ((Author))
DE- <MAJOR> *AERODYNAMIC LOADS; *DYNAMIC STRUCTURAL ANALYSIS; *HELICOPTER PERFORMANCE; *IN-FLIGHT MONITORING; *ROTOR AERODYNAMICS
DE- ACOUSTIC MEASUREMENT; AEROELASTICITY; FLIGHT TESTS; HIGH SPEED
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00820341
AN- <AEROSPACE> A77-24935
TI- Application of a model-based flight director design technique to a longitudinal hover task
AU- HESS, R. A.
SO- Journal of Aircraft, vol. 14, Mar. 1977, p. 265-271.
PY- 1977
PD- 197703
RF- 11
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7710
AB- An analytical pilot model is used to design flight director laws for longitudinal control of a UH-1H helicopter in hovering flight in the presence of longitudinal turbulence. A simplified design technique is demonstrated which uses only essential feedbacks in synthesizing the director laws. The flight director is evaluated in a fixed-based pilot-in-the-loop simulation, in which root mean square performance and pilot opinion ratings are obtained. Significant improvement in performance and pilot ratings is achieved with the director as compared to the baseline display, in which only status information is presented. Based upon simulation results, the pilot model is refined, and improved director laws are generated and analytically evaluated using the refined model. ((Author))
DE- <MAJOR> *FLIGHT CONTROL; *HELICOPTER CONTROL; *HOVERING; *HUMAN FACTORS ENGINEERING; *LONGITUDINAL CONTROL; *MATHEMATICAL MODELS; *PILOT PERFORMANCE
DE- AERODYNAMIC STABILITY; ATMOSPHERIC TURBULENCE; FEEDBACK CONTROL; FLIGHT INSTRUMENTS; MAN MACHINE SYSTEMS; OPTIMIZATION; ROOT-MEAN-SQUARE ERRORS ; TRANSFER FUNCTIONS; UH-1 HELICOPTER
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00811938
AN- <AEROSPACE> A77-16531
TI- Experimental cognition for qualification of voice warning systems in aircraft
TI- <ORIGINAL> Experimentelle Erkenntnisse zur Eignung von Stimmwarnsystemen in Flugzeugen
AU- REINECKE, M. (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Ingolstadt, West Germany)
SO- Deutsche Gesellschaft fuer Luft- und Raumfahrt, Jahrestagung, 9th, Munich, West Germany, Sept. 14-16, 1976, 4 p. In German.
PY- 1976
PD- 197609
RN- DGLR PAPER 76-211
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7705
AB- Pilots' responses to auditory (speaking voice) and visual warning and alarm annunciation systems are compared, with emphasis on response times. Response times to auditory warnings are found to be demonstratively shorter than response times to visual warnings, although the gap is smaller with more experienced pilots. Simulator and flight tests were carried out with UH-1D helicopter and with F104. A

voice-transmitted 'check caution panel' warning in hedgehopping flight brought no faster response than the visual warning. Pilots tend to respond most urgently to voiced warnings: 'fire', 'rotor rpm too low', and 'exhaust temperature too high'. Some average response times to different modes of warning are cited. (R.D.V.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *AUDITORY SIGNALS; *FLIGHT SAFETY; *PILOT PERFORMANCE; *VOICE COMMUNICATION; *WARNING SYSTEMS
DE- F-104 AIRCRAFT; MILITARY TECHNOLOGY; PSYCHOACOUSTICS; TIME RESPONSE; UH-1 HELICOPTER
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00811538
AN- <AEROSPACE> A77-16131
TI- The response of a vibrating structure as a function of structural parameters - Application and experiment
AU- DONE, G. T. S. (Edinburgh, University, Edinburgh, Scotland); HUGHES, A. D. (Southampton, University, Southampton, England); WEBBY, J. (Westland Helicopters, Ltd., Yeovil, Somerset, England)
SO- Journal of Sound and Vibration, vol. 49, Nov. 22, 1976, p. 149-159.
PY- 1976
PD- 197611
RF- 7
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7704
AB- It was shown theoretically in previous work that for linear structures subjected to forced vibration at a constant frequency, the locus of the response at a point when a simple mass or stiffness parameter is changed describes a circle or arc of a circle in the complex plane. Furthermore when two parameters are altered simultaneously, the response lies in a prescribed 'feasible response' region, outside of which the response could never be attained with that particular choice of parameters. This paper applies this theory to finding suitable modifications for a helicopter fuselage excited by oscillatory forces from the rotor, such that the response at the pilot's seat would be reduced from its then excessive level. An experimental test model consisting of square steel blocks interconnected by flat steel spring strips to form a six by four inch rectangular grid has been devised and resonance and variable stiffness tests were performed on it. (B.J.)
SF- AIAA
DE- <MAJOR> *FORCED VIBRATION; *FUSELAGES; *HELICOPTER PERFORMANCE; *SEATS; *STRUCTURAL VIBRATION; *VIBRATION TESTS
DE- CORRELATION; DEGREES OF FREEDOM; HUMAN FACTORS ENGINEERING; RESONANT FREQUENCIES; SCALE MODELS; STIFFNESS
SH- 7539 Structural Mechanics (1975-)

AN- <DIALOG> 00806828
AN- <AEROSPACE> A77-11421
TI- Evaluation of the state of the cardiovascular systems of helicopter flightcrews
TI- <ORIGINAL> Otsenka sostoianiia serdechno-sosudistoi sistemy u ekipazhei vertoletov
AU- CHIREIKIN, L. V.; BONDAREV, E. V.; EGOROV, V. A.; KOLOSOV, V. A.; BATAEV, B. P.
SO- Kosmicheskaia Biologiia i Aviakosmicheskaia Meditsina, vol. 10, May-June 1976, p. 78, 79. In Russian.
PY- 1976
PD- 197606
LA- Russian
CP- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7701
AB- Variational ECG pulsometry was used to study the heart rhythms of 33 healthy helicopter flight crew members in the age range 20-40 years. Variational pulsograms were constructed on the basis of RR intervals of 0.05 s, and the following values were considered during analysis of the variability of the dynamic series of intervals: the difference between the maximum and minimum values of RR, the mean value of RR, the root-mean-square deviation, the mode, the asymmetry measure, and the coefficient of variation. The major results were: a quickening of heart rate for most of the crew members in horizontal flight, evidence for sympathicotonic responses during flight, observed bradycardia for most of the crew members after flight. (B.J.)
SF- AIAA
DE- <MAJOR> *BRADYCARDIA; *CARDIOVASCULAR SYSTEM; *FLIGHT CREWS; *FLIGHT STRESS (BIOLOGY); *HELICOPTERS; *PILOT PERFORMANCE

DE- AEROSPACE MEDICINE; BIOMEDICAL DATA; CARDIOLOGY; ELECTROCARDIOGRAPHY
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00804593
AN- <AEROSPACE> A76-47112
TI- The today and tomorrow of civilian helicopter flight director systems. II
TI- <ORIGINAL> Dzis i jutro systemow dyspozycyjnego sterowania smiglowcow cywilnych. II
AU- MALINSKI, E. (Instytut Lotnictwa, Warsaw, Poland)
SO- Technika Lotnicza i Astronautyczna, vol. 31, Sept. 1976, p. 9-15. In Polish.
PY- 1976
PD- 197609
RF- 10
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7624
AB- Three-channel helicopter flight director systems are examined as crucial components of integrated flight indication and control systems. Airspeed hold and altitude hold, vertical speed hold, landing approach and flare control, flight path and glide slope control for helicopters are examined in the case of three-channel flight director systems manufactured by various American firms. Electronic true speed indication and measurements, display problems, control of helicopter hover parameters, and instrumentation for measurement and sensing of flow, flowspeed, wake vortices (ultrasonic sensors), and minimum airspeed are also covered. Functions programmed into the instruments or optionally programmed by pilot or airline are mentioned, and instrumentation and display streamlining to ease helicopter pilots' work load is discussed. (R.D.V.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *DISPLAY DEVICES; *HELICOPTER CONTROL; *TECHNOLOGY ASSESSMENT
DE- AIRSPEED; CIVIL AVIATION; FLIGHT CONTROL; LANDING AIDS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00800114
AN- <AEROSPACE> A76-42633
TI- Air bag protection for the co-pilot/gunner in the Cobra
AU- LOUSHINE, T. M. (U.S. Army, Material Command, Picatinny Arsenal, Dover, N.J.)
SO- In: Survival and Flight Equipment Association, Annual Conference and Trade Exhibit, 13th, San Antonio, Tex., September 21-26, 1975, Proceedings. (A76-42626 21-54) Canoga Park, Calif., Survival and Flight Equipment Association, 1975, p. 54-57.
PY- 1975
PD- 197500
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7621
AB- Results are presented for a study intended to determine the feasibility of designing an air bag which will prevent the gunner of a Cobra attack helicopter from contacting the sighting device during crash impact. The overall system operation of automobile air bags is discussed in terms of three subsystems referred to as crash sensor, gas source, and inflatable bag. An air bag restraint system for the Cobra helicopter works much as that for automobiles, but with several differences pertaining to the location, size, and weight of various components as well as the duration of bag inflation. It is concluded that the use of an air bag substantially reduces the extent of injury and is therefore recommended. The location and designs suggested can be used without significant weight penalty. (S.D.)
SF- AIAA
DE- <MAJOR> *AIR BAG RESTRAINT DEVICES; *ATTACK AIRCRAFT; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS
DE- AIRCRAFT SAFETY; CRASH INJURIES; DESIGN ANALYSIS; HELICOPTER DESIGN; PILOTS; RELIABILITY ANALYSIS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00800107
AN- <AEROSPACE> A76-42626
TI- Survival and Flight Equipment Association, Annual Conference and Trade Exhibit, 13th, San Antonio, Tex., September 21-26, 1975, Proceedings
SO- Canoga Park, Calif., Survival and Flight Equipment Association, 1975.

148 p
PY- 1975
PD- 197500
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA7621
AB- Papers are presented on an inflatable seat cushion system for high acceleration cockpits, interface characteristics of oxygen regulators, an advanced capability microphone for an oxygen breathing mask, and the role of personal restraints in ejection mishaps. Attention is also paid to a hand portable fire extinguisher for the AH-L Army helicopter, catapult dynamics in a high acceleration environment, parachute landing injuries, and the development testing of a portable oxygen-contaminant detector. Seat mounted oxygen regulator systems, the development of an in-flight physiological data acquisition system, and a photo-computer technique for the design and analysis of personal protective equipment are also treated. Individual items are announced in this issue. (B.J.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *EMERGENCY LIFE SUSTAINING SYSTEMS; *FLIGHT SAFETY; *SAFETY DEVICES
DE- AIR BAG RESTRAINT DEVICES; CATAPULTS; COCKPITS; COMFORT; FIRE EXTINGUISHERS; HUMAN FACTORS ENGINEERING; MILITARY TECHNOLOGY; OXYGEN MASKS; PARACHUTE DESCENT; PORTABLE EQUIPMENT; PROTECTIVE CLOTHING
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00799450
AN- <AEROSPACE> A76-41969
TI- Aerial observations for environmental monitoring
AU- TRAKOWSKI, A. G., JR. (U.S. Environmental Protection Agency, Office of Monitoring and Technical Support, Washington, D.C.)
SO- In: National Association for Remotely Piloted Vehicles, Annual Symposium, 3rd, Dayton, Ohio, May 3-5, 1976, Proceedings. (A76-41967 21-05) Dayton, Ohio, National Association for Remotely Piloted Vehicles, 1976. 8 p.
PY- 1976
PD- 197600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7621
AB- The use of aerial observation techniques - including aerial photography, thermal imaging, and multispectral scanning - in Environmental Protection Agency efforts to detect violations of air and water pollution standards and ensure their enforcement is discussed. The resulting data, together with those obtained from the analysis of atmospheric gas samples and aerosols, have been used to track stack plumes from major point sources (industries with one or more stacks in close proximity emitting more than 100 metric tons per year of any pollutant for which standards have been established) and to determine their emission levels. In addition, airborne platforms have been used to detect heat plumes in bodies of water and to monitor runoffs from feedlot operations. The remote sensing instrumentation for a rotary wing aircraft is discussed. (C.K.D.)
SF- AIAA
DE- <MAJOR> *AERIAL PHOTOGRAPHY; *ENVIRONMENTAL MONITORING; *REMOTE SENSORS

DE- AGRICULTURE; AIR POLLUTION; AIR SAMPLING; ENVIRONMENT PROTECTION; HELICOPTERS; POLLUTION MONITORING; WATER QUALITY
SH- 7545 Environment Pollution (1975-)

AN- <DIALOG> 00798945
AN- <AEROSPACE> A76-41464
TI- A simple helicopter automatic flight control system for single-pilot IFR operations
AU- MILLER, R. J. (Sperry Rand Corp., Sperry Flight Systems Div., Phoenix, Ariz.)
SO- In: Guidance and Control Conference, San Diego, Calif., August 16-18, 1976, Proceedings. (A76-41426 20-12) New York, American Institute of Aeronautics and Astronautics, Inc., 1976, p. 330-336.
PY- 1976
PD- 197600
RF- 8
RN- AIAA PAPER 76-1953
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7620
AB- Because of their inherent instability, helicopters require both

stability augmentation and automation to permit reliable operation by a single pilot under instrument flight conditions. Modern Stability Augmentation System (SAS) design provides the former by not only providing vehicle stabilization, but also by controlling handling qualities accurately, using command augmentation. A Stability Augmentation System, configured to control vehicle response to a command accurately, can provide the automation required when coupled to a flight director system. This paper describes a hardware-efficient system design that provides stabilization, automation, and the necessary redundancy, both similar and dissimilar, to permit reliable single-pilot IFR operation. ((Author))
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *HELICOPTER CONTROL; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- AIRBORNE/SPACEBORNE COMPUTERS; FEEDBACK CONTROL; MAN MACHINE SYSTEMS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00793331
AN- <AEROSPACE> A76-35850
TI- A model-based analysis of a display for helicopter landing approach
AU- HESS, R. A.; WHEAT, L. W. (U.S. Naval Postgraduate School, Monterey, Calif.)
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> NS368219
SO- IEEE Transactions on Systems, Man, and Cybernetics, vol. SMC-6, July 1976, p. 505-511. NASA-supported research.
PY- 1976
PD- 197607
RF- 5
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7617
AB- A control theoretic model of the human pilot was used to analyze a baseline electronic cockpit display in a helicopter landing approach task and to generate display quickening laws designed to improve pilot-vehicle performance. A simple fixed base simulation provided comparative tracking data which allowed refinement of the pilot model. ((Author))
DE- <MAJOR> *AIRCRAFT LANDING; *APPROACH CONTROL; *CONTROL SIMULATION; *DISPLAY DEVICES; *HELICOPTER CONTROL; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- COCKPITS; COMPUTERIZED SIMULATION; HELICOPTER PERFORMANCE; MANUAL CONTROL; MATHEMATICAL MODELS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00791722
AN- <AEROSPACE> A76-34241
TI- Effect on pilot performance with refined helicopter displays
AU- WINTER, F. J., JR. (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio)
SO- In: Toward more effective testing; Proceedings of the Sixth Annual Symposium, St. Louis, Mo., August 13-16, 1975. (A76-34233 16-05) Lancaster, Calif., Society of Flight Test Engineers, 1975, p. 135-157.
PY- 1975
PD- 197500
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7616
AB- A flight research effort has been established to evaluate recent developments of rotary wing instrument flight capability. These developments center around vehicle controllability through advanced displays and stability augmentation systems. The configuration to be first evaluated was designed from the results documented by actual pilot performance during typical rotary wing IFR maneuvers. Several subject pilots flew designed profiles to establish in what areas improvements were required. Each pilot's performance was then computerized to create the mean and standard deviation values of pilot ability to perform prescribed tasks. The analysis of the data gathered determined in what areas pilot performance could most likely be improved through refined helicopter displays. ((Author))
DE- <MAJOR> *AIRCRAFT STABILITY; *DISPLAY DEVICES; *HELICOPTER CONTROL; *HELICOPTER DESIGN; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- AIRCRAFT MANEUVERS; DATA ACQUISITION; FEEDBACK CONTROL; FLIGHT CHARACTERISTICS; FLIGHT STABILITY TESTS; ROTARY WINGS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00791646
AN- <AEROSPACE> A76-34165
TI- Crashworthy fuel systems
AU- ROBERTSON, S. H.; ADAMCZYK, T. J. (Robertson Research, Inc., Tempe, Ariz.)
SO- In: Aircraft crashworthiness; Proceedings of the Symposium, Cincinnati, Ohio, October 6-8, 1975. (A76-34132 16-03) Charlottesville, University Press of Virginia, 1975, p. 669-682.
PY- 1975
PD- 197500
RF- 22
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7616
AB- The state of the art in the development of crashworthy fuel systems is reviewed. The postcrash fire environment is described, early developments in the design of crashworthy fuel systems are discussed, and crashworthiness programs pursued by the U.S. Army are outlined. The standard fuel system used in the Army's UH-1D/H helicopter is compared with a crashworthy system, and accident data for aircraft with standard and crashworthy systems are contrasted. Design features of a crash-resistant fuel system are described, including the tear-resistant fuel tanks, self-sealing breakaway valves, frangible connections, and high-strength flexible hoses. It is noted that the knowledge gained in this research can be readily applied to the civilian aircraft industry. (F.G.M.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT RELIABILITY; *AIRCRAFT SURVIVABILITY; *FIRE PREVENTION; *FUEL SYSTEMS; *HELICOPTER DESIGN; *SYSTEM EFFECTIVENESS
DE- FUEL TANKS; PHYSIOLOGICAL EFFECTS; PILOT PERFORMANCE; SELF SEALING; STRUCTURAL STABILITY; TECHNOLOGY ASSESSMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00791614
AN- <AEROSPACE> A76-34133
TI- An overview of aircraft crashworthiness research and development
AU- PERRONE, N. (U.S. Navy, Office of Naval Research, Arlington, Va.)
SO- In: Aircraft crashworthiness; Proceedings of the Symposium, Cincinnati, Ohio, October 6-8, 1975. (A76-34132 16-03) Charlottesville, University Press of Virginia, 1975, p. 3-12.
PY- 1975
PD- 197500
RF- 12
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7616
AB- Research into crashworthiness and biodynamics problems related to aircraft is reviewed. The origin of crash-injury research is outlined, and it is argued that the essence of the crashworthiness problem in potentially survivable aircraft accidents is to define what the design should be so that the highest probability of occupant survival with minimal injury will exist without significant weight penalty. Occupant simultation techniques and human tolerance limitations are discussed, the use of protective systems in aircraft is noted, and the state of the art of occupant simulation models, human impact-tolerance determination, and determinations of aircraft structural response to severe impact is summarized. Fiscal trends in vehicle-crashworthiness and biomechanics research are described. (F.G.M.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *AIRCRAFT RELIABILITY; *BIODYNAMICS; *CRASH INJURIES; *CRASHWORTHINESS; *RESEARCH AND DEVELOPMENT
DE- AIRCRAFT SURVIVABILITY; ALLOCATIONS; COST ANALYSIS; CRASH LANDING; FINANCIAL MANAGEMENT; HELICOPTER DESIGN; IMPACT DAMAGE; PILOT PERFORMANCE; STRESS (PSYCHOLOGY); WEIGHT ANALYSIS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00790852
AN- <AEROSPACE> A76-33371
TI- An airplane performance control system - A flight experiment
TI- <EXTENSION> banking angle and vertical speed control
AU- BERGMAN, C. A. (Singer Co., Binghamton, N.Y.)
SO- Human Factors, vol. 18, Apr. 1976, p. 173-181.
PY- 1976
PD- 197604
RF- 10
CN- F44620-70-C-0105
LA- English
GL- United States

CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7615
AB- Pilot performance and preference measures were obtained for 12 pilots in actual flight operations using a twin-engine general aviation aircraft with both conventional controls and a Performance Control System (PCS). The PCS provides zero-order control of aircraft bank angle and vertical speed over the ranges of plus or minus 60 deg and plus or minus 457.2 m/min, respectively. An information-processing side-task was also used. With the PCS, flight error scores were reliably lower than with conventional aircraft controls. Pilot preferences, using a six-point scale, ranging from slight to moderate to strong preference for each of the two control systems, showed a moderate preference for the PCS as the median response. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *GENERAL AVIATION AIRCRAFT; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AIRSPEED; HUMAN FACTORS ENGINEERING; HUMAN REACTIONS; PILOT ERROR; TURNING FLIGHT; VERTICAL FLIGHT
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00789609
AN- <AEROSPACE> A76-32128
TI- Incipient failure detection in high-speed rotating machinery
TI- <EXTENSION> vibroacoustic emission analysis tested on CH-47C helicopter drive transmission
AU- BOARD, D. B. (Boeing Vertol Co., Philadelphia, Pa.)
SO- In: Symposium on Nondestructive Evaluation, 10th, San Antonio, Tex., April 23-25, 1975, Proceedings. (A76-32126 15-38) San Antonio, Tex., Southwest Research Institute, 1975, p. 8-18.
PY- 1975
PD- 197500
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7615
AB- A new method for high-frequency vibroacoustic emission analysis is evaluated on three CH-47 helicopter drive system transmissions in a regenerative test stand. Test instrumentation, setup, and description are presented. During the course of the test a total of five discrepant conditions are indicated by analysis of the high-frequency demodulated carrier data. The defects analyzed are the scratched outer ring of the combining transmission input bearing, a localized surface defect on the outer race of the ring gear outboard roller support bearing of the left hand engine transmission, a badly worn inboard input pinion roller bearing on the right hand input pinion of the combining transmission, combining transmission input pinion roller bearing outer race rotation discrepancy, and right hand engine transmission shafting unbalance. Of the five faults involved in the test only one is known at the outset, but all five can be detected through analysis of the test data without recourse to baseline information of any kind. (S.D.)
SF- AIAA
DE- <MAJOR> *ACOUSTIC MEASUREMENT; *CH-47 HELICOPTER; *FAILURE ANALYSIS; *HELICOPTER PROPELLER DRIVE; *NONDESTRUCTIVE TESTS
DE- ROLLER BEARINGS; SHAFTS (MACHINE ELEMENTS); SPALLING; STRUCTURAL VIBRATION; SURFACE DEFECTS; TEST EQUIPMENT
SH- 7538 Quality Assurance & Reliability (1975-)

AN- <DIALOG> 00786964
AN- <AEROSPACE> A76-29483
TI- A pilot model with visual and motion cues
AU- CURRY, R. E.; YOUNG, L. R. (MIT, Cambridge, Mass.); HOFFMAN, W. C. (Aerospace Systems, Inc., Burlington, Mass.); KUGEL, D. L. (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio)
SO- In: Visual and Motion Simulation Conference, Dayton, Ohio, April 26-28, 1976, Proceedings. (A76-29476 13-53) New York, American Institute of Aeronautics and Astronautics, Inc., 1976, p. 50-54.
PY- 1976
PD- 197600
RF- 8
CN- F33615-75-C-3069
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7613
AB- A model of pilot control performance is developed to account for the effects of motion cues and external visual (VMC) cues. The starting point for the model is the optimal control model of the human operator, which has been well validated in fixed-base IMC (e.g., instrument cues) situations. The first goal was to incorporate motion cues by augmenting the controled-state vector with the dynamic description of the

vestibular sensory organs (semicircular canal and otolith). Comparison of the model predictions with experimental results of motion-only tracking indicates that the noise/signal ratio for the vestibular measurements can be modeled as approximately -18 dB. This new model was applied to a VTOL hovering task and did an excellent job of describing the control performance with and without motion cues, both on an absolute and relative basis. The model provides a good description of control performance with and without motion and VMC cues, and predicts the change in scanning behavior observed under these conditions. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *MATHEMATICAL MODELS; *MOTION PERCEPTION; *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *VISUAL SIGNALS
DE- COMPUTERIZED SIMULATION; CONTROL SIMULATION; DISPLAY DEVICES; HOVERING; MOTION SIMULATORS; OPTIMAL CONTROL; VERTICAL TAKEOFF AIRCRAFT
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00786037
AN- <AEROSPACE> A76-28556
TI- Notes on the pollution of airplanes and helicopters by chemicals during agricultural jobs
TI- <ORIGINAL> Kilka uwag na temat zanieczyszczenia chemikaliami samolotow i smiglowcow podczas wykonywania prac agrolotniczych
AU- STASZEWSKI, B. (Instytut Lotnictwa, Warsaw, Poland)
SO- In: Ergonomics in aviation; National Scientific-Technological Conference, 1st, Warsaw, Poland, March 17-19, 1975, Proceedings. (A76-28526 12-01) Warsaw, Instytut Lotnictwa, 1975, p. 326-328. In Polish.
PY- 1975
PD- 197500
LA- Polish
GL- Poland
CP- Poland
DT- CONFERENCE PAPER
JA- IAA7612
DE- <MAJOR> *AIR POLLUTION; *CHEMICAL EFFECTS; *FLIGHT HAZARDS; *TOXICITY AND SAFETY HAZARD; *UTILITY AIRCRAFT
DE- AGRICULTURE; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; STATISTICAL ANALYSIS
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00786011
AN- <AEROSPACE> A76-28530
TI- Retention of selected physiological indicators in pilots in the course of agricultural flights
TI- <ORIGINAL> Zachowanie sie wybranych wskaznikow fizjologicznych u pilotow podczas lotow agrotechnicznych
AU- MARKIEWICZ, L.; KORADECKA, D.; KONARSKA, M. (Centralny Instytut Ochrony Pracy, Warsaw, Poland)
SO- In: Ergonomics in aviation; National Scientific-Technological Conference, 1st, Warsaw, Poland, March 17-19, 1975, Proceedings. (A76-28526 12-01) Warsaw, Instytut Lotnictwa, 1975, p. 41-52. In Polish.
PY- 1975
PD- 197500
LA- Polish
GL- Poland
CP- Poland
DT- CONFERENCE PAPER
JA- IAA7612
AB- Stress on the organism of pilots maneuvering fixed-wing or rotary-wing aircraft in crop-dusting and sowing operations, with abrupt changes in terrain and sharp turns required, is studied on the basis of telemetered heart rate, tremorgrams, indications of muscle fatigue (particularly, flexor muscles of the fingers), and response to vibrations. Comparisons are made of data for low-level flight over even terrain and nap-of-the-earth flight over hilly terrain. Responses in fixed-wing flight and helicopter flight are also contrasted. Criteria are proposed for optimization of piloting conditions in this type of service. Restrictions on interpretation of the data are stated, and data are presented in tabular and graphical form. (R.D.V.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT MANEUVERS; *FLIGHT STRESS (BIOLOGY); *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE
DE- BIOTELEMETRY; FARMLANDS; FLIGHT CONDITIONS; HEART RATE; HELICOPTERS; MUSCULAR FUNCTION; STATISTICAL ANALYSIS; TASK COMPLEXITY; UTILITY AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00783389

AN- <AEROSPACE> A76-25908
TI- Downlooking airborne lidar studies - August 1974
TI- <EXTENSION> over St. Louis metropolitan area
AU- ECKERT, J. A.; MCELROY, J. L.; BUNDY, D. H.; GUAGLIARDO, J. L.; MELFI, S. H. (U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Las Vegas, Nev.)
SO- In: International Conference on Environmental Sensing and Assessment, Las Vegas, Nev., September 14-19, 1975, Proceedings. Volume 1. (A76-25876 11-45) New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 1 10-3 to 4 10-3.
PY- 1976
PD- 197600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7611
AB- Results are discussed for airborne lidar studies that were conducted to determine the height of the mixing layer over the St. Louis, Mo., metropolitan area during the morning and evening transition periods. The instrumentation for this monitoring technique consisted of a down-looking ruby-laser lidar mounted in a fixed-wing aircraft with on-board data capability. Although the primary objective was the determination of mixing-layer height, some data were obtained on individual industrial plumes, and one flight was made over a power-generation plant north of the city. The lidar data on mixing-layer height are shown to correlate strongly with vertical-profile nephelometer data obtained from helicopter ascents. It is concluded that a down-looking lidar is able to document the height of the mixing layer over a relatively large geographical area in a short period of time and that this technique can also be applied in studies of individual plumes, studies of the urban plume, and feasibility studies for the placement of a network of ground-based fixed sensors. (F.G.M.)
SF- AIAA
DE- <MAJOR> *AIR POLLUTION; *AIRBORNE SURVEILLANCE RADAR; *CITIES; *OPTICAL RADAR; *POLLUTION MONITORING
DE- ATMOSPHERIC BOUNDARY LAYER; DIURNAL VARIATIONS; LASER APPLICATIONS; MISSOURI; MIXING LAYERS (FLUIDS); NEPHELOMETERS; PLUMES; TEMPERATURE INVERSIONS; VERTICAL DISTRIBUTION
SH- 7535 Instrumentation & Photography (1975-)

AN- <DIALOG> 00781109
AN- <AEROSPACE> A76-23628
TI- Steering and regulation as part of a total flight-control system
TI- <ORIGINAL> Steuerung und Regelung als Teil eines Gesamt-Flugfuehrungssystems
AU- SCHMITZ, MR. (Bundesamt fuer Wehrtechnik und Beschaffung, Koblenz, West Germany)
SO- In: International Helicopter Forum, 11th, Bueckeburg, West Germany, June 10-12, 1975, Reports. (A76-23626 09-05) Bueckeburg, West Germany, Hubschrauberzentrum, 1975. 3 p. In German.
PY- 1975
PD- 197500
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
JA- IAA7609
AB- The exacting requirements related to the piloting of a helicopter under night and bad weather conditions make it highly desirable to relieve the pilot as much as possible from functions which are connected to flight-regulation objectives. Equipment available for providing this relief is considered. Attention is given to stability augmentation systems, the autopilot, and command stability augmentation systems. A command stability augmentation system can currently be implemented with the aid of electronic systems. Economic considerations make it desirable to provide such a system as an integral component of a total system which is also employed for objectives related to navigation, landing, and fire-guidance applications. (G.R.)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *AIRCRAFT GUIDANCE; *AUTOMATIC PILOTS; *FLIGHT CONTROL; *HELICOPTER CONTROL
DE- AIRCRAFT LANDING; ALL-WEATHER AIR NAVIGATION; COMMAND AND CONTROL; COMMAND GUIDANCE; ELECTRONIC CONTROL; PILOT PERFORMANCE; SYSTEMS ANALYSIS; SYSTEMS STABILITY
SH- 7504 Aircraft Communications & Navigation (1975-)

AN- <DIALOG> 00779703
AN- <AEROSPACE> A76-22222

TI- Research and development applications of the new NAE air-borne simulator
TI- <EXTENSION> helicopter for V/STOL flight simulation
AU- HINDSON, W. S.; SINCLAIR, S. R. M. (National Aeronautical Establishment, Flight Research Laboratory, Ottawa, Canada)
SO- (Canadian Aeronautics and Space Institute, Flight Test Symposium, Edmonton, Alberta, Canada, Mar. 12, 1975.) Canadian Aeronautics and Space Journal, vol. 21, Oct. 1975, p. 305-316.
PY- 1975
PD- 197510
RF- 16
LA- English
GL- Canada
CP- Canada
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7608
AB- The National Aeronautical Establishment of Canada has developed an airborne flight simulator, based on a single rotor helicopter, which can simulate a fairly wide range of V/STOL aircraft. The concept of the simulator can best be described as a flight simulation task typical of a ground-based simulation facility but where the cockpit motion results from controlling the helicopter simulation platform as a servomechanism. The design characteristics of the simulation helicopters are described with particular attention paid to the electrohydraulic control system, the autopilot design, the instrumentation and the onboard computers with emphasis on the computational capacity. The general control logic and fault monitoring of the integrated simulator system is described. Independent control of longitudinal and lateral linear motion is considered, and the flight control and guidance aspects of the helicopter are discussed. (B.J.)
SF- AIAA
DE- <MAJOR> *FLIGHT SIMULATORS; *HELICOPTER PERFORMANCE; *IN-FLIGHT MONITORING; *RESEARCH AND DEVELOPMENT; *V/STOL AIRCRAFT
DE- AIRBORNE/SPACEBORNE COMPUTERS; AIRCRAFT DESIGN; AUTOMATIC PILOTS; FLIGHT CONTROL; PILOT PERFORMANCE; RESEARCH AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00778098
AN- <AEROSPACE> A76-20616
TI- Evaluation of the load on a pilot's organism during agrotechnical flights, on the basis of physiological studies
TI- <ORIGINAL> Ocena obciazenia organizmu pilota podczas lotow agrotechnicznych na podstawie badan fizjologicznych
AU- MARKIEWICZ, L.; KORADECKA, D.; KONARSKA, M. (Centralny Instytut Ochrony Pracy, Warsaw, Poland)
SO- Technika Lotnicza i Astronautyczna, vol. 31, Jan. 1976, p. 13-16. In Polish.
PY- 1976
PD- 197601
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7607
AB- Pilots engaged in flights in agricultural work at tree-hopping heights, performing dozens of flights in the course of one day, under a variety of weather conditions and with different machines in contrasting missions, are found to be frequently under severe emotional stress before takeoff and during the flight. Physiological variables studied included: heart rate on the basis of telemetered or conducted ECG data, strength and stamina of finger-flexing muscles (electrodynamometer data), the number of errors in a tremorometric test, testing response time, and threshold levels of vibration sensation. Comparative tests were conducted for pilots operating different aircraft, gliders, or helicopters in agricultural service. Shortcomings of the testing procedure are discussed. Three hours maximum consecutive flying time in agrotechnical flights are suggested, among other measures. (R.D.V.)
SF- AIAA
DE- <MAJOR> *EMOTIONAL FACTORS; *FLIGHT STRESS (BIOLOGY); *PHYSIOLOGICAL RESPONSES; *PILOT PERFORMANCE; *STRESS (PSYCHOLOGY)
DE- AEROSPACE MEDICINE; LOW ALTITUDE; STATISTICAL ANALYSIS; UTILITY AIRCRAFT
SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00772081
AN- <AEROSPACE> A76-14599
TI- Navy shipboard trials of helicopters and V/STOL aircraft
AU- BECK, D. E. (Sub-Board of Inspection and Survey, Patuxent River, Md.)
SO- In: American Helicopter Society, Annual National Forum, 31st, Washington, D.C., May 13-15, 1975, Proceedings. (A76-14565 04-05) New York, American Helicopter Society, Inc., 1975. 6 p.
PY- 1975

PD- 197500
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7604
AB- The mode of operation and mission varies widely between helicopters, tilt wings, or direct lift jet V/STOL aircraft. However, the preparation and planning for shipboard trials are over 90 percent common for all types. The planning phases can be broken into the following areas: (1) basic flight restrictions, (2) shipboard restrictions, (3) operational goals, (4) shore-based tests, (5) instrumentation data package, (6) shipboard indoctrination, and (7) contingency plans. Naval Air Test Center (NATC) shipboard trials of the H-2, CX-84, and AV-8A are used to illustrate the required planning phases. The helicopter 'dynamic interface' tests and subsequent promulgation of shipboard launch/recovery envelopes are the end result of the preparation and conduct of shipboard trials. ((Author))
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTER DESIGN; *JET AIRCRAFT; *MILITARY OPERATIONS; *SHIPS; *V/STOL AIRCRAFT
DE- INSTRUMENT PACKAGES; MISSION PLANNING; NAVY; RECOVERABLE LAUNCH VEHICLES; TILT WING AIRCRAFT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00772075
AN- <AEROSPACE> A76-14593
TI- A flight investigation of control, display, and guidance requirements for decelerating descending VTOL instrument transitions using the X-22A variable stability aircraft
AU- LEBACQZ, J. V.; AIKEN, E. W. (Calspan Corp., Buffalo, N.Y.)
SO- In: American Helicopter Society, Annual National Forum, 31st, Washington, D.C., May 13-15, 1975, Proceedings. (A76-14565 04-05) New York, American Helicopter Society, Inc., 1975. 16 p.
PY- 1975
PD- 197500
RF- 25
CN- N00019-73-C-0504
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7604
AB- The third flight research program using the variable stability X-22A aircraft was undertaken to investigate control, display, and guidance requirements for VTOL instrument transitions. The primary purpose of the experiment was to provide meaningful data related to the interaction of aircraft control system and pilot display characteristics on pilot rating and performance during a steep decelerating descending transition from a representative forward velocity (100 kt) to the hover under simulated instrument conditions. Thirty-seven evaluations were performed of combinations of five generic display presentations, ranging from position-information-only to four-axis control directors, and five levels of control augmentation systems, ranging from rate-augmentation-only to decoupled velocity responses and automatic configuration changes. Primary results of the program include the demonstration of an inverse relationship between control complexity and display sophistication, as was hypothesized in the experiment design, and the definition of acceptable and satisfactory control-display combinations. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *FLIGHT SIMULATION; *INSTRUMENT LANDING SYSTEMS; *PILOT PERFORMANCE; *X-22A AIRCRAFT
DE- AIRCRAFT INSTRUMENTS; AIRSPEED; DESCENT; FLIGHT INSTRUMENTS; FLIGHT TESTS; HOVERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00772072
AN- <AEROSPACE> A76-14590
TI- Use of programmable force feel for handling qualities improvement in a helicopter velocity flight control system
AU- BRYANT, W. B.; TRUEBLOOD, R. B. (Charles Stark Draper Laboratory, Inc., Cambridge, Mass.)
SO- In: American Helicopter Society, Annual National Forum, 31st, Washington, D.C., May 13-15, 1975, Proceedings. (A76-14565 04-05) New York, American Helicopter Society, Inc., 1975. 10 p.
PY- 1975
PD- 197500
RF- 6
CN- DAAJ02-73-C-0070
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7604
AB- Extensive flight experience with helicopter velocity flight control

systems has shown that conventional thinking regarding pilot's control force-feel characteristics must be modified for this type of control system. Simpler control systems, including those with rate augmentation, require a relatively high level of pilot's control activity because the pilot must provide attitude and speed stability by control inputs. Velocity control systems, on the other hand, provide full and continuous stabilization of attitude and speed so that no control manipulation is required to check divergences. Control inputs with velocity control therefore are much less frequent and of relatively small amplitude. Some premium is, however, placed on smoothness of control motion due to the nature of the transfer functions relating control motions to aircraft responses. The paper presents an analysis in terms of these transfer functions; the analysis was used to develop the design of a programmable force feel system to improve the short term handling qualities of the control system. Such a system applied to the longitudinal axis of the CH-47B TAGS system has been flight tested. ((Author))
DE- <MAJOR> *AIRSPEED; *FLIGHT CONTROL; *HELICOPTER CONTROL; *LONGITUDINAL
CONTROL; *PILOT PERFORMANCE
DE- AERODYNAMIC STABILITY; FEEDBACK CONTROL; MANUAL CONTROL; PITCHING
MOMENTS; TRANSFER FUNCTIONS
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00772061
AN- <AEROSPACE> A76-14579
TI- Manual precision hover with superimposed symbology on FLIR image
TI- <EXTENSION> Forward Looking IR for helicopter tests
AU- MILELLI, R. J.; JOHNSON, D. C.; TSOUBANOS, C. M. (U.S. Army, Avionics Laboratory, Fort Monmouth, N.J.)
SO- In: American Helicopter Society, Annual National Forum, 31st, Washington, D.C., May 13-15, 1975, Proceedings. (A76-14565 04-05) New York, American Helicopter Society, Inc., 1975. 14 p.
PY- 1975
PD- 197500
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7604
AB- A research effort was initiated to investigate display, sensor, and instrumentation requirements for a manual precision hover task. This effort included a simulation and a flight test program. The moving-base simulation effort included the optimization of symbology requirements and the selection of alternative display concepts to be tested in the Research Aircraft Visual Environment (RAVE) flight test program. The simulation was also used to ground test hardware to be installed in the RAVE and to train the subject pilots. For the flight test, a Marine CH-53A helicopter was modified by installing a third pilot's station in the forward cargo area containing a panel mounted CRT and standard instrumentation. The flight test program demonstrated a manual precision hover capability utilizing symbology developed in simulation. ((Author))
DE- <MAJOR> *FLIGHT INSTRUMENTS; *FLIGHT TESTS; *HELICOPTER CONTROL; *HOVERING; *INFRARED IMAGERY; *MANUAL CONTROL
DE- AVIONICS; DISPLAY DEVICES; FLIGHT SIMULATION; VISUAL FLIGHT
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00767184
AN- <AEROSPACE> N75-33699
TI- Unique wide field of view visual simulation
TI- <EXTENSION> of helicopter flight close to earth surface
AU- NIEMELA, J.
CS- Army Avionics Lab., Fort Monmouth, NJ.
CS- <CODE> AZ170530
PY- 1975
PD- 197505
NT- In NASA. Ames Res. Center 11th Ann. Conf. on Manual Control p 377-382 (SEE N75-33675 24-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7524
AB- Visual simulations are required to support investigations of the man-machine aspects of helicopter nap-of-the-earth flight. The visual simulation requirements are discussed vis-a-vis available technology. A wide field of view of the world outside the cockpit is necessary to provide adequate visual cues to the pilot. A unique design is described employing three TV monitors, collimating lenses, and electronics to selectively display a wide field of view without the use of a costly wide angle optical probe. (Author)
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *PILOT PERFORMANCE;

*VIDEO EQUIPMENT
DE- COMPENSATORY TRACKING; HELICOPTERS; HORIZONTAL FLIGHT; MAN MACHINE
SYSTEMS; MANUAL CONTROL
SH- <COSATI> 5E Human Factors Engineering
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00767181
AN- <AEROSPACE> N75-33696
TI- A simulator study on information requirements for precision hovering
AU- LEMONS, J. L.; DUKES, T. A. (Princeton Univ.)
CS- Aeronautical Systems Div., Wright-Patterson AFB, OH.
CS- <CODE> AF595779
PY- 1975
PD- 197505
NT- In NASA. Ames Res. Center 11th Ann. Conf. on Manual Control p 325-336 (SEE N75-33675 24-54)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7524
AB- A fixed base simulator study of an advanced helicopter instrument display utilizing translational acceleration, velocity and position information is reported. The simulation involved piloting a heavy helicopter using the Integrated Trajectory Error Display (ITED) in a precision hover task. The test series explored two basic areas. The effect on hover accuracy of adding acceleration information was of primary concern. Also of interest was the operators' ability to use degraded information derived from less sophisticated sources. The addition of translational acceleration to a display containing velocity and position information did not appear to improve the hover performance significantly. However, displayed acceleration information seemed to increase the damping of the man machine system. Finally, the pilots could use translational information synthesized from attitude and angular acceleration as effectively as perfect acceleration. (Author)
DE- <MAJOR> *DISPLAY DEVICES; *HOVERING; *MANUAL CONTROL; *PILOT PERFORMANCE
DE- COCKPIT SIMULATORS; COMPENSATORY TRACKING; HEAVY LIFT HELICOPTERS; MAN
MACHINE SYSTEMS
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00767180
AN- <AEROSPACE> N75-33695
TI- Results of a flight investigation of control-display interactions for VTOL decelerating descending instrument approaches using the X-22A aircraft
AU- LEBACQZ, J. V.; AIKEN, E. W.
CS- Calspan Corp., Buffalo, NY.
CS- <CODE> CD663716
PY- 1975
PD- 197505
NT- In NASA. Ames Res. Center 11th Ann. Conf. on Manual Control p 297-324 (SEE N75-33675 24-54)
NT- Sponsored in part by NASA
CN- N00019-73-C-0504
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7524
AB- Control, display, and guidance requirements for VTOL instrument transitions were studied to provide meaningful data related to the interaction of aircraft control system and pilot display characteristics on pilot rating and performance during a steep decelerating descending transition from a representative forward velocity to the hover under simulated instrument conditions. Thirty seven evaluations were performed of combinations of five generic display presentations, ranging from position information only to four axis control directors, and five levels of control augmentation systems, ranging from rate augmentation only to decoupled velocity responses and automatic configuration changes. Primary results include the demonstration of an inverse relationship between control complexity and display sophistication and the definition of acceptable and satisfactory control display combinations. (Author)
DE- <MAJOR> *DISPLAY DEVICES; *INSTRUMENT LANDING SYSTEMS; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- FLIGHT TESTS; HOVERING; MAN MACHINE SYSTEMS; MANUAL CONTROL; X-22
AIRCRAFT
SH- <COSATI> 5H Man-machine Relations

SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00767170
AN- <AEROSPACE> N75-33685
TI- A model for simultaneous monitoring and control
TI- <EXTENSION> by pilot during helicopter approaches
AU- CURRY, R. E.; KLEINMAN, D. L. (Conn. Univ.); HOFFMAN, W. C. (Aerospace Systems, Inc.)
CS- Massachusetts Inst. of Tech., Cambridge. Man-Vehicle Lab.
CS- <CODE> MJ700802
PY- 1975
PD- 197505
NT- In NASA. Ames Res. Center 11th Ann. Conf. on Manual Control p 144-150 (SEE N75-33675 24-54)
CN- NAS1-13653
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7524
AB- Mathematical models of the human operator have been concerned primarily with his input/output characteristics and his adaptive behavior to sudden changes in the controlled element dynamics. Newer models have examined the ability of the human to detect failures when acting as a monitor. However, models for simultaneous monitoring and control (e.g., an aircraft pilot flying a split axis approach) are necessary for performing pilot task allocations and for coordinated design of display and control subsystems. Flight test results of simulated instrument helicopter approaches conducted have shown the following: (1) constant speed approaches can be made quite comfortably by the pilots; (2) pilots cannot hover on situation displays alone; and (3) pilots can hover with a flight director display, but feel uncomfortable because they do not have enough time to monitor the situation displays. (Author)
DE- <MAJOR> *APPROACH CONTROL; *HELICOPTERS; *MATHEMATICAL MODELS; *PILOT PERFORMANCE
DE- ADAPTIVE CONTROL; IN-FLIGHT MONITORING; INSTRUMENT LANDING SYSTEMS; MAN MACHINE SYSTEMS
SH- <COSATI> 5H Man-machine Relations
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00765575
AN- <AEROSPACE> N75-32043
TI- Air bag protection of the gunner in the US Army Cobra AH-1Q
TI- <SUPPLEMENT> Final Report
AU- LOUSHINE, T. M.
CS- Army Materiel Command, Texarkana, TX. Intern Training Center.
CS- <CODE> A1192392
PY- 1975
PD- 197504
PG- 62P.
RN- AD-A009421; USAMC-ITC-02-08-75-411
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7523
AB- The new version of the U.S. Army Cobra attack helicopter, the AH-1Q, makes use of a new rigid column sighting device. This rigid column introduces a serious hazard to the gunner who may come in contact with it during a crash. This report looks at the possibility of using an inflatable air bag to protect the gunner from sight inflicted injury. An overall description of the mechanics and reliability of the air bag, as found in present day automobiles, is included to give the reader a basic understanding of how air bags work. With this understanding, various considerations are made as to how an air bag system, similar to an automobile air bag system, could be designed into the gunner position of the AH-1Q. (DTIC)
SF- DTIC
DE- <MAJOR> *AIR BAG RESTRAINT DEVICES; *GUNS (ORDNANCE); *MILITARY HELICOPTERS
DE- CRASH LANDING; HUMAN FACTORS ENGINEERING; INFLATABLE STRUCTURES
SH- <COSATI> 1C Aircraft
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00764656
AN- <AEROSPACE> N75-31117
TI- Flight director laws for the longitudinal cyclic and collective controls of the UH-1H helicopter
TI- <SUPPLEMENT> M.S. Thesis

AU- SMITH, G. K.
CS- Naval Postgraduate School, Monterey, CA.
CS- <CODE> NS368219
PY- 1975
PD- 197503
PG- 41P.
RN- AD-A009822
LA- English
GL- United States
CP- United States
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7522
AB- A technique for determining flight director laws for the longitudinal control of a V/STOL aircraft in landing approach is evaluated. The method is based on the application of an optimal control model for the human pilot. The vehicle studied was the UH-1H helicopter at three approach groundspeeds: 60 knots, 40 knots, and 20 knots. The two pilot outputs were longitudinal cyclic and collective. In the analysis, ten pilot transfer functions which relate the two control variables to the five displayed and perceived quantities were obtained. These transfer functions were then used to obtain the respective flight director laws. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT CONTROL; *LONGITUDINAL CONTROL; *V/STOL AIRCRAFT; *VERTICAL LANDING
DE- DISPLAY DEVICES; OPTIMAL CONTROL; PILOT PERFORMANCE; TRANSFER FUNCTIONS

SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00764605
AN- <AEROSPACE> N75-31065
TI- Pilot Factors for helicopter pre-experimental phase
TI- <SUPPLEMENT> Final Report
TI- <EXTENSION> flight tests/flight instruments
AU- ARMSTRONG, G. C.; MCDOWELL, J. W.; SAMS, D. D.; WINTER, F. J., JR.
CS- Instrument Flight Center, Randolph AFB, TX.
CS- <CODE> IP938983
PY- 1975
PD- 197502
PG- 20P.
CN- F33615-73-C-3112; AF PROJ. 8226
RN- AD-A009839; IFC-TR-74-2
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7522
AB- An investigation was conducted to establish the methods and procedures to collect pilot factors information and to obtain firsthand pilot opinions and judgments concerning the present control-display systems installed in helicopters. Four instrument instructor pilots were used as test subjects and a total of seven data gathering sorties were accomplished. The profiles flown represented typical helicopter instrument maneuvers. The subject pilot activity required in performance of the maneuver segments was designed to progress from simple tasks to complex tasks. Objective and subjective data were obtained through the use of video, audio, and oscillograph recording equipment. (DTIC)
SF- DTIC
DE- <MAJOR> *FLIGHT INSTRUMENTS; *FLIGHT TESTS; *HELICOPTERS; *PILOT PERFORMANCE
DE- DISPLAY DEVICES; FLIGHT CONTROL; HUMAN FACTORS ENGINEERING; MANEUVERS; PERFORMANCE TESTS; TASK COMPLEXITY
SH- <COSATI> 1C Aircraft
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00763633
AN- <AEROSPACE> N75-30079
TI- An automatic flight control system for a helicopter night landing system
AU- MILLER, R. J.; TRIBKEN, E. R.
CS- Sperry Rand Corp., Phoenix, AZ.
CS- <CODE> SX583485
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 9 p (SEE N75-30052 21-01)
LA- English
GL- United States

CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- An automatic flight control system (AFCS) is described which provides the vehicle with handling qualities sufficient for the pilot to perform IFR approach and landings manually, using cockpit displays. It provides absolute maximum operational simplicity so as not to contribute to cockpit workload already increased by the requirement to operate display controls. The AFCS provides stability and command augmentation in pitch, roll and yaw, and the pilot relief functions of pitch, roll, heading hold, and both barometric and radar altitude hold. To provide the improved handling qualities required for the night landing problem, feedback gains and shaping were chosen to attenuate basic aircraft response, and to provide model following of the closed-loop system. The rationale behind the specific aircraft response provided by the system for this mission, the establishment of the operational characteristics and procedures, and the implementation of the system are described in detail. (Author)
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *INSTRUMENT LANDING SYSTEMS; *LOW VISIBILITY; *UH-1 HELICOPTER
DE- APPROACH INDICATORS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE; SYSTEMS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00763632
AN- <AEROSPACE> N75-30078
TI- Helicopter automatic flight control systems for poor visibility operations
AU- ROBINSON, P.; HOLLINGTON, J. L. (Smiths Industries Ltd.); MEADOWS, J. (Smiths Industries Ltd.)
CS- Royal Aircraft Establishment, Farnborough (England).
CS- <CODE> R2785060
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 13 p (SEE N75-30052 21-01)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- Operations are described which helicopters may be required to carry out at night and in poor visibility. Because of the very high pilot work load likely to arise in these situations, it is shown that the helicopter should be equipped with an autostabilization system having a defect-survival capability. One system which meets this requirement was developed for installation and trails in a Sea King helicopter. This system is triplex, with digital computation and has the development potential to include autopilot facilities, sophisticated control techniques, and extended system redundancy. The redundancy philosophy together with salient design and engineering details of the system are described. (Author)
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *LOW VISIBILITY; *PILOT PERFORMANCE; *SH-3 HELICOPTER
DE- DESIGN ANALYSIS; DIGITAL COMPUTERS; EQUIPMENT SPECIFICATIONS; FLIGHT TESTS; SYSTEMS ENGINEERING
SH- 7508 Aircraft Stability & Control (1975-)

AN- <DIALOG> 00763624
AN- <AEROSPACE> N75-30070
TI- Research on displays for V/STOL low-level and IMC operations
AU- STROTHER, D. D.; UPTON, H. W.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 11 p (SEE N75-30052 21-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- The results of several research studies covering cockpit displays and their effect on the performance of helicopter pilots. These studies evaluated displays used for the guidance and control of helicopters at night and in restricted visibility, especially for operations at extremely low altitudes. (Author)
DE- <MAJOR> *APPROACH INDICATORS; *LOW VISIBILITY; *METEOROLOGICAL

PARAMETERS; *PILOT PERFORMANCE; *V/STOL AIRCRAFT
DE- APPROACH CONTROL; HUMAN FACTORS ENGINEERING; LOW ALTITUDE; NIGHT VISION

SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00763621
AN- <AEROSPACE> N75-30067
TI- Display for approach and hover with and without ground reference
TI- <EXTENSION> image enhancement
AU- DUKES, T. A.
CS- Princeton Univ., NJ. Dept. of Aerospace and Mechanical Sciences.
CS- <CODE> P3732113
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 9 p (SEE N75-30052 21-01)
CN- DAAB07-72-C-0161; DAAB07-74-C-0051
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- The various elements of flight variable information available from an image display are discussed from the point of view of image enhancement by means of superimposed symbology. The significance of a heading reference for accurate positioning is emphasized. Two particular symbology formats are described. For approach and hover unaided by ground based instrumentation, the position information obtainable from an image display is improved by superposition of an electronically stabilized 'terrain marker'. If a radiating point source is available on the ground, quantitative error information can be derived from suitable instrumentation, and the deviation from a nominal point can be displayed superimposed on the image. Additional flight variable information (horizon, airspeed, climb rate, etc.) is also incorporated. (Author)
DE- <MAJOR> *APPROACH CONTROL; *HELICOPTERS; *HOVERING; *IMAGE ENHANCEMENT
DE- APPROACH INDICATORS; COCKPITS; FLIGHT PATHS; HUMAN FACTORS ENGINEERING
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00763619
AN- <AEROSPACE> N75-30065
TI- Low level night operations of tactical helicopters
AU- KENNEALLY, W. J.
CS- Army Electronics Command, Fort Monmouth, NJ. Avionics Lab.
CS- <CODE> A0057764
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 14 p (SEE N75-30052 21-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- Initial results are presented of the U.S. Army's Low Level Night Operations Program, an on-going research program to define Avionic equipment parameters for low level night and adverse weather conditions. Results of the program include quantitative data on the performance of pilots flying at low level with varying levels of avionic equipment augmentation (e.g. none, Night Vision Goggles, FLIR, LLLTV and Radar); simulation and experimental flight test data on conceptual systems (e.g. symbolically augmented visual imaging systems) as well as experimental measurements of various candidate hardware for obstacle detection. The results are utilized to develop preliminary conceptual avionic systems for low level night operations as well as to identify areas in which additional research is required. Future research efforts directed to identified barrier problems are also presented. (Author)
DE- <MAJOR> *AVIONICS; *MILITARY HELICOPTERS; *NIGHT VISION
DE- COMBAT; FLIGHT TESTS; OPERATIONS RESEARCH; PILOT PERFORMANCE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00763611
AN- <AEROSPACE> N75-30057
TI- US Army experience in low-level night flight
AU- BAUER, R. W.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1975
PD- 197505

NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 6 p (SEE N75-30052 21-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- During the period of U.S. conflict in Southeast Asia there were a number of air operations conducted under adverse visibility conditions or at night. There were even a few night operations involving large numbers of aircraft, but most were made up of one or two aircraft, engaged in an insertion, extraction, long-range patrol or supply movement. Some lessons learned from these experiences are reviewed. Current developments and testing have demonstrated an improved capability in night flight, using either selected specialists without night vision systems or a wider group of aviators aided by the night vision goggles. The electroluminescent formation flight lights and rotor-tip lights have greatly increased safety in formation flights at night. But each approach has been hampered by design limitations in display panels, poor lighting quality and poor lighting control in the aircrew stations. Landing in dark unimproved areas, navigation over unfamiliar terrain and target acquisition also present special problems which have not yet been completely overcome. (Author)
DE- <MAJOR> *ALL-WEATHER AIR NAVIGATION; *INSTRUMENT FLIGHT RULES; *MILITARY HELICOPTERS; *NIGHT VISION
DE- HUMAN FACTORS ENGINEERING; LOW VISIBILITY; SOUTHEAST ASIA
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00763609
AN- <AEROSPACE> N75-30055
TI- Effect on nap-of-the-earth requirements on aircrew performance during night attack helicopter operations
CS- Army Combat Developments Experimentation Center, Fort Ord, CA.
CS- <CODE> AZ535984
PY- 1975
PD- 197505
NT- In AGARD The Guidance and Control of V/STOL Aircraft and Helicopters at Night and in Poor Visibility 10 p (SEE N75-30052 21-01)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7521
AB- Night nap-of-the-earth (NOE) flight is described as it relates to three major areas: man, machine, and operational use. The findings and operational experience reported were encountered in exploratory efforts for a major field experiment. Activities discussed include aviator selection and training, psychological and physiological effects, mission planning, map reading and terrain interpretation, aircraft handling, emergency procedures, and man-machine operations. Behavioral research requirements and other needs established for night NOE training and operations by current scout and attack helicopters are presented, and a training program for night NOE training is offered as a general guideline. (Author)
DE- <MAJOR> *INSTRUMENT FLIGHT RULES; *MILITARY HELICOPTERS; *NIGHT VISION;
*PILOT PERFORMANCE
DE- FLIGHT CHARACTERISTICS; MAN MACHINE SYSTEMS; OPERATIONS RESEARCH; PILOT
TRAINING; TERRAIN FOLLOWING AIRCRAFT; WARFARE
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00761277
AN- <AEROSPACE> N75-27686
TI- Aircrew assessment of the vibration environment in helicopters
AU- RANCE, B. H.; CHAPPELOW, J. W.
CS- Royal Aerospace Establishment, Farnborough (England).
CS- <CODE> R1297595
PY- 1975
PD- 197503
NT- In AGARD Vibration and Combined Stresses in Advan. Systems 7 p (SEE N75-27685 18-51)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7518
AB- A survey of military helicopter crews was carried out to determine the scope and nature of problems due to vibration. Three hundred questionnaires were completed. The chief consequences of vibration were discomfort and difficulty in reading displays. The occurrence of these effects was associated with significant increases in reported fatigue. The major effects were, mainly confined to the larger aircraft. Most of

the reports from Royal Navy helicopters were associated with hovering or transition to or from the hover; turbulence was found to increase the number of reports of vibration effects. Loading of the aircraft was not found to cause any increase in the number of reports. (Author)
DE- <MAJOR> *FLIGHT CREWS; *FLIGHT FATIGUE; *HELICOPTERS; *VIBRATIONAL STRESS
DE- HUMAN FACTORS ENGINEERING; HUMAN PERFORMANCE; INFRASONIC FREQUENCIES; VIBRATION EFFECTS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00759511
AN- <AEROSPACE> N75-25897
TI- Orientation-error accidents in regular Army aircraft during fiscal year 1971: Relative incidence and cost
AU- HIXSON, W. C.; SPEZIA, E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1974
PD- 197411
PG- 46P.
CN- MF51524005
RN- AD-A004189; NAMRL-1209; USAARL-75-6
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7517
AB- The report is the fifth in a series of reports dealing with the pilot disorientation/vertigo accident problem in Army fixed wing and rotary wing flight operations. Incidence and cost data presented for fiscal year 1971 include a total of 50 major and minor orientation-error accidents (25 of which were fatal), resulting in 65 fatalities, 67 nonfatal injuries, and an over-all aircraft damage cost of $11,404,119. The contribution of rotary wing accidents to this total was 47 accidents (23 of which were fatal), resulting in 62 fatalities, 67 nonfatal injuries, and an over-all aircraft damage cost of $11,191,377.(DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *ATTITUDE (INCLINATION); *BEARING (DIRECTION); *MILITARY AIRCRAFT; *PILOT PERFORMANCE
DE- AIRCRAFT SAFETY; ECONOMIC FACTORS; HELICOPTERS; MILITARY TECHNOLOGY
SH- <COSATI> 1B Aeronautics
SH- 7503 Air Transportation & Safety (1975-)

AN- <DIALOG> 00754693
AN- <AEROSPACE> N75-21025
TI- Test of a model of visual spatial discrimination and its application to helicopter control
TI- <SUPPLEMENT> Annual Summary Report, 1 Jun. 1973 - 31 May 1974
AU- BYNUM, J. A.; SMART, E. E.; SANBORN, F. A.; MATNENY, W. G.
CS- Life Sciences, Inc., Hurst, TX.
CS- <CODE> LP202656
PY- 1974
PD- 197406
PG- 49P.
CN- DADA17-72-C-2110
RN- AD-A002624; LSI-TR-74-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7512
AB- This report describes two field studies which tested pilots' abilities to maintain hover control of a helicopter when the visual field was restricted and when referents were specified. Two laboratory studies are also described which tested observer's abilities to detect small displacements in one of a pair of stimulus dots on a CRT display and displacements of real-world visual scenes when only the scene moved or when scene and observer were moved in the pitch dimension. Results of studies are discussed. (DTIC)
SF- DTIC
DE- <MAJOR> *HELICOPTERS; *HOVERING; *VISUAL PERCEPTION
DE- CATHODE RAY TUBES; FLIGHT CONTROL; PILOT PERFORMANCE; VISUAL ACUITY
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00751690
AN- <AEROSPACE> N75-17963

TI- Proceedings of Conference on Aircrew performance in Army Aviation
TI- <SUPPLEMENT> Final Report
TI- <EXTENSION> considering terrain following night flight
CS- Office of the Chief of Research Development and Acquisition (Army), Washington, DC.
CS- <CODE> OK643043
PY- 1974
PD- 197407
PG- 205P.
NT- Held at Fort Rucker, Ala., 27-29 Nov. 1973
RN- AD-A001539
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7509
AB- The purpose of the conference was to explore the behavioral problems affecting pilots of Army helicopters, with special emphasis on Nap-of-the-Earth (NOE) flight. The technical papers included in this Proceedings deal with the nature of the future combat environment, next generation helicopters, cockpit configuration, map aids, avionics systems, night vision devices, training and simulation requirements and measurement criteria. Included also is a recommended behavioral research program to support Army Aviation. (DTIC)
SF- DTIC
DE- <MAJOR> *MILITARY AVIATION; *PILOT PERFORMANCE; *TERRAIN FOLLOWING AIRCRAFT
DE- FLIGHT CREWS; HUMAN BEHAVIOR; MILITARY HELICOPTERS; NAVIGATION AIDS; NIGHT VISION
SH- <COSATI> 1B Aeronautics
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00751079
AN- <AEROSPACE> N75-17351
TI- US Army Human Engineering Laboratory helicopter cockpit lighting study. Phase 1: An evaluation of current and potential instrument panel lighting techniques for use in Army helicopters
AU- STOWELL, H. R.; POSTON, A. M.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1974
PD- 197408
PG- 43P.
RN- AD-A001527; HEL-TN-7-74
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7509
AB- The objective of the study is to evolve lighting specifications which will alleviate current cockpit lighting problems. The objective of this phase was to quantitatively identify the problems with current lighting systems in Army helicopters. It also investigated the potential improvements afforded by some of the state-of-art lighting techniques. Luminance measurements were made at various points on instrument dial faces. Results are shown in tabular and pictorial forms. The results also showed that the current techniques of post and eyebrow lighting are unacceptable. From a comparison of all the techniques examined, the circular wedge technique gave the best light distribution. Illuminance measurements were made at the pilots: eye positions for use in other phases of the lighting study. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPITS; *LIGHTING EQUIPMENT; *MILITARY AIRCRAFT; *MILITARY HELICOPTERS
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; VISUAL PERCEPTION
SH- <COSATI> 1C Aircraft
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00751075
AN- <AEROSPACE> N75-17347
TI- Helicopter TERPS validation study, phase 1
TI- <SUPPLEMENT> Final Report
AU- CLARK, W. E., JR.; INTANO, G. P.
CS- Instrument Flight Center, Randolph AFB, TX.
CS- <CODE> IP938983
PY- 1974
PD- 197410
PG- 92P.
RN- AD-A000423; IFC-TR-74-4

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7509
AB- With the addition of Chapter 11 to AFM 55-9, an attempt was made to provide helicopters with specialized approach criteria. Chapter 11 criteria was written largely from opinion with little feasibility testing accomplished. Helicopter TERPs Validation Study, Phase I, was conducted in order to provide Chapter 11 criteria validation. Eight highly qualified Air Force Instructor Pilots (with varied helicopter experience) were utilized as subject pilots. Each subject flew five different approaches utilizing maximum descent gradients, utilizing minimum segment lengths for maximum intercept angles, and maneuvering at minimum distance from the facility. Included were VOR, TACAN and ILS type approaches. All approaches were flown at 90 knots. (Modified author abstract) (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT LANDING; *HELICOPTERS; *INSTRUMENT LANDING SYSTEMS
DE- LANDING AIDS; PILOT PERFORMANCE; TACAN
SH- <COSATI> 1B Aeronautics
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00744749
AN- <AEROSPACE> N75-10917
TI- Integrated avionics: Controls and displays for helicopter IFR operation
AU- WINTER, F. J., JR.
CS- Air Force Flight Dynamics Lab., Wright-Patterson AFB, OH.
CS- <CODE> AI058438
PY- 1974
PD- 197400
NT- In Soc. of Flight Test Engr. Advan. in Flight Test Eng. 12 p (SEE N75-10910 02-05)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7502
AB- A flight research effort has been established to investigate all aspects of helicopter instrument flight rule (IFR) operations ranging from lift-off, transition to cruise, approach, hover, and landing. The basic purpose is to evaluate recent developments in rotary wing instrument flight capability. These developments center around vehicle controllability through both control/display and stability augmentation systems. The configuration to be first evaluated was designed from the results documented by actual pilot performance during typical rotary wing IFR maneuvers. The maneuver profiles were designed and flown to record pilot activity and aircraft attitude. Several subject pilots flew the designed profiles to extablish in what areas improvements were required. Each pilot's performance was then computerized to create a mean value of pilot ability to perform prescribed tasks. The analysis of the data gathered determined in what areas pilot performance could most likely be improved through refined helicopter controls and displays. (Author)
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT INSTRUMENTS; *HELICOPTER DESIGN; *INSTRUMENT FLIGHT RULES
DE- FLIGHT CHARACTERISTICS; FLIGHT CONTROL; FLIGHT SAFETY; FLIGHT TESTS; HELICOPTER PERFORMANCE
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00743935
AN- <AEROSPACE> N75-10084
TI- Helicopter dropsight
TI- <SUPPLEMENT> Final Report
AU- WOGSLAND, N. C.
CS- Army Land Warfare Lab., Aberdeen Proving Ground, MD.
CS- <CODE> A0721779
PY- 1974
PD- 197405
PG- 19P.
RN- AD-784551; LWL-TR-74-29
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7501
AB- The Helicopter Dropsight was developed for use when hand dropping unattended ground sensors and other hardware from UH-1D/H helicopters.

It consists of a simple cross hair mounted in a ring that projects outside the helicopter on an arm attached to a standard installed in a rear doorway. Sighting consists of aligning the cross hair, a marker on the helicopter skid, and the drop zone. It can be adjusted for various drop conditions, weighs less than 10 pounds, and can be installed within 5 minutes. Dropsights have been evaluated and are being used for training by the US Army Intelligence Center/School at Fort Huachuca, AZ. (Author (GRA))
SF- DTIC
DE- <MAJOR> *MATERIALS HANDLING; *OPTICAL EQUIPMENT; *TARGET ACQUISITION;
*UH-1 HELICOPTER
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; MILITARY TECHNOLOGY; PERFORMANCE TESTS; SYSTEMS ENGINEERING
SH- <COSATI> 19E Fire Control & Bombing Systems
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00740022
AN- <AEROSPACE> N74-31455
TI- V/STOL aircraft control/display concept for maximum operational effectiveness
AU- MCELREATH, K. W.; KLEIN, J. A. (Collins Radio Co.); THOMAS, R. C. (Collins Radio Co.)
CS- Air Force Flight Dynamics Lab., Wright-Patterson AFB, OH.
CS- <CODE> AI058438
PY- 1974
PD- 197405
NT- In AGARD Advan. in Control Systems 8 p (SEE N74-31429 21-02)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7421
AB- Vertical/Short Takeoff and Landing (V/STOL) aircraft and their unique missions define four requirements for a practical and suitable IFR control/display system: (1) maximum flight profile flexibility, (2) flight control precision, (3) low pilot workload, and (4) simplicity at low cost. A system concept which has made significant progress in meeting these requirements is described. The system concept is that of retaining the human pilot as an active control element, augmented by an integrated system of displays, steering computation, and automatic control elements. The task allocation between the pilot and the automatic portion of the system optimizes the pilot's flexibility and control effectiveness in the control tasks for which he is most suited, complemented by the precision and reduction in workload afforded by automatic control techniques. The approach taken in the development of the system was to first define the mission tasks to be performed and the system constraints. Analysis and pilot-in-the-loop simulation determined the most effective control scheme and the optimum human-automatic interface. Flight testing then validated the system concepts in hardware form aboard a CH-3E helicopter test bed. (Author)
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *FLIGHT SAFETY; *V/STOL
AIRCRAFT
DE- FLIGHT TESTS; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE; SYSTEMS
ANALYSIS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00738062
AN- <AEROSPACE> N74-29469
TI- Summary of the Human Engineering Laboratory's air-to-ground target detection studies using stationary targets
TI- <SUPPLEMENT> Final Technical Note
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1974
PD- 197403
PG- 12P.
RN- AD-779409; HEL-TN-5-74
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7419
AB- Recent events have increased interest in the ranges at which the helicopter crewman can be expected to detect and/or identify a target. Studies of air-to-ground target detection identification have all concluded with essentially the same results; a stationary, passive, noncamouflaged military ordnance type of target can be detected by an observer in a slow speed, 60 knots, low flying, less than 300 feet, helicopter at maximum ranges up to 2000 meters but cannot be reliably identified at ranges greater than 1000 meters. (DTIC)

SF- DTIC
DE- <MAJOR> *AERIAL RECONNAISSANCE; *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *TARGET RECOGNITION
DE- GROUND TRUTH; HUMAN PERFORMANCE; MILITARY HELICOPTERS; VISUAL DISCRIMINATION
SH- <COSATI> 5E Human Factors Engineering
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00736135
AN- <AEROSPACE> N74-27508
TI- Cobra window design analysis and no glare canopy design
TI- <SUPPLEMENT> Final Report
AU- DAUMIT, R. H.; KIESEL, J. B.
CS- Westinghouse Electric Corp., Baltimore, MD. Systems Development Div.
CS- <CODE> WS296685
PY- 1974
PD- 197403
PG- 37P.
RF- 1
CN- DAAD05-72-C-0284; DAAD05-73-C-0305
RN- AD-778165; LWL-CR-06P72
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7417
AB- The report details the work related to the redesign and modification of the canopy of the Attack Helicopter (AH-1G) to minimize sun reflections and thereby reduce the probability of detection through visual observation. There were two objectives in this effort, namely: Canopy redesign through analysis of directional components of reflections; and computer analysis of the design in a modified version of a special program developed in earlier work entitled Cobra Glint Model, AH-1G. (Modified author abstract) (DTIC)
SF- DTIC
DE- <MAJOR> *CANOPIES; *MILITARY HELICOPTERS; *OPTICAL PROPERTIES; *WINDSHIELDS
DE- FLIGHT SAFETY; HUMAN FACTORS ENGINEERING; VISUAL PERCEPTION
SH- <COSATI> 1C Aircraft
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00735271
AN- <AEROSPACE> N74-26632
TI- Helicopter aircrew fatigue
AU- PERRY, I. C., ed.
CS- Advisory Group for Aerospace Research and Development, Paris (France). Aerospace Medical Panel.
CS- <CODE> AD481245
PY- 1974
PD- 197405
PG- 25P.
RN- AGARD-AR-69
LA- English
GL- France
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7416
AB- A study was conducted to provide: (1) a definition of aviator fatigue, (2) a list of the effects of fatigue on operational effectiveness, (3) a statement of causal factors and diagnostic criteria, (4) a statement of preventive measures, and (5) a statement of methods of treatment of aviator fatigue. These specific aims were accomplished and are presented. In addition, the results are given of an aircrew opinion questionnaire and a review of 120 helicopter accidents. (D.L.G.)
SF- NASA CASI
DE- <MAJOR> *FLIGHT FATIGUE; *HELICOPTERS; *PILOT PERFORMANCE
DE- AIRCRAFT ACCIDENTS; FLIGHT CREWS; MILITARY TECHNOLOGY; SURVEYS
SH- <COSATI> 5E Human Factors Engineering
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00735151
AN- <AEROSPACE> N74-26488
TI- Flight control of airplanes and helicopters
TI- <EXTENSION> characteristics of automatic flight control to include methods of display and human factors engineering
AU- BORODIN, V. T.; RYLSKY, G. I.
CS- Air Force Systems Command, Wright-Patterson AFB, OH. Foreign Technology Div.
CS- <CODE> AJ773273
PY- 1974
PD- 197403

PG- 357P.
NT- Transl. into ENGLISH of the book ""Upravlenie Poletom Samoletov i Vertoletov" USSR, 1972 p 1-240
RN- AD-777297; FTD-MT-24-251-74
LA- English
GL- U.S.S.R.
CP- United States
DT- BOOK
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7416
AB- The book provides an analysis and systematizes the basic results of foreign investigations into the automation of flight control of airplanes and helicopters. It presents the block diagrams and descriptions of the control systems of contemporary airplanes and helicopters, flexible aircraft, and also of adaptive (self-tuning, with variable structure, self-organizing) aviation systems. It examines the bionic principles of adaptation and the possibility of their use in control systems of aircraft, and also the problems of the automation of landings, flight at low and maximally low altitudes, and the integration of airborne equipment. It describes the methods for the display of flight information to the pilot, the system of semiautomatic control, the system for the prevention of the collision of airplanes in the air, landing systems, systems of profile flight, and contemporary complexes of airborne equipment. (DTIC)
SF- DTIC
DE- <MAJOR> *AUTOMATIC CONTROL; *FLIGHT CONTROL; *HELICOPTERS; *VERTICAL TAKEOFF AIRCRAFT
DE- DISPLAY DEVICES; HUMAN FACTORS ENGINEERING; LANDING AIDS; SYSTEMS ENGINEERING
SH- <COSATI> 1C Aircraft
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00734219
AN- <AEROSPACE> N74-25543
TI- Predicting laternal hover, flying qualities with paper pilot
TI- <SUPPLEMENT> M.S. Thesis
TI- <EXTENSION> simulation of pilot performance in VTOL aircraft
AU- NOLTING, D. L.
CS- Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
CS- <CODE> AI174479
PY- 1973
PD- 197312
PG- 133P.
RN- AD-775704; GA/MA/73A-2
LA- English
GL- United States
CP- United States
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7415
AB- Data were obtained from a fixed base simulation of VTOL aircraft in the lateral hover mode and used to develop a technique for predicting lateral hover flying qualities. The task for the simulation was to maintain position in the presence of lateral gusts. Root-mean-square aircraft state and pilot input data were obtained and correlated with Cooper-Harper Pilot Ratings. A mathematical model for predicting the pilot rating of VTOL aircraft in lateral hover is developed. This model includes: the lateral hover aircraft equations of motion; a stochastic gust model; a linear pilot model; and a pilot rating expression that is a function of rms position error, rms lateral velocity, rms roll rate, and pilot lead terms. (Modified author abstract) (DTIC)
SF- DTIC
DE- <MAJOR> *COMPUTER PROGRAMS; *HOVERING; *MATHEMATICAL MODELS; *VERTICAL TAKEOFF AIRCRAFT
DE- COMPUTERIZED SIMULATION; PILOT PERFORMANCE
SH- <COSATI> 1A Aerodynamics
SH- 6501 Aerodynamics (1965-74)

AN- <DIALOG> 00732482
AN- <AEROSPACE> N74-21759
TI- HELHAT 2 - scout crew/observer target detection flight tests
TI- <EXTENSION> target acquisition at low flight altitude
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1974
PD- 197401
PG- 23P.
RN- AD-773686; HEL-TN-1-74
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7413
AB- The HELHAT 2 flight test compared the target detection capability of helicopter scout crews and single observers flying in an OH-58 Kiowa at above the ground levels of 80 to 300 feet. An ancillary test employing six crews, gave some information on the target detection capability of scout crews in the nap-of-the-earth flight reign, 1 to 30 feet. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLYING PERSONNEL; *HELICOPTERS; *LOW ALTITUDE; *TARGET ACQUISITION
DE- FLIGHT TESTS; HARRIER AIRCRAFT; MILITARY AIRCRAFT; PILOT PERFORMANCE; TARGET RECOGNITION
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00732387
AN- <AEROSPACE> N74-21663
TI- Problems of pilot-automatic control interactions in flight control
TI- <ORIGINAL> das problem des zusammenwirkens von flugzeugfuehrer und regler in der flugfuehrung
TI- <EXTENSION> applied to blind CTOL landing and VTOL stabilization
AU- DEY, D.; KIRCHHOFF, U.
CS- Technische Univ., Berlin (Germany). Inst. fuer Luft- und Raumfahrt.
CS- <CODE> TJ477159
PY- 1973
PD- 197305
PG- 134P.
RN- ILR-4-1973
LA- German
GL- Germany
CP- Germany
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7413
AB- The problems in pilot-controller interaction are discussed from the viewpoints of blind landing automation for CTOL aircraft and stabilization of VTOL aircraft. For the optimization of the task division between pilot and automation, the properties and capabilities of the human being were compared with those of the technical controller. Optimization criteria for the design of a flight control system are requirements of safety, performance, and economy. Based on the complementary properties of the pilot and the automatic system, a strong man-machine integration is proposed, and the model representations of a hierarchical systems structure for systematic design of flight control systems is described. The hierarchy model is applied to the guidance simulation study of a hovering VTOL aircraft. (ESRO)
SF- ESA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *BLIND LANDING; *PILOT PERFORMANCE; *VERTICAL LANDING
DE- AIRCRAFT LANDING; CONTROLLERS; MAN MACHINE SYSTEMS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00731503
AN- <AEROSPACE> N74-20772
TI- In-flight escape system for heavy helicopters
AU- OGDEN, W.; DAVIS, G. (Naval Air Systems Command)
CS- Naval Air Development Center, Warminster, PA.
CS- <CODE> NO000154
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 9 p (SEE N74-20756 12-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- The design and development of a helicopter escape and personnel survival system (HEPS) are discussed. The system contains four primary functions: (1) in flight escape, (2) crash impact energy attenuation, (3) fuel fire suppression, and (4) flotation. The configuration of the system is illustrated. Results of flight tests are reported. (Author)
DE- <MAJOR> *EMERGENCY LIFE SUSTAINING SYSTEMS; *ESCAPE CAPSULES; *ESCAPE SYSTEMS; *HELICOPTERS
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; SYSTEMS

ENGINEERING
SH- 6503 Auxiliary Systems (1965-74)

AN- <DIALOG> 00731502
AN- <AEROSPACE> N74-20771
TI- Army autorotational accidents
TI- <EXTENSION> analysis of factors contributing to helicopter accidents
AU- KIMBALL, K. A.; HARDEN, D. F.; HOFMANN, M. A.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat aircraft 10 p (SEE N74-20756 12-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- A study reviewing autorotation accidents was initiated to ascertain the relative contributions that certain factors had in such accidents. The active Army, for fiscal years 1970 through 1972, was reviewed and a total of 790 accidents, or 42.3% of all accidents, were of the autorotational type. They accounted for over 89 million dollars in aircraft damage, 92 aircrew fatalities and 652 aircrew injuries. Of these 790 accidents, it was determined that personnel error alone accounted for 32.7% of the accidents, while materiel failure alone accounted for 31.4%. Of the remaining accidents (35.9%), 20.9% were attributed to a combination of personnel error and materiel failure, while the remaining 15% were attributed to other causative factors. Though the total number and rate of rotary wing accidents was found to be declining over the time for frame considered, the number of autorotation accidents attributed solely to personnel error was found to be on the increase, with fiscal year 1972 approximately 10% higher than 1970. The study also reviews autorotation accidents in light of total accidents, rates, geographical areas, aircraft, cost, fatalities, and injuries. It also provides impact data with regard to the reduction of certain parameters. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AUTOROTATION; *FLIGHT HAZARDS; *HELICOPTERS; *STATISTICAL ANALYSIS
DE- AIRCRAFT ACCIDENT INVESTIGATION; HELICOPTER PERFORMANCE; HUMAN FACTORS

ENGINEERING
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00731501
AN- <AEROSPACE> N74-20770
TI- Escape measures for combat helicopter crews
AU- MELZIG, H. D.; SCHMIDT, U.
CS- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany). Inst. fuer Flugmechanik.
CS- <CODE> DO696666
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 11 p (SEE N74-20756 12-05)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- Flight-control malfunction, loss of control, loss of main or tail rotor, mid-air collision, fire explosion and transmission freeze-up occur relatively often and cause emergency conditions which can not be followed by an auto-rotation landing. Together with a very high percentage of pilot error as the responsible reason for the emergency and the operational requirements for combat helicopters with low altitude and speed, in a relatively high number of accident fatalities could have only been avoided by means of an escape system. Although the technology of capable escape systems is highly developed, its application to a helicopter causes great difficulties because of the rotating blades. A comparative analysis is made for the different modes of downward, sideward, foward and upward ejection or extraction in correlation to the expected percentage of rescue from emergencies and a number of other factors, like development cost and time, reliability, human tolerance, adaptability for retrofit and others. (Author)
DE- <MAJOR> *EJECTION SEATS; *ESCAPE SYSTEMS; *HELICOPTERS; *SAFETY DEVICES

DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; SYSTEMS ENGINEERING
SH- 6503 Auxiliary Systems (1965-74)

AN- <DIALOG> 00731500
AN- <AEROSPACE> N74-20769
TI- Human factors aspects of in-flight escape from helicopters
AU- READER, D. C.
CS- Royal Aerospace Establishment, Farnborough (England).
CS- <CODE> R1297595
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 4 p (SEE N74-20756 12-05)
LA- English
GL- United Kingdom
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- A review of the accident statistics from some helicopters users of the NATO forces has shown that helicopter operations impose a greater risk to their crews compared with fixed-wing aircraft. Cost analyses have shown that the crew cost more to replace than their aircraft. Thus, it is considered that a strong case exists for in-flight escape from helicopters. Some human factors to be considered when designing such a system are described. Human tolerance to acceleration, egress path requirements, center of gravity data, restraint and parachute requirements, blast, noise, fragmentation and toxic hazards, and vision and egress time requirements are discussed. (Author)
DE- <MAJOR> *ESCAPE (ABANDONMENT); *ESCAPE SYSTEMS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING
DE- AIRCRAFT EQUIPMENT; EQUIPMENT SPECIFICATIONS; SAFETY DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00731498
AN- <AEROSPACE> N74-20767
TI- Helicopter personnel survivability requirements
AU- MEEK, T. S.
CS- Naval Air Systems Command, Washington, DC.
CS- <CODE> NO789311
PY- 1974
PD- 197402
RF- 1
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 6 p (SEE N74-20756 12-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- Current provisions for countering helicopter in-flight emergencies are discussed and their inadequacies are noted. To assess the need for improved helicopter occupant survivability, a review is presented of U. S. Navy, Marine Corps and Army helicopter fatal accident data. Analyses of these data have identified the survival mechanisms which could have prevented these fatalities. Practicable combinations of these survival mechanisms - (1) emergency in-flight egress, (2) improved crash impact protection, (3) improved fire protection and (4) improved flotation - could have averted more than 80 percent of the fatalities analyzed over a 17 year period. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *EJECTION SEATS; *ESCAPE SYSTEMS; *HELICOPTERS; *LIFE SUPPORT SYSTEMS
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; PRODUCT DEVELOPMENT; SYSTEMS ENGINEERING
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00731497
AN- <AEROSPACE> N74-20766
TI- Advanced concepts for rotary wing and V/STOL aircraft escape systems
AU- LAW, W. G.
CS- Naval Air Development Center, Warminster, PA. Crew Systems Dept.
CS- <CODE> NO000154
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 5 p (SEE N74-20756 12-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- The requirements for ejection seats to provide safe egress from helicopters and V/STOL aircraft are discussed. The limitations of existing ejection seats for such applications are defined. The desirability of a display device for indicating safe ejection conditions to the crew members is expressed. The research projects

which have been conducted in an effort to develop a more satisfactory ejection system are reported. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *EJECTION SEATS; *ESCAPE SYSTEMS; *HELICOPTERS; *V/STOL AIRCRAFT
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; PRODUCT DEVELOPMENT; RESEARCH PROJECTS
SH- 6503 Auxiliary Systems (1965-74)

AN- <DIALOG> 00731488
AN- <AEROSPACE> N74-20757
TI- Technical evaluation of the Aerospace Medical Panel Specialists Meeting on Escape Problems and Manoeuvres in Combat Aircraft
AU- JONES, W. L.
CS- National Aeronautics and Space Administration, Washington, DC.
CS- <CODE> NC452981
PY- 1974
PD- 197402
NT- In AGARD Escape Probl. and Manoeuvres in Combat Aircraft 6 p (SEE N74-20756 12-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7412
AB- A technical evaluation of the papers presented at a conference on escape systems for helicopters and V/STOL aircraft was made. The subjects discussed include the following: (1) bioengineering aspects of spinal injury during ejection, (2) aerodynamic forces acting on crewman during escape, (3) operational practicality of fly away ejection seats, (4) helicopter survivability requirements, (5) ejection experience from V/STOL aircraft, and (6) research projects involving escape and retrieval systems. (Author)
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *EJECTION SEATS; *ESCAPE SYSTEMS; *HELICOPTERS; *SAFETY DEVICES; *V/STOL AIRCRAFT
DE- AERODYNAMIC FORCES; HUMAN FACTORS ENGINEERING; HUMAN TOLERANCES; LIFE SUPPORT SYSTEMS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00730472
AN- <AEROSPACE> N74-19689
TI- A design study to standardize collective-stick controls in US Army helicopters: A Human Factors Engineering (HFE) evaluation
AU- STOWELL, H. R.; FRY, C. A.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1973
PD- 197310
PG- 82P.
RN- AD-773688; HEL-TM-24-73
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7411
AB- The design study was conducted by HEL to standardize collective-stick controls in U.S. Army helicopters. The objective was to formulate a standard which will specify functions and arrangement of switches on collective-stick controls in Army helicopters. Two types of collective-stick controls were developed to meet requirements in all categories of helicopters designed for the U.S. Army. A human factors engineering (HFE) evaluation was done by HEL on functional hard mock-up models representing the general design configuration developed for standardization of collective-stick controls. Results of the HFE test indicate that the configurations developed for standardization is suitable for developing airworthy designs for flight test. (Author (GRA))
SF- DTIC
DE- <MAJOR> *CONTROL STICKS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *MILITARY AIRCRAFT
DE- AIRCRAFT MODELS; SPECIFICATIONS; STANDARDIZATION
SH- <COSATI> 1C Aircraft
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00729599
AN- <AEROSPACE> N74-18804
TI- Incidence, cost and factor analysis of pilot-error accidents in US Army aviation
AU- RICKETSON, D. S.; JOHNSON, S. A.; BRANHAM, L. B.; DEAN, R. K.
CS- Army Agency for Aviation Safety, Fort Rucker, AL.
CS- <CODE> AY871566

PY- 1973
PD- 197312
NT- In AGARD Behavioural Aspects of Aircraft Accidents 19 p (SEE N74-18797 10-05)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7410
AB- From 1958 through 1972 pilot-error was a consistently large and costly cause of accidents. Past analytic and prevention efforts have not approached pilot-error accidents in the context of malfunctions among the basic man-machine-environment elements. Such an approach was proposed and seeks to identify the common human-error events in pilot-error accidents. A partial test of this approach was made with helicopter and airplane mishap information in its present form. A factor analysis produced nine distinct, meaningful and representative helicopter and airplane factors. A component score analysis yielded pilot and mishap background information which was helpful in interpreting the factors. An experimental human-error events reporting form was developed which holds promise for clearer identification of mishap-causing system elements and corrective measures required. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *FLIGHT HAZARDS; *HUMAN FACTORS ENGINEERING; *MILITARY AIRCRAFT; *PILOT ERROR
DE- AIRCRAFT ACCIDENT INVESTIGATION; COST ANALYSIS; HUMAN BEHAVIOR; PSYCHOLOGICAL FACTORS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00729593
AN- <AEROSPACE> N74-18798
TI- Pilot factor in aircraft accidents of the German Federal Armed Forces
AU- FALCKENBERG, B.
CS- Institute of Aviation Medicine, Fuerstenfeldbruck (Germany).
CS- <CODE> IK612960
PY- 1973
PD- 197312
NT- In AGARD Behavioural Aspects of Aircraft Accidents 7 p (SEE N74-18797 10-05)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7410
AB- An analysis with reference to the most frequent types of pilot error was made of 154 aircraft accidents which occurred in the years between 1967 - 1970. Of special interest were differences between pilots of jet, propeller aircraft and helicopters. The flying experience of the pilot, his age and other so called time-variable factors were also taken into consideration. In general, errors predominantly occurred during low level flight and during the landing phase immediately before touch-down. In jet aircraft accidents the majority of errors committed by the pilot is due to an extreme workload in handling his aircraft. In pilots of the other categories, particularly on propeller-driven aircraft, those types of errors are more pronounced which may be attributed to the pilot's flying attitude (in extreme cases resulting in violations). The findings of other authors relating to flying experience could be confirmed. As for the age distribution of pilots there were remarkable differences in comparison with the data in other publications. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *FLIGHT HAZARDS; *HUMAN FACTORS ENGINEERING; *PILOT ERROR; *PILOT PERFORMANCE
DE- AIRCRAFT ACCIDENT INVESTIGATION; PSYCHOLOGICAL FACTORS; STATISTICAL ANALYSIS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00729499
AN- <AEROSPACE> N74-18702
TI- Parachute escape from helicopters
TI- <EXTENSION> vertical and horizontal separation of parachutist from autorotating helicopter
AU- CHANE, W. P.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1973
PD- 197308
PG- 14P.
CN- DA PROJ. 3A0-62110-A-819
RN- AD-772970; USAARL-74-4
LA- English
GL- United States
CP- United States
DT- REPORT

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7410
AB- Experimental evidence shows that a parachutist experiences no major difficulty in achieving vertical and horizontal separation from an autorotating helicopter. At high rates of descent, there is a 0.5 - 0.75 second delay after exit before expected separation begins. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AUTOROTATION; *BAILOUT; *HELICOPTERS; *PARACHUTE DESCENT
DE- ESCAPE (ABANDONMENT); FLIGHT SAFETY; HUMAN FACTORS ENGINEERING
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00728556
AN- <AEROSPACE> N74-17736
TI- Influence of turbulence on helicopter design and operation
TI- <EXTENSION> analysis of structural loads, pilot workload, and passenger comfort affected by atmospheric turbulence
AU- REICHERT, G.; RADE, M.
CS- Messerschmitt-Boelkow G.m.b.H., Ottobrunn (Germany).
CS- <CODE> MT624400
PY- 1973
PD- 197311
NT- In AGARD Flight in Turbulence 16 p (SEE N74-17720 09-02)
LA- English
GL- Germany
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7409
AB- The sensitivity of the helicopter to atmospheric turbulence because of the relatively low disc loading is discussed. The influences of other parameters such as rotor stiffness and damping are analyzed. The effects of these influences on different helicopters are compared. The main design problems of meeting operational and certification requirements and methods for improving the performance of helicopters are examined. (Author)
DE- <MAJOR> *ATMOSPHERIC TURBULENCE; *HELICOPTER DESIGN; *HELICOPTER PERFORMANCE; *TURBULENCE EFFECTS
DE- AERODYNAMIC LOADS; HUMAN FACTORS ENGINEERING; ROTOR AERODYNAMICS; STRUCTURAL DESIGN CRITERIA
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00726638
AN- <AEROSPACE> N74-15801
TI- Study of flight environment effects on helicopter gunner
AU- LARSON, C. (Drexel Univ.); WELLS, E. (Drexel Univ.); KAPLAN, B. H.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1973
PD- 197306
PG- 39P.
RN- AD-766224; USAARL-73-15
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7407
AB- Disorientation periods of a helicopter gunner in the conduct of his task during a planned flight profile were investigated through the use of a computerized mathematical model of the vestibular system. Flight attitude and crewman seat change data were used as input to the model and crewman nystagmus rates and perceived angular sensations were predicted. These output data were then compared to actual onboard flight observations of crewman status and well being. The mathematical model was found to accurately predict periods of disorientation that coincided with those observed and were manifested by either excess nystagmus rates, perceived sensations of motion, or a combination of both. Rapid changes in seat angle were attributed as the primary cause of disorientation with vehicle attitude changes cross-coupled with seat angle changes, producing a secondary effect. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLYING PERSONNEL; *MOTION SICKNESS; *TARGET RECOGNITION; *VESTIBULAR TESTS
DE- AEROSPACE MEDICINE; HELICOPTERS; HUMAN FACTORS ENGINEERING; NYSTAGMUS
SH- <COSATI> 6S Stress Physiology
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00724595
AN- <AEROSPACE> N74-13742
TI- Orientation-error accidents in regular Army UH-1 aircraft during fiscal year 1970: Relative incidence and cost
AU- NIVEN, J. I.; HIXSON, W. C.; SPEZIA, E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1973
PD- 197309
PG- 36P.
CN- MF51524005
RN- AD-768307; NAMRL-1192; USAARL-74-5
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7405
AB- The report is the fourth in a series of reports dealing with pilot disorientation/vertigo accident problem is Regular Army UH-1 helicopter operations. Incidence and cost data presented for fiscal year 1970 include a total of 43 major and minor orientation-error, accidents (17 of which were fatal), resulting in 66 fatalities, 67 nonfatal injuries, and a total UH-1 aircraft damage cost of $7,706,191. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *DISORIENTATION; *HELICOPTERS; *MILITARY AIRCRAFT; *VERTIGO
DE- COSTS; FLIGHT SAFETY; PILOT PERFORMANCE; PROPRIOCEPTION
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00724306
AN- <AEROSPACE> N74-13450
TI- The effect of helicopter noise on communication and hearing
AU- GIORDANO, T. A.; KEANE, G. C.
CS- Army Electronics Command, Fort Monmouth, NJ.
CS- <CODE> A0057764
PY- 1973
PD- 197308
PG- 151P.
CN- DA PROJ. 1T0-61101-A-91A; DA PROJ. 1F2-63207-DB-97
RN- AD-767222; ECOM-4140
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7404
AB- The effects of CH-47 (CHINOOK) helicopter noise on the aviator's hearing and on communication system intelligibility are serious ones. The effort described by this report is aimed at reducing the sound pressure levels at the aviator's ears while maintaining high intelligibility and quality in the communication system. The overall problem is first defined. The noise levels inside all areas of the CH-47 were found to exceed the hearing damage risk criteria set forth by the Surgeon General. Even with hearing protectors, the aviator is limited to the time he may fly without undue risk to his hearing. The electrical characteristics of the communication system were determined. Non-linear frequency responses of the microphone and earcup were detected. These resonances cause emphasis of those frequencies in which the ear is most sensitive. The poor noise cancelling ability of the M-87 microphone at high frequencies cause low signal to noise ratios in the communication system. An intelligibility vs. in-ear dBA level study was run to evaluate the potential success of an ideal perfect noise cancelling microphone and other microphone modifications. (DTIC)
SF- DTIC
DE- <MAJOR> *ACOUSTIC PROPERTIES; *AIRCRAFT NOISE; *CH-47 HELICOPTER; *NOISE INTENSITY
DE- EAR PROTECTORS; HUMAN FACTORS ENGINEERING; PHYSIOLOGICAL EFFECTS; VOICE COMMUNICATION
SH- <COSATI> 20A Acoustics
SH- 6523 Physics, General (1965-74)

AN- <DIALOG> 00721832
AN- <AEROSPACE> N74-10930
TI- Orientation-error accidents in regular Army aircraft during fiscal year 1970: Relative incidence and cost
AU- NIVEN, J. I.; HIXSON, W. C.; SPEZIA, E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.

CS- <CODE> NN881427
PY- 1973
PD- 197308
PG- 47P.
NT- Prepared in cooperation with Army Aeromedical Res. Lab.
CN- MF51524005
RN- AD-767028; NAMRL-1188; USAARL-74-3
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7402
AB- The report is the fourth in a series of dealing with the pilot disorientation/vertigo accident problem in Army fixed wing and rotary wing flight operations. Incidence and cost data presented for fiscal year 1970 include a total of 81 major and minor orientation-error accidents (25 of which were fatal), resulting in 80 fatalities, 104 nonfatal injuries, and an over-all aircraft damage cost of $19,355,689. The contribution of rotary wing accidents to this total was 75 accidents (24 of which were fatal), resulting in 79 fatalities, 98 nonfatal injuries, and over-all aircraft damage cost of $17,060,490. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *MILITARY AIRCRAFT; *MILITARY HELICOPTERS; *PILOT PERFORMANCE
DE- AIRCRAFT ACCIDENT INVESTIGATION; FAILURE ANALYSIS; MALFUNCTIONS
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00721148
AN- <AEROSPACE> N74-10229
TI- Transportability
TI- <EXTENSION> of military equipment
CS- Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
CS- <CODE> A2870159
PY- 1973
PD- 197302
PG- 74P.
RN- AD-765456; TOP-1-2-500
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7401
AB- The report describes a method for evaluation of military equipment transportability characteristics; discusses preliminary activities, facilities, and equipment required; and provides procedures for lifting and tiedown attachments; rail, highway, and marine transportability; terminals handling and movement; air portability, fixed and rotary wing, internal and external carried, to include airdropped materiel, shock, vibration, safety, human factors, and maintenance evaluation. Appendixes provide railway landing procedures, highway vehicle and load limits, marine transport environmental factors and characteristics, aircraft capacities, shock and vibration environments during transport by rail, sea, and air. The method is applicable to equipment whether towed, self-propelled, or moved by carrier over highway, cross-country, railway, waterway, or air. (Author (GRA))
SF- DTIC
DE- <MAJOR> *COMMUNICATION EQUIPMENT; *ELECTRONIC EQUIPMENT; *MILITARY TECHNOLOGY; *TRANSPORTATION
DE- AIR TRANSPORTATION; CARGO SHIPS; RAIL TRANSPORTATION
SH- <COSATI> 9C Lasers and Masers
SH- 6510 Electronics (1965-74)

AN- <DIALOG> 00718529
AN- <AEROSPACE> A75-45424
TI- The 'Lynx' - Into the 80's
TI- <EXTENSION> hingeless rotor helicopter design
AU- BERRINGTON, D. (Westland Helicopters, Ltd., Yeovil, Somerset., England)
SO- Aircraft Engineering, vol. 47, Sept. 1975, p. 4-8.
PY- 1975
PD- 197509
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7523
AB- The basic Lynx design is characterized by high reliability, ease of maintenance, and adaptability to meet a variety of requirements in the

8,000 to 10,000 lb. weight range. The number of moving parts in the 'soft' hingeless rotor is much smaller than in the traditional articulated rotor, and the use of conformal gearing in the final drive stage of the main gearbox has greatly reduced the number of gears and bearings from the number present in a conventional epicyclic arrangement. Details on the Automatic Flight Control System, navigation system, and brakes are given. Modifications of the oleo design and instrumentation to meet special purposes are described, and performance and handling specifications are presented. Special production techniques for the cabin roof, rotor hubs, and rotor blades are outlined. (C.K.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT SPECIFICATIONS; *HELICOPTER DESIGN; *MILITARY HELICOPTERS; *RIGID ROTOR HELICOPTERS; *WESTLAND AIRCRAFT
DE- HELICOPTER CONTROL; HELICOPTER PERFORMANCE; HELICOPTER PROPELLER DRIVE; ROTARY WINGS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00716654
AN- <AEROSPACE> A75-43549
TI- Suggestions for modernizing a helicopter cockpit
TI- <ORIGINAL> Propozycje unowoczesnienia ukladu kabiny smiglowca
AU- WIELGUS, S. (Instytut Lotnictwa, Warsaw, Poland)
SO- Technika Lotnicza i Astronautyczna, vol. 30, July-Aug. 1975, p. 29-32. In Polish.
PY- 1975
PD- 197508
LA- Polish
GL- Poland
CP- Poland
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7521
AB- A first-generation helicopter cockpit is described, and means of modernizing its layout (such as shifting the pilot seat from the traditional left side to the right side) are studied. A number of instruments (such as an automatic flight control system and a VOR/ILS radio navigation system) that should be introduced in future helicopters are noted. (V.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPITS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- AUTOMATIC FLIGHT CONTROL; INSTRUMENT LANDING SYSTEMS; RADIO NAVIGATION; SEATS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00713989
AN- <AEROSPACE> A75-40884
TI- Air cycle air conditioning of turbine powered helicopters
AU- BUSS, L. B.; DAUER, A. J. (AiResearch Manufacturing Company of California, Torrance, Calif.)
SO- ASME, SAE, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Francisco, Calif., July 21-24, 1975, ASME9 p.
PY- 1975
PD- 197507
RN- ASME PAPER 75-ENAS-20
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7520
AB- The first aircraft to use air cycle air conditioning was the Lockheed F-80 and now nearly all turbine powered fixed wing aircraft use this type of system. The Bell Huey Cobra helicopter was the first production helicopter to be fitted with air cycle air conditioning and since then over a dozen other helicopter models have utilized air cycle air conditioning systems. The paper discusses the various types of air cycle systems and how, through ventilation, humidity control, heating and cooling, they can convert the turbine powered helicopter 'greenhouse' into a very comfortable environment in which to fly. ((Author))
DE- <MAJOR> *AIR CONDITIONING; *COOLING SYSTEMS; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING
DE- AMBIENT TEMPERATURE; CABIN ATMOSPHERES; DESIGN ANALYSIS; HUMIDITY; TEMPERATURE CONTROL; THERMAL COMFORT; TURBINE ENGINES; VENTILATION
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00712640

AN- <AEROSPACE> A75-39535
TI- The United States Naval Test Pilot School
AU- JOHNSON, R. A. (U.S. Naval Test Pilot School, Patuxent River, Md.)
SO- American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Los Angeles, Calif., Aug. 4-7, 1975, 7 p.
PY- 1975
PD- 197508
RN- AIAA PAPER 75-1048
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7519
AB- Information concerning the United States Naval Test Pilot School, its academic curriculum and flight syllabus including the school aircraft and their uses are discussed. The student spends half of each working day in the classroom studying aero-thermodynamics, dynamic and static stability, aircraft and engine performance, and other related aeronautical engineering subjects. A complete list of courses is presented. The remainder of the day is devoted to the flight phase and includes planning, flying, and writing reports of test flights in a complete spectrum of aircraft. Both fixed-wing and rotary-wing syllabi consist of approximately 65 flights including participation in appropriate flights in performance and flying qualities, comprehensive flight evaluations of radar, fire control, bombing, navigation, and ASW systems. The selection of students, prerequisites for admission, and the flight test instrumentation are described. (M.G.)
SF- AIAA
DE- <MAJOR> *MILITARY AVIATION; *PILOT TRAINING; *SCHOOLS; *TEST PILOTS
DE- EDUCATION; FLIGHT TESTS; FLIGHT TRAINING; HELICOPTER CONTROL; TRANSFER OF TRAINING
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00702685
AN- <AEROSPACE> A75-29580
TI- Disorientation phenomena in naval helicopter pilots
AU- TORMES, F. R.; GUEDRY, F. E., JR. (U.S. Naval Aerospace Medical Research Laboratory, Pensacola, Fla.)
SO- Aviation, Space, and Environmental Medicine, vol. 46, Apr. 1975, Section 1, p. 387-393.
PY- 1975
PD- 197504
RF- 13
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7513
AB- A study is conducted of the flight conditions in which disorientation is most likely to occur during shipboard helicopter operations. It is found that a high percentage of naval aviators experience disorientation while in low-altitude hovers at sea in IFR conditions, and at night. Factors which contribute to disorientation include relative motion illusions and somatic sensations while in the hover configuration. Disorientation problems occur also frequently during approaches and takeoffs from aviation ships at night. (G.R.)
SF- AIAA
DE- <MAJOR> *DISORIENTATION; *FLIGHT CONDITIONS; *MOTION PERCEPTION; *MOTION SICKNESS; *PILOT PERFORMANCE
DE- AIRCRAFT CONTROL; AIRCRAFT STABILITY; INSTRUMENT FLIGHT RULES; MILITARY HELICOPTERS; NAVY
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00701870
AN- <AEROSPACE> A75-28765
TI- International Aerospace Instrumentation Symposium, 8th, Cranfield, Beds., England, Mar. 24-27, 1975, Proceedings
SO- Symposium sponsored by the Cranfield Institute of Technology, RAeS, ISA, and Institute of Measurement and Control. London, Royal Aeronautical Society, 1975. 479 p
PY- 1975
PD- 197500
LA- English
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA7512
AB- Recent progress in several areas of aerospace instrumentation technology is investigated. These areas comprise transducers, aviation and space flight testing, telemetry, avionic equipment and navigational aids, tape recorders, and data analysis and computers. Topics treated include developments in the supersonic stagnation pressure probe, a miniature 32-channel self-contained digital data system, measurement of

a helicopter crewman's low-level target acquisition performance, a wide-bandwidth optical telemetry link for ground testing of equipment in high EMI environments, optimum redundancy for engine management and control, the development of a serial PCM instrumentation system, and the benefits of real-time computer analysis of experimental aircraft flight test data. Individual items are announced in this issue. (S.J.M.)
SF- AIAA
DE- <MAJOR> *AIRBORNE EQUIPMENT; *CONFERENCES; *DATA SYSTEMS; *FLIGHT TEST INSTRUMENTS; *NAVIGATION AIDS; *RECORDING INSTRUMENTS
DE- CONTROL EQUIPMENT; DATA ACQUISITION; DATA PROCESSING EQUIPMENT; ENGINE MONITORING INSTRUMENTS; IN-FLIGHT MONITORING; LANDING INSTRUMENTS; NAVIGATION INSTRUMENTS; TAPE RECORDERS; TELEMETRY; TRANSDUCERS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00698175
AN- <AEROSPACE> A75-25070
TI- Pilot control/display factors for helicopters /PIFAX-H/
AU- SAMS, D. D.; WEBB, E. G., JR. (USAF, Instrument Flight Center, Randolph AFB, Tex.)
SO- In: Survival and Flight Equipment Association, Annual Conference and Trade Exhibit, 12th, Las Vegas, Nev., September 8-12, 1974, Proceedings. (A75-25051 10-05) Canoga Park, Calif., Survival and Flight Equipment Association, 1975, p. 109-113.
PY- 1975
PD- 197500
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7510
AB- A three-phase program for pilot control/display factors of helicopters is developed to investigate the full instrument potential of the helicopter and then improve the instrument flight capabilities within the helicopter operational mission environment. The study of Phase I baseline flying revealed the capabilities and deficiencies within the standard helicopter control-display system. The baseline study helped establish an initial configuration of refined controls and displays. Phase II is being conducted to evaluate individually each feature of the new controls and displays with the aim of reducing pilot workload and enhance performance efficiency. (S.D.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *HELICOPTER CONTROL; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- ATTITUDE INDICATORS; AVIONICS; FLIGHT CONTROL
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00698160
AN- <AEROSPACE> A75-25055
TI- A crashworthy armored helicopter crew seat
AU- SCHULMAN, M. (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.); SABO, D. (U.S. Army, Aviation Systems Command, St. Louis, Mo.)
SO- In: Survival and Flight Equipment Association, Annual Conference and Trade Exhibit, 12th, Las Vegas, Nev., September 8-12, 1974, Proceedings. (A75-25051 10-05) Canoga Park, Calif., Survival and Flight Equipment Association, 1975, p. 15-18.
PY- 1975
PD- 197500
RF- 5
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7510
AB- A crashworthy armored pilot/copilot seat has been developed that uses a system of energy attenuators to dissipate crash energy. It has been thoroughly tested under crash conditions. Installation into a test bed aircraft and flight testing have been completed. Progress is under way to retrofit the system into two helicopter series. It has also been selected as the seating system for the model 214A helicopter. Design philosophy and testing results are discussed. (S.J.M.)
SF- AIAA
DE- <MAJOR> *CRASH INJURIES; *ENERGY ABSORPTION; *HELICOPTER PERFORMANCE; *SEATS
DE- DESIGN ANALYSIS; PILOT PERFORMANCE; SHOCK ABSORBERS; SURVIVAL EQUIPMENT ; TEST EQUIPMENT
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00692795
AN- <AEROSPACE> A75-19690
TI- Control-display-stability-augmentation system
TI- <EXTENSION> for low visibility helicopter maneuvers
AU- ROLEK, E. P. (Systems Research Laboratories, Inc., Dayton, Ohio)
SO- In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. (A75-19676 07-54) Santa Monica, Calif., Human Factors Society, 1974, p. 255-258.
PY- 1974
PD- 197400
CN- F33615-72-C-1064
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7507
AB- Helicopters cannot currently use their unique capabilities under low or zero visibility conditions because they lack the necessary avionics. Rather than pursuing a fully automatic system, several systems (e.g., 3 axis flight director) were developed which were almost totally under manual control. This study used objective and subjective data to evaluate these systems under simulated zero visibility conditions for cruise and approach flight profiles. The data indicated that for almost all cases these systems increased performance and decreased workload when compared to using situation-only displays. ((Author))
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *HELICOPTER CONTROL; *LOW VISIBILITY; *MAN MACHINE SYSTEMS; *MANUAL CONTROL
DE- APPROACH CONTROL; AVIONICS; CRUISING FLIGHT; PILOT PERFORMANCE; SYSTEMS ANALYSIS
SH- 7506 Aircraft Instrumentation (1975-)

AN- <DIALOG> 00692794
AN- <AEROSPACE> A75-19689
TI- Navigation and flight proficiency under Nap of the Earth conditions as a function of aviator training and experience
TI- <EXTENSION> treetop helicopter flight
AU- FINEBERG, M. L. (U.S. Army, Army Research Institute for the Behavioral and Social Sciences, Washington, D.C.)
SO- In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. (A75-19676 07-54) Santa Monica, Calif., Human Factors Society, 1974, p. 249-254.
PY- 1974
PD- 197400
RF- 7
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7507
AB- Nap-of-the-Earth (NOE) flight involves a flight at treetop level and below. The new tactic uses existing terrain features to mask the aircraft from enemy radar and optical detection. It is pointed out that the introduction of NOE tactics presents special difficulties to Army rotary wing aviators, particularly in navigation. These difficulties are to be overcome by appropriate NOE training. In connection with this objective an investigation was conducted involving 14 helicopter pilots who had completed a preliminary course of instruction in NOE flight. (G.R.)
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *HELICOPTER PERFORMANCE; *MISSION PLANNING; *PILOT PERFORMANCE; *TERRAIN FOLLOWING AIRCRAFT
DE- AIRCRAFT CONTROL; EXPERIMENT DESIGN; PILOT TRAINING; TARGET ACQUISITION ; TERRAIN ANALYSIS
SH- 7553 Behavioral Science (1975-)

AN- <DIALOG> 00692781
AN- <AEROSPACE> A75-19676
TI- Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974, Proceedings
AU- SAENGER, E. L., (ED.); KIRKPATRICK, M., III (Essex Corp., Huntsville, Ala.)
SO- Santa Monica, Calif., Human Factors Society, 1974. 657 p.
PY- 1974
PD- 197400
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA7507
AB- Topics discussed include the use of aircraft simulators in man-machine interface research and crew training, a new methodological technique for measuring individual differences in basic attention capabilities, the disturbed-attitude tracking performance of experienced pilots using a frequency-separated display, the use of pattern and motion cues for

the enhancement of detection rates in a visual search for linear target patterns embedded in static noise, the effect of scene rotation on the target acquisition performance of an airborne observer, the development of boarding-gate and in-flight defenses against aircraft hijacking, a model for predicting an individual's cardiac response to a series of fixed-intensity tasks, an evaluation of the efficiency of manually controlled helicopter control-display systems, an integrated control and display station configuration concept for operating a remote teleoperator spacecraft, the use of spectral power density shifts on electromyograms to measure muscle fatigue, and a description of the simultaneous paths of movement of a large number of body landmarks of a pilot performing upper-limb motions. Individual items are announced in this issue. (A.B.K.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS
DE- ANTHROPOMETRY; AUTOMOBILES; COMPUTER TECHNIQUES; DISPLAY DEVICES; EMPLOYEE RELATIONS; EXTRAVEHICULAR ACTIVITY; HUMAN REACTIONS; MEDICAL SERVICES; PILOT TRAINING; SAFETY MANAGEMENT; TARGET ACQUISITION; URBAN TRANSPORTATION; VISUAL TASKS
SH- 7554 Man/System Technology & Life Support (1975-)

AN- <DIALOG> 00688278
AN- <AEROSPACE> A75-15173
TI- Practical aerodynamics of the Ka-26 helicopter
TI- <ORIGINAL> Prakticheskaia aerodinamika vertoleta Ka-26
TI- <EXTENSION> Russian book
AU- LALETIN, K. N.
SO- Moscow, Izdatel'stvo Transport, 1974. 192 p. In Russian.
PY- 1974
PD- 197400
RF- 18
LA- Russian
CP- U.S.S.R.
DT- BOOK
JA- IAA7504
AB- The present work sets forth the aerodynamic basis of the lifting rotor, balancing, stability, and controllability of the Ka-26 helicopter in steady and nonsteady flight regime. Special attention is given to description of physical processes taking place during operation of the aircraft in various flight regimes and to characteristics of piloting the helicopter. Special aspects of the aerodynamics of coaxial helicopters are studied. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AERODYNAMIC STABILITY; *FLIGHT CHARACTERISTICS; *HELICOPTER CONTROL; *LIFTING ROTORS
DE- AIRCRAFT STABILITY; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; ROTOR AERODYNAMICS
SH- 7505 Aircraft Design, Testing & Performance (1975-)

AN- <DIALOG> 00687184
AN- <AEROSPACE> A75-14079
TI- Additional heart rate - An indicator of psychological activation
AU- BLIX, A. S. (Royal Norwegian Air Force, Blindern, Oslo, Norway); STROMME, S. B. (Norwegian College of Physical Education and Sport, Oslo, Norway); URSIN, H. (Bergen, Universitetet, Bergen, Norway)
SO- Aerospace Medicine, vol. 45, Nov. 1974, p. 1219-1222.
PY- 1974
PD- 197411
RF- 21
LA- English
GL- Norway
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7503
AB- Heart rate and oxygen consumption of helicopter and transport aircraft pilots were measured. During flight operations, the heart rate accelerated without a corresponding increase in oxygen consumption. This heart rate increase beyond that expected from the oxygen uptake - i.e., additional heart rate - is therefore used as an indicator of psychological activation. This activation did not depend only on the actual task, but also on the experience level of the pilot himself. The levels of heart rate (and blood pressure) recorded indicate that even routine missions may impose a hazard to pilots with unmanifested or latent heart failure. This obviously calls for frequent workload-ECG examinations of flying personnel. ((Author))
DE- <MAJOR> *HEART RATE; *OXYGEN CONSUMPTION; *PILOT PERFORMANCE; *PSYCHOPHYSIOLOGY
DE- BLOOD PRESSURE; C-130 AIRCRAFT; FLIGHT FITNESS; HEART DISEASES; HELICOPTERS; PHYSICAL WORK; TASK COMPLEXITY

SH- 7552 Aerospace Medicine (1975-)

AN- <DIALOG> 00679548
AN- <AEROSPACE> A74-43210
TI- Control system considerations for helicopter gas turbines
AU- FOULDS, A. B. (Hawker Siddeley Dynamics Engineering, Ltd., Hatfield, Herts., England)
SO- In: Symposium on the Application of Electrical Control to Aircraft Propulsion Systems, London, England, February 20, 21, 1974, Proceedings. (A74-43201 22-28) London, Royal Aeronautical Society, 1974. 21 p.
PY- 1974
PD- 197400
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA7422
AB- The present work describes the main characteristics of existing control systems of gas turbine engines for helicopter applications, and indicates how advances in technology are likely to influence future designs. The universal trend in recent years has been to adopt electronics for the computing functions of the control while retaining the hydromechanical elements in their simplest form for the essential fuel handling role. Engine-mounting of controls gives very distinct advantages. Digital techniques in the future will be used principally to improve integrity and interfacing functions such as display, self-test, and health monitoring for the propulsion system. (P.T.H.)
SF- AIAA
DE- <MAJOR> *ELECTRONIC CONTROL; *ENGINE CONTROL; *GAS TURBINE ENGINES; *HELICOPTER ENGINES; *PROPULSION SYSTEM CONFIGURATIONS
DE- ELECTRIC CONTROL; ENGINE DESIGN; FUEL CONTROL; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; SELF TESTS
SH- 6528 Propulsion Systems (1965-74)

AN- <DIALOG> 00679253
AN- <AEROSPACE> A74-42915
TI- Modular liquid-cooled helmet liner for thermal comfort
AU- WILLIAMS, B. A.; SHITZER, A. (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif.)
SO- Aerospace Medicine, vol. 45, Sept. 1974, p. 1030-1036.
PY- 1974
PD- 197409
RF- 19
CN- NAS2-6650
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7422
AB- A modular liquid-cooled helmet liner made of eight form-fitting neoprene patches was constructed. The liner was integrated into the sweatband of an Army SPH-4 helicopter aircrew helmet. This assembly was tested on four subjects seated in a hot (47 C), humid (40%) environment. Results indicate a marked reduction in the rate of increase of physiological body functions. Rectal temperature, weight loss, heart rate, and strain indices are all reduced to approximately 50% of uncooled levels. The cooling liner removed from 10% to 30% of total metabolic heat produced. This study also demonstrated the technical feasilibity of using a cooling liner in conjunction with a standard hard helmet. Potential applications of the cooling liner in thermally stressful environments are numerous, notably for helicopter and other aircrews. ((Author))
DE- <MAJOR> *HELMETS; *HUMAN FACTORS ENGINEERING; *LIQUID COOLING; *PHYSIOLOGICAL EFFECTS; *THERMAL COMFORT
DE- BODY TEMPERATURE; HEART RATE; HEAT MEASUREMENT; HUMIDITY; HYPERTHERMIA; SKIN TEMPERATURE (BIOLOGY)
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00675320
AN- <AEROSPACE> A74-38982
TI- A controller for a computer-controlled vehicle
TI- <EXTENSION> helicopter flight optimization
AU- LIPPAY, A. L.; VAIDYA, V. (CAE Electronics, Ltd., St. Laurant, Quebec, Canada)
SO- In: Canadian Conference on Automatic Control, Fredericton, Canada, September 24, 25, 1973, Preprints. (A74-38977 19-10) Fredericton, Canada, D. P. Atherton, University of New Brunswick, 1974, p. 10.4-1 to 10.4-17.
PY- 1974
PD- 197400

LA- English
GL- Canada
CP- Canada
DT- CONFERENCE PAPER
JA- IAA7419
AB- Discussion of human engineering and system development experience gathered in a novel helicopter flight control mechanization project using triply redundant on-board digital computers and a fly-by-wire system. A digital filter is described in some detail as an example of software methods used to interface the manual inputs to the flight control complex and to improve the aircraft response to pilot commands. Some problem areas requiring further effort and optimization are identified. (T.M.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *FLIGHT OPTIMIZATION; *FLY BY WIRE CONTROL; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *NUMERICAL CONTROL
DE- COMPUTER PROGRAMS; COMPUTER TECHNIQUES; DIGITAL COMPUTERS; FLIGHT CONTROL; ONBOARD EQUIPMENT; OPTIMAL CONTROL; SYSTEM EFFECTIVENESS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00675053
AN- <AEROSPACE> A74-38715
TI- U.S. Army helicopter icing qualification program
AU- LEWIS, R. B., II (U.S. Army, Aviation Engineering Flight Activity, Edwards AFB, Calif.)
SO- American Institute of Aeronautics and Astronautics, Aircraft Design, Flight Test and Operations Meeting, 6th, Los Angeles, Calif., Aug. 12-14, 1974, 8 p.
PY- 1974
PD- 197408
RF- 17
RN- AIAA PAPER 74-942
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7419
AB- A series of simulated and natural icing tests have been conducted to determine the capability of Army helicopters to operate in icing conditions. A helicopter icing simulation system, instrumentation, and experimental procedures have been developed to quantify icing effects on engine and vehicle performance, handling qualities, and structural vibrations. Test findings on UH-1H, AH-1G, and CH-47C helicopters include increased level flight power requirements, reduced autorotational capability, asymmetric main rotor ice shedding causing severe vibration, damage to engines and rotor blades from shed ice, and identification of inadequate components, including windshields and antennas. Future efforts include qualification testing of other Army helicopters and examination of advanced helicopter ice protection systems. ((Author))
DE- <MAJOR> *DEICERS; *ENVIRONMENT EFFECTS; *HELICOPTER PERFORMANCE; *ICE FORMATION; *LOW TEMPERATURE ENVIRONMENTS; *PERFORMANCE TESTS
DE- AIRCRAFT HAZARDS; ENVIRONMENT SIMULATION; FLIGHT SIMULATION; MILITARY AIRCRAFT; ROTARY WINGS; STRUCTURAL FAILURE; STRUCTURAL VIBRATION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00674337
AN- <AEROSPACE> A74-37999
TI- Manual of the aviation engineer
TI- <ORIGINAL> Spravochrik aviatsionnogo inzhenera
TI- <EXTENSION> Russian book
AU- ALEKSANDROV, V. G.; MYRTSYMOV, V. V.; IVLEV, S. P.; MAIOROV, A. V.; BORSHCHOV, K. V.; KHAIMOVICH, I. A.
SO- Moscow, Izdatel'stvo Transport, 1973. 400 p. In Russian.
PY- 1973
PD- 197300
LA- Russian
CP- U.S.S.R.
DT- BOOK
JA- IAA7418
AB- Questions of practical aerodynamics of aircraft including helicopters are examined, giving attention to basic characteristics of the air, fundamental aerodynamic equations, aircraft parameters, aircraft takeoff and landing operations, and various flight considerations. External loads and the strength of aircraft components are discussed along with safety considerations, operational life, maintenance problems, economical questions, the interchangeability of aircraft components, glider design, aircraft engines, and aspects of aviation instrumentation. (G.R.)

SF- AIAA
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *AERONAUTICAL ENGINEERING;
*AIRCRAFT MAINTENANCE; *AIRCRAFT RELIABILITY; *HELICOPTER PERFORMANCE
DE- AERODYNAMIC LOADS; AIR CURRENTS; AIRBORNE EQUIPMENT; AIRCRAFT LANDING;
AIRCRAFT PARTS; AIRCRAFT SPECIFICATIONS; AVIONICS; FLIGHT CHARACTERISTICS; FLIGHT SAFETY; TABLES (DATA)
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00673845
AN- <AEROSPACE> A74-37507
TI- Hingeless rotor theory and experiment on vibration reduction by periodic variation of conventional controls
AU- SISSINGH, G. J.; DONHAM, R. E. (Lockheed-California Co., Burbank, Calif.)
SO- In: Specialists Meeting on Rotorcraft Dynamics, Moffett Field, Calif., February 13-15, 1974, Proceedings. (A74-37481 18-02) Moffett Field, Calif., NASA Ames Research Center, 1974. 17 p.
PY- 1974
PD- 197400
RF- 12
CN- NAS2-7245
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7418
AB- A preliminary evaluation is made of the concept of vibration reduction by properly selected oscillatory collective and cyclic control applications. The investigations are based on experimental frequency response data covering advance ratios from approximately 0.2 to 0.85. Because there was no instrumentation for the measurement of the pitch and roll vibrations, these values were obtained by properly adding up the flap-bending moments at 3.3 in. Any other quantity representing pitch/roll vibrations can be compensated for in the same fashion. The calculated control inputs required for vibration reduction stay within acceptable limits. For four of the five conditions tested they are smaller than the values used for the frequency response tests. As to be expected, the compensating controls greatly affect the blade loads, i.e., torsion, flap- and chordwise bending. (F.R.L.)
SF- AIAA
DE- <MAJOR> *PERIODIC VARIATIONS; *RIGID ROTORS; *ROTOR AERODYNAMICS;
*ROTOR BLADES; *STRUCTURAL VIBRATION; *VIBRATION DAMPING
DE- FLAPPING; FREQUENCY RESPONSE; HELICOPTER DESIGN; MATHEMATICAL MODELS;
PITCHING MOMENTS; ROLLING MOMENTS
SH- 6532 Structural Mechanics (1965-74)

AN- <DIALOG> 00672964
AN- <AEROSPACE> A74-36626
TI- Helicopter command instrument systems
AU- HATCHER, J. F. (U.S. Army, Flight Standards and Qualification Div., St. Louis, Mo.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 7 p.
PY- 1974
PD- 197405
RF- 5
RN- AHS PREPRINT 822
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- The direct application of fixed wing systems to helicopters has proven inadequate, resulting in a command system designed uniquely for helicopters. The importance of a command instrument system is twofold: (1) the increased emphasis on helicopter IFR flight, and (2) the expanded flight envelope of helicopters in the steep angle approach regime. In both applications, the command instrument system improves flight path accuracy while reducing pilot workload. This enables the maximum utilization of the helicopter in the vertical plane for which it is best suited. (F.R.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COMMAND AND CONTROL; *FLIGHT INSTRUMENTS; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING
DE- APPROACH CONTROL; FIXED WINGS; FLIGHT CONTROL; FLIGHT ENVELOPES; FLIGHT
PATHS; INSTRUMENT FLIGHT RULES; MAN MACHINE SYSTEMS; PILOT PERFORMANCE;
ROTARY WINGS; WORK CAPACITY
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00672963
AN- <AEROSPACE> A74-36625
TI- Visual and manual workload of the helicopter pilot
AU- STROTHER, D. D. (Bell Helicopter Co., Fort Worth, Tex.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 7 p.
PY- 1974
PD- 197405
RN- AHS PREPRINT 821
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- Two facets of the total pilot workload are discussed. The first addresses manipulative workload during single-pilot actual instrument flight in a high-density zone. Data indicate that the helicopter pilot has ample time to perform his required manipulative tasks. The second discusses visual workload and an experimental technique for measuring this load. Data are presented which indicate an interaction of visual workload with altitude. ((Author))
DE- <MAJOR> *AIRCRAFT PILOTS; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *MANUAL CONTROL; *VISUAL TASKS; *WORK CAPACITY
DE- AIRCRAFT MANEUVERS; COCKPITS; DISPLAY DEVICES; HELICOPTER DESIGN; MAN MACHINE SYSTEMS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00672962
AN- <AEROSPACE> A74-36624
TI- Pilot workload during instrument flight
AU- WINN, A. L.; LEWIS, R. B., II (U.S. Army, Edwards AFB, Calif.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 7 p.
PY- 1974
PD- 197405
RF- 10
RN- AHS PREPRINT 820
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- Workload analysis including pilot effort and flight path accuracy software was developed for testing on the OH-6A helicopter. Several approaches were used to obtain pilot effort information from flight control activity. The control activity parameter which indicated the most consistent correlation with pilot opinion was the line integral of control displacement. During the tests, it was determined that a definable trade-off exists between pilot effort and flight path accuracy. It has been possible to show this quantitatively by examining the product of flight path accuracy expressed in terms of standard deviation from the mean and control activity expressed in terms of the line integral of control displacement. This procedure provided good agreement with qualitative pilot ratings for certain flight conditions. (F.R.L.)
SF- AIAA
DE- <MAJOR> *FLIGHT CONTROL; *HUMAN FACTORS ENGINEERING; *INSTRUMENT FLIGHT RULES; *OH-6 HELICOPTER; *PILOT PERFORMANCE; *WORK CAPACITY
DE- COMPUTER TECHNIQUES; FLIGHT CONDITIONS; FLIGHT PATHS; HELICOPTER CONTROL; PILOT ERROR; POSITION ERRORS; STANDARD DEVIATION; TRADEOFFS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00672941
AN- <AEROSPACE> A74-36603
TI- Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations
AU- ODNEAL, B. L. (U.S. Army, Combat Developments Experimentation Command, Fort Ord, Calif.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 9 p.
PY- 1974
PD- 197405
RN- AHS PREPRINT 863
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417

AB- Review of the experiences and findings on man, machine, and operational use gained in exploratory nighttime nap-of-the-earth helicopter flight (i.e., as close to the ground as vegetation and obstacles permit and generally following terrain contours) experiments. The activities discussed include aviator selection and training, psychological and physiological effects, mission planning, map reading and terrain interpretation, aircraft handling, emergency procedures, and man-machine problems. (M.V.E.)
SF- AIAA
DE- <MAJOR> *ATTACK AIRCRAFT; *COMBAT; *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *MILITARY HELICOPTERS; *TERRAIN FOLLOWING AIRCRAFT
DE- FLIGHT CREWS; HUMAN BEHAVIOR; MILITARY TECHNOLOGY; NIGHT; PILOT PERFORMANCE; PILOT TRAINING; WARFARE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00672940
AN- <AEROSPACE> A74-36602
TI- Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task
AU- DICARLO, D. J. (NASA, Langley Research Center, Hampton, Va.); KELLEY, H. L. (U.S. Army, Air Mobility Research and Development Laboratory, Hampton, Va.); SPIVEY, D. L. (U.S. Army, Fort Eustis, Va.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 13 p.
PY- 1974
PD- 197405
RF- 6
RN- AHS PREPRINT 862
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- Helicopter sling-load operations have been limited during hover and low-speed flight by the degree of precision achieved by the pilot/helicopter/sling-load combination. Previous attempts to improve precision have included stabilization of the load and helicopter and the addition of a pilot station directly facing the load. In these tests, use of a closed-circuit TV as a display that would permit sling-load delivery and placement by the forward-facing pilot was evaluated using a CH-54B helicopter. In all, three test cases were documented, which included the following: (1) forward-facing pilot using the TV display, (2) forward-facing pilot using verbal commands from a load-facing observer, and (3) aft-facing pilot using direct visual cues. The results indicate that a comparable level of performance was achieved for each test case; however, an increase in pilot workload was noted when the TV system was used. ((Author))
DE- <MAJOR> *CLOSED CIRCUIT TELEVISION; *DISPLAY DEVICES; *FLIGHT TESTS; *HEAVY LIFT HELICOPTERS; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE
DE- AIRCRAFT STABILITY; ERROR ANALYSIS; LOAD TESTS; TABLES (DATA); TELEVISION SYSTEMS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00672932
AN- <AEROSPACE> A74-36594
TI- Analysis, simulation, and piloted performance of advanced tandem-rotor helicopters in hover
AU- SMITH, R. P. (U.S. Army, Air Mobility Research and Development Laboratory, Fort Eustis, Va.); LYTWYN, R. T.; WHITE, F. (Boeing Vertol Co., Philadelphia, Pa.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 12 p.
PY- 1974
PD- 197405
CN- DAAJ02-72-C-0095
RN- AHS PREPRINT 843
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- In order to explore the potential parameters of possible future tandem-rotor helicopters, which are likely to affect aircraft performance during precise hover missions, four tandem-rotor helicopters, with the gross weight capabilities of 50,000, 80,000, 120,000, and 200,000 lb, were defined parametrically in sufficient detail to permit stability and control evaluation and piloted simulations. Automatic stabilization and hover hold functions were then synthesized for each configuration. Several command systems were

established specifically for the piloted hover hold missions. The hover performance was established analytically, including hover hold capability in turbulence with automatic control functions alone and the piloted hover capability without automatic hold functions. The 50,000-lb configuration was utilized to generate similar performance results with the Northrop Corporation Large Amplitude Simulator/Wide Angle Visual System (LAS/WAVS). The simulator results were then directly compared with the analysis in order to establish the degree of validity of the selected analytical approaches. (F.R.L.)
SF- AIAA
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE; *HOVERING; *PILOT PERFORMANCE; *TANDEM ROTOR HELICOPTERS
DE- HELICOPTER DESIGN; MATHEMATICAL MODELS; OPTIMIZATION; TABLES (DATA)
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00672927
AN- <AEROSPACE> A74-36589
TI- AH-56A /AMCS/ compound helicopter vibration reduction
TI- <EXTENSION> Advanced Mechanical Control System
AU- ANDERSON, W. D.; WOOD, E. R. (Lockheed-California Co., Burbank, Calif.)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 10 p.
PY- 1974
PD- 197405
RF- 6
CN- DAAJ01-73-C-0286
RN- AHS PREPRINT 834
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- Problems encountered during initial flight tests of the Lockheed AH-56A helicopter led to design and development of an advanced mechanical control system. Flight tests of this new control system required reballasting of the helicopter to a configuration different from the basic AH-56A design due to installation of extensive instrumentation in the aircraft, and to the removal of major components of the armament, avionics, and weapon system. In initial flights of this configuration, vibration levels measured at high speeds were found to be totally unacceptable. Analytical and experimental efforts were systematically undertaken to reduce these levels to acceptable values. The methods incorporated to reduce the levels and the effects of various parameters on vibrations of a high-speed compound helicopter are described. Flight variables such as rotor speed, collective blade angle, roll rate, and maneuvering load factor are discussed. ((Author))
DE- <MAJOR> *COMPOUND HELICOPTERS; *FLIGHT TESTS; *H-56 HELICOPTER; *HELICOPTER CONTROL; *LOCKHEED AIRCRAFT; *VIBRATION DAMPING
DE- AIRCRAFT CONFIGURATIONS; CONTROL EQUIPMENT; GYROSCOPIC STABILITY; HELICOPTER DESIGN; RESONANT FREQUENCIES; ROTOR SPEED
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00672922
AN- <AEROSPACE> A74-36584
TI- Controls and displays for helicopter IFR operation - Pilot factor considerations
AU- WINTER, F. J., JR. (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio)
SO- American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, 7 p.
PY- 1974
PD- 197405
RN- AHS PREPRINT 825
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7417
AB- A flight research effort has been established to investigate all aspects of helicopter instrument flight rule (IFR) operations ranging from lift-off, transition to cruise, approach, hover, and landing. The basic purpose is to evaluate recent developments in rotary wing instrument flight capability. These developments center around vehicle controllability through both control/display and stability augmentation systems. The configuration to be first evaluated was designed from the results documented by actual pilot performance during typical rotary wing IFR maneuvers. The maneuver profiles were designed and flown to record pilot activity and aircraft attitude. Several subject pilots flew the designed profiles to establish in what areas improvements were required. Each pilot's performance was then computerized to create a

'mean' value of pilot ability to perform prescribed tasks. The analysis of the data gathered determined in what areas pilot performance could most likely be improved through refined helicopter controls and displays. This configuration is currently being flown in two US Air Force TH-1F helicopters to interface the various avionic systems and establish pilot acceptability prior to operational suitability testing. ((Author))
DE- <MAJOR> *AIRCRAFT MANEUVERS; *DISPLAY DEVICES; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE
DE- AIRCRAFT STABILITY; AVIONICS; FEEDBACK CONTROL; FLIGHT PATHS; FLIGHT TESTS; WORK CAPACITY
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00667087
AN- <AEROSPACE> A74-30749
TI- USAF evaluating helicopter IFR aids
AU- ELSON, B. M.
SO- Aviation Week and Space Technology, vol. 100, May 20, 1974, p. 59-63.
PY- 1974
PD- 197405
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7414
AB- Recent advances in helicopter control, display, and stability augmentation systems are being evaluated by USAF to determine whether they can materially improve pilots' instrument flight capabilities at reasonable cost. One of these systems is a flight director system that includes a three-cue attitude director indicator; another is an automatic flight control system that allows for pilot input without changing the system's control dynamics or control laws. This is accomplished by placing force-sensing devices in the aircraft's controls, thereby coupling the pilot electronically to the flight control system. Also, the main features of a yaw axis augmentation system are described. (P.T.H.)
SF- AIAA
DE- <MAJOR> *AVIONICS; *HELICOPTERS; *INSTRUMENT FLIGHT RULES; *MILITARY TECHNOLOGY
DE- AIRCRAFT EQUIPMENT; AIRCRAFT MANEUVERS; COST EFFECTIVENESS; DISPLAY DEVICES; FLIGHT INSTRUMENTS; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00663597
AN- <AEROSPACE> A74-27259
TI- Helicopter and V/STOL aircraft noise measurement problems
SO- SAE Aerospace Information Report, AIR 1286, Apr. 1973. 5 p.
PY- 1973
PD- 197304
RN- SAE AIR 1286
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7411
AB- The noise signatures of vertical and short takeoff and landing (V/STOL) aircraft can differ substantially from those of conventional takeoff and landing (CTOL) aircraft for which measurement procedures have been standardized. An attempt is made to review the more important factors associated with the measurement of external noise of V/STOL aircraft and to provide general guidance for the acquisition and analysis of such data. Problem areas and instrumentation requirements are discussed. (F.R.L.)
SF- AIAA
DE- <MAJOR> *ACOUSTIC MEASUREMENT; *AIRCRAFT NOISE; *HELICOPTER PERFORMANCE ; *V/STOL AIRCRAFT
DE- DATA ACQUISITION; MEASURING INSTRUMENTS; NOISE SPECTRA; SIGNATURE ANALYSIS; STANDARDS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00662903
AN- <AEROSPACE> A74-26565
TI- The concept of the WG-13
TI- <EXTENSION> small twin engined helicopter for light tactical support
AU- AUSTIN, R. G. (Westland Helicopters, Ltd., Yeovil, Somerset, England)
SO- Aeronautical Journal, vol. 78, Jan. 1974, p. 7-15.
PY- 1974
PD- 197401

LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7411
AB- The WG-3, which was eventually to become the WG-13, was a Westland conception for a small twin-engined helicopter which operated by the Army, could function as a light tactical support. The aircraft was designed to carry ten armed men in addition to the flight crew of two. Questions of aircraft maintenance and reliability are discussed together with the flex hinge rotor system, the improved rotor blade used, attempts to provide a device for measuring the thrust of the rotor, and the merits of the aircraft loading facilities. The developments leading to the design of the WG-13 are reviewed. (G.R.)
SF- AIAA
DE- <MAJOR> *HELICOPTER DESIGN; *HELICOPTER PERFORMANCE; *MILITARY HELICOPTERS; *WESTLAND AIRCRAFT
DE- AIRCRAFT MAINTENANCE; AIRCRAFT RELIABILITY; ARMED FORCES (FOREIGN); HELICOPTER ENGINES; HELICOPTER PROPELLER DRIVE; LIGHT INTRATHEATER TRANSPORT; ROTARY WINGS; SUPPORT SYSTEMS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00650935
AN- <AEROSPACE> A74-14596
TI- Control authority with a flight performance controller
AU- BERGMAN, C. A.; SIVIER, K. R.; ROSCOE, S. N. (Illinois, University, Urbana, Ill.)
SO- In: Human Factors Society, Annual Meeting, 17th, Washington, D.C., October 16-18, 1973, Proceedings. (A74-14585 03-05) Santa Monica, Calif., Human Factors Society, Inc., 1973, p. 240-245. USAF-sponsored research.
PY- 1973
PD- 197300
RF- 10
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7403
AB- Description of a performance control system that provides direct pilot control of vertical speed and bank angle and has been flight tested in a twin-engine, general aviation aircraft. Automatic coordination and lift compensation in turns are provided. The system is FAA-certified for normal category operations under visual flight rules, above 400 feet AGL. (M.V.E.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *AUTOMATIC FLIGHT CONTROL; *PILOT PERFORMANCE; *VISUAL FLIGHT RULES
DE- CERTIFICATION; FLIGHT TESTS; SPEED CONTROL; TURNING FLIGHT; VERTICAL FLIGHT
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00650934
AN- <AEROSPACE> A74-14595
TI- Simulator tests of pilotage error in area navigation with vertical guidance - Effects of descent angle and display scale factor
AU- VANDERKOLK, R. J.; ROSCOE, S. N. (Illinois, University, Urbana, Ill.)
SO- In: Human Factors Society, Annual Meeting, 17th, Washington, D.C., October 16-18, 1973, Proceedings. (A74-14585 03-05) Santa Monica, Calif., Human Factors Society, Inc., 1973, p. 229-239.
PY- 1973
PD- 197300
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7403
AB- Pilotage error in area navigation with vertical guidance was measured in a flight simulation facility for all combinations of four descent angles and four scale factors for the vertical guidance display for each of two pilot groups representing different experience levels. Pilot performance was measured in terms of altitude error, crosstrack error, airspeed error, procedural error, and information processing rate on an independent side task. The results show that altitude tracking errors increase with descent angle and decrease as display scale factor becomes more sensitive. Altitude errors for airline transport pilots were reliably smaller than for commercial instrument pilots for most of the experimental conditions tested. ((Author))
DE- <MAJOR> *AREA NAVIGATION; *DESCENT TRAJECTORIES; *FLIGHT SIMULATION; *PILOT ERROR

DE- AIRSPEED; ANGULAR DISTRIBUTION; ERROR ANALYSIS; VERTICAL DISTRIBUTION;
VERTICAL FLIGHT
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00645977
AN- <AEROSPACE> N73-33565
TI- Construction and validation of decision-theoretic models of low-level piloting and navigational behavior
TI- <SUPPLEMENT> Ph.D. Thesis
TI- <NOTATION OF CONTENT> Utilization of decision and value theory concepts by helicopter pilots to plan attacks
AU- HUTCHERSON, D. C.
CS- Ohio State Univ., Columbus.
CS- <CODE> OM593208
PY- 1973
PD- 197300
PG- 500P.
LA- English
GL- United States
CP- United States
DT- THESIS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> Univ. Microfilms Order No. 73-18907
JA- STAR7324
AB- An attempt was made to determine whether or not decision and value theory concepts can be used as elements of a model to explain the behavior of a military decision maker in the heat of battle, under severe time constraints, and in the face of the enemy. The decision task selected for analysis is that faced by a helicopter pilot in planning a route to be followed during an attack upon a target. The results indicate that considerable variation exists between subjects so that it may be impossible to develop a single route selection model that is completely acceptable to all individuals. However, the decision behavior of a predominant class of decision makers is apparently described to an acceptable degree by the route planning model, if the threat perception model known as Model One is used to measure perceived threat. Unfortunately, the model does not describe decision behavior equally well in all route selection situations. Furthermore, the data collected so far are not sufficient to determine whether or not the model can be used to predict the type of attack a decision maker will conduct in a specific situation. (Dissert. Abstr.)
SF- Dissert. Abstr.
DE- <MAJOR> *DECISION MAKING; *HELICOPTERS; *MILITARY TECHNOLOGY; *PILOT
PERFORMANCE; *TACTICS
DE- DATA ACQUISITION; MATHEMATICAL MODELS; VALUE
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00645400
AN- <AEROSPACE> N73-32985
TI- Design optimization and testing of flight control systems for light helicopters
TI- <ORIGINAL> optimale auslegung und erprobung von flugregelungssystemen fuer leichte hubschrauber
TI- <NOTATION OF CONTENT> Design optimization and testing of flight control systems for light helicopters, applied to BO-105 helicopter
AU- KOENIG, H.
CS- Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany).
CS- <CODE> MT620643
PY- 1972
PD- 197203
NT- In DGLR Flight Control Systems: Requirements and Design Probl. from the Flight Mech. Viewpoint p 145-170 (SEE N73-32978 24-02)
LA- German
GL- Germany
CP- Germany
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7324
AB- Based on the flight dynamic properties of the BO-1-5 helicopter with hingeless rotor, characterized by very good controllability, the influence over several controller concepts was investigated. Flight control systems consisting of a fast controller (with authority limitation of the regulating distance) as attitude stabilizers, and a slow controller as automatic trimmers (with limitation of the regulating speed), were found to be the optimal controller concepts for this type of helicopter. A further optimal concept results from addition of an altitude control, which includes the trimmer system. The investigations and tests have shown that, with relatively little effort, pilot activity can be considerably simplified. (ESRO)
SF- ESA
DE- <MAJOR> *BO-105 HELICOPTER; *FLIGHT CONTROL; *HELICOPTER DESIGN; *LIGHT
HELICOPTERS

DE- AERODYNAMIC BALANCE; AIRCRAFT STABILITY; ATTITUDE STABILITY; AUTOMATIC
PILOTS; FLIGHT ALTITUDE; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00637674
AN- <AEROSPACE> N73-25020
TI- Aerodynamic research progress, including turbine, nozzle, flutter, and instrumentation studies, Volume 2
TI- <SUPPLEMENT> Technical Report, 1959
TI- <NOTATION OF CONTENT> Research projects in theoretical and practical aerodynamics - Vol. 2
CS- Aeronautical Research Council, London (England).
CS- <CODE> AF325015
PU- <PUBLISHER> HMSO
PY- 1971
PD- 197100
PG- 785P.
LA- English
GL- United Kingdom
CP- United Kingdom
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS HMSO L 18
JA- STAR7316
AB- Research projects in theoretical and practical aerodynamics are presented. The subjects discussed are: (1) performance of highly loaded turbine stages, (2) subsonic derivatives for an oscillating wing, (3) pitching moment derivatives for two-dimensional flow at subsonic and supersonic speeds, (4) effects of transonic speed on wing-aileron flutter, (5) effects of wing stiffness and inertia changes on modes and frequencies of model delta wing aircraft, (6) loading of helicopter blades in forward flight, (7) performance of supersonic turbine nozzles, and (8) design of wing-body combinations of low zero-lift drag rise at transonic speeds.
DE- <MAJOR> *AERODYNAMIC CONFIGURATIONS; *AERODYNAMIC LOADS; *FLOW
DISTRIBUTION; *GAS TURBINES; *ROTARY WINGS; *WING PLANFORMS
DE- AERODYNAMIC COEFFICIENTS; AERODYNAMIC INTERFERENCE; FLOW EQUATIONS;
WIND TUNNEL TESTS
SH- 6501 Aerodynamics (1965-74)

AN- <DIALOG> 00636735
AN- <AEROSPACE> N73-24067
TI- In flight escape systems for helicopters should be developed to prevent fatalities
TI- <SUPPLEMENT> Report to the Congress by the Comptroller General of the United States
TI- <NOTATION OF CONTENT> Analysis of escape systems for helicopter flight crews and passengers
AU- STAATS, E. B.
CS- General Accounting Office, Washington, DC.
CS- <CODE> GB268442
PY- 1973
PD- 197306
PG- 33P.
RN- B-177166
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7315
AB- An investigation was conducted to determine the current status of escape systems for helicopter flight crews. The subjects discussed are: (1) need for helicopter in-flight escape systems, (2) development of capsule in-flight escape system, and (3) development of individual in-flight escape system. (Author)
DE- <MAJOR> *ESCAPE SYSTEMS; *FLIGHT CREWS; *HELICOPTERS
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; PRODUCT DEVELOPMENT; SYSTEMS ENGINEERING
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00633750
AN- <AEROSPACE> N73-21013
TI- Greater safety, maintainability, and reliability through improved helicopter flight testing
TI- <NOTATION OF CONTENT> Improvements in military helicopter flight test techniques to provide data for safety, maintainability, and reliability
AU- SWECKER, G. E.
CS- Army Aviation Systems Test Activity, Edwards AFB, CA.
CS- <CODE> AZ161666
PY- 1973

PD- 197302
NT- In AGARD Advanced Rotorcraft, Vol. 1 15 p (SEE N73-21008 12-02)
LA- English
GL- United States
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7312
AB- Date obtained from helicopter flight test programs are presented. Greater safety, maintainability, and reliability are being assured through constantly improved flight testing techniques and the use of state-of-the-art instrumentation, data acquisition, and data reduction equipment. More stringent helicopter performance criteria are placing greater demands on the test agencies to devise new methods and procedures for collecting and analyzing data. Included are such programs as; (1) the AH-1G (Cobra) helicopter and a simplified approach to finding height loss during dive recovery from throttle chops; (2) recommendation of limiting AH-1G tail rotor control; (3) OH-6A g loads experienced at high frequencies during weapons firing; (4) recommended pilot cues to define a safe AH-1G envelope following engine failure; (5) investigation of large sideslip and pitch excursions following throttle chops in the TH-55 helicopter; (6) identification of requirements for AH-1G instrument-flight-rule (IFR) evaluation; (7) results from OH-58 and AH-1G helicopter height-velocity (H-V) (autorotational) testing with discussion of application to operational use; and (9) AH-1G maneuvering limits from return-to-target profiles. Tests conducted with the AH-1G helicopter determined time return-to-target time, height lost during pullout from a dive, and other maneuvering characteristics. The concept of energy maneuverability has been established, and significant data have been added to the literature. (Author)
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *FLIGHT TESTS; *MILITARY HELICOPTERS; *RELIABILITY ANALYSIS
DE- DATA ACQUISITION; FLIGHT PATHS; HELICOPTER PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00630860
AN- <AEROSPACE> N73-18049
TI- Major orientation-error accidents in Regular Army UH-1 aircraft during fiscal year 1969: Accident factors
TI- <NOTATION OF CONTENT> Investigation of correlation between pilot disorientation and UH-1 helicopter accidents
AU- HIXSON, W. C.; NIVEN, J. I.; SPEZIA, E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1972
PD- 197210
PG- 39P.
NT- Prepared in cooperation with Army Aeromed. Res. Lab., Fort Rucker, Ala.
CN- MF51524005
RN- AD-753208; NAMRL-1169; USAARL-73-2
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7309
AB- The report is the third dealing with pilot disorientation/vertigo problem in Regular Army UH-1 helicopter operations. Individual case history data extracted from the USABAAR master aircraft accident files are presented on 44 major orientation-error accidents that occurred in UH-1 aircraft during fiscal year 1969. Summary data listings involving a variety of operational and pilot-related accident factors are presented for each of the cases. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *DISORIENTATION; *PILOT PERFORMANCE; *UH-1 HELICOPTER
DE- ACCIDENT INVESTIGATION; MALFUNCTIONS; STATISTICAL ANALYSIS; VERTIGO
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00627915
AN- <AEROSPACE> N73-15059
TI- Orientation-error accidents in regular Army UH-1 aircraft during fiscal year 1969: Relative incidence and cost
TI- <NOTATION OF CONTENT> Investigation of US Army UH-1 helicopter accidents where orientation errors were contributing factor during fiscal year 1969
AU- HIXSON, W. C.; NIVEN, J. I.; SPEZIA, E.
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1972

PD- 197208
PG- 35P.
RN- AD-749695; NAMRL-1163; USAARL-73-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7306
AB- The report deals with the magnitude of the pilot disorientation/vertigo accident problem in Regular Army UH-1 helicopter operations. Incidence and cost data presented for fiscal year 1969 include a total of 46 major and minor orientation-error accidents (16 of which were fatal), resulting in 39 fatalities, 67 nonfatal injuries, and $8,130,297 aircraft damage. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *DISORIENTATION; *UH-1 HELICOPTER; *VISUAL PERCEPTION
DE- AIRCRAFT ACCIDENT INVESTIGATION; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00626926
AN- <AEROSPACE> N73-14044
TI- A statistical investigation into the development of energy absorber design criteria
TI- <SUPPLEMENT> Final Report
TI- <NOTATION OF CONTENT> Development of statistical technique for determining injury reduction capability of energy absorber equipment
AU- PHILLIPS, N. S.; CARR, R. W.; SCRANTON, R. S.
CS- Beta Industries, Inc., Dayton, OH.
CS- <CODE> BO395133
PY- 1971
PD- 197112
PG- 82P.
CN- N00156-71-C-0669
RN- AD-749333; BII-217-5; NADC-CS-7122
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7305
AB- A Statistical technique for evaluating the injury reduction capability of energy absorbers was developed. Existing statistical data on crash accelerations and man-weight distributions were used as inputs to a MIMIC computer program. A Dynamic Response Index (D.R.I) and stroke length were computed for each acceleration man-weight combination. The joint probability for each acceleration, man-weight, DRI combination was figured. The summation of all such combinations produced a cumulative probability of injury for the specific energy absorber. The waveform of the force deflection curve of the energy absorber was varied to determine the effect on cumulative probability of injury and required stroke length. The results of the program can be used as a guideline in selecting candidate energy absorbers and the technique developed is appropriate for evaluating the absorbers so selected. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *IMPACT LOADS; *LANDING GEAR; *SHOCK ABSORBERS
DE- COMPUTER PROGRAMS; EQUIPMENT SPECIFICATIONS; HUMAN TOLERANCES; STATISTICAL ANALYSIS
SH- <COSATI> 1C Aircraft
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00625587
AN- <AEROSPACE> N73-12686
TI- The Princeton Pennsylvania Army avionics research program
TI- <SUPPLEMENT> Final Report, 1 Sep. 1966 - 30 Jun. 1968
TI- <NOTATION OF CONTENT> Analysis of limitations on helicopter approach and landing during conditions of low visibility
AU- GRAHAM, D.
CS- Princeton Univ., NJ.
CS- <CODE> P3732113
PY- 1972
PD- 197203
PG- 42P.
CN- DA-28-043-AMC-02412(E); DA PROJ. 1Y1-62202-A-219
RN- AD-747732; ECOM-02412-8

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7303
AB- Using the tools of feedback system analysis and simulation a study has been made of the limitations on helicopter approach and landing under conditions of low visibility. It is shown that relatively steep approaches to low decision heights can be made on instruments. Successful loop topologies were identified and considerable improvement over the standard GCA approaches was shown to be possible with a scanning beam system especially if beam rate signals were employed. Errors introduced by turbulence and wind shear were the dominant ones. An automatic approach system could be mechanized using the same signals as the manual approaches which were considered. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT LANDING; *APPROACH CONTROL; *HELICOPTERS; *LOW VISIBILITY; *METEOROLOGICAL PARAMETERS; *PILOT PERFORMANCE
DE- FLIGHT SAFETY; GLIDE PATHS; HELICOPTER CONTROL; INSTRUMENT LANDING SYSTEMS; RADAR APPROACH CONTROL
SH- <COSATI> 17G Navigation & Guidance
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00625411
AN- <AEROSPACE> N73-12508
TI- Design guide for load suspension points, slings, and aircraft hard points
TI- <SUPPLEMENT> Final Report
TI- <NOTATION OF CONTENT> Design criteria for load suspension points, slings, and lifting equipment used on military helicopters
AU- HUEBNER, W. E.
CS- United Aircraft Corp., Stratford, CT. Sikorsky Aircraft Div.
CS- <CODE> UK265625
PY- 1972
PD- 197207
PG- 105P.
CN- DAAJ02-71-C-0016; DA PROJ. 1F1-62203-AA-33
RN- AD-747814; SER-50769; USAAMRDL-TR-72-36
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7303
AB- The design guide provides criteria and procedures to be used for the design of lift points on a piece of Army equipment, the sling system used to suspend material as an external helicopter load, and the aircraft hard points to which the sling is attached. Hardware components designed in accordance with the criteria and procedures in this text in the three design areas listed above will be compatible with each other and with existing and future helicopters. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *FASTENERS; *MATERIALS HANDLING; *MILITARY HELICOPTERS; *WINCHES
DE- EQUIPMENT SPECIFICATIONS; HUMAN FACTORS ENGINEERING; SYSTEMS ENGINEERING
SH- <COSATI> 13I Machinery & Tools
SH- 6515 Machine Elements & Processes (1965-74)

AN- <DIALOG> 00623132
AN- <AEROSPACE> N73-10166
TI- UH-1H job performance tests (VNAF) series TS-1
TI- <NOTATION OF CONTENT> Performance tests to determine proficiency of maintenance personnel in servicing fuel start solenoid in UH-1 helicopter
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 24P.
CN- F33615-70-C-1550
RN- AD-745163
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7301
AB- The TS-1 test is one of a series of 10 advanced type job performance

tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes a test on troubleshooting and repairing a helicopter with a bad fuel start solenoid, procedures for inserting faults for correction, maintenance tasks, an information questionnaire on the technician's experience and training, a test of malfunction in helicopter starting, an instruction manual and guide, a performance evaluation sheet, and a form for recording the test conditions. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HUMAN FACTORS ENGINEERING; *UH-1
HELICOPTER; *VALVES
DE- ELECTRIC EQUIPMENT; FLIGHT SAFETY; SOLENOIDS
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00623108
AN- <AEROSPACE> N73-10141
TI- Motion cue effects on pilot tracking
TI- <NOTATION OF CONTENT> Motion cue effects on pilot manual control tracking task
AU- RINGLAND, R. F.; STAPLEFORD, R. L.
CS- Systems Technology, Inc., Inglewood, CA.
CS- <CODE> S9793228
PY- 1972
PD- 197200
NT- In NASA, Washington 7th Ann. Conf. on Manual Control p 327-338 (SEE N73-10104 01-05)
CN- NAS2-3650; NAS2-5261
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7301
AB- The results of two successive experimental investigations of the effects of motion cues on manual control tracking tasks are reported. The first of these was an IFR single-axis VTOL roll attitude control task. Describing function data show the dominant motion feedback quantity to be angular velocity. The second experimental task was multiaxis, that of precision hovering of a VTOL using separated instrument displays with reduced motion amplitude scaling. Performance data and pilot opinion show angular position to be the dominant cue when simulator linear motion is absent. (Author)
DE- <MAJOR> *COMPENSATORY TRACKING; *MANUAL CONTROL; *MOTION; *PILOT
PERFORMANCE; *SPACE PERCEPTION
DE- ATTITUDE CONTROL; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS;
SENSORY DISCRIMINATION; SENSORY PERCEPTION
SH- <COSATI> 5E Human Factors Engineering
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00623102
AN- <AEROSPACE> N73-10135
TI- A performance measure for manual control systems
TI- <NOTATION OF CONTENT> Phase margin measure for determining human operator control performance in multivariable closed loop system
AU- DUKES, T. A.; SUN, P. B.
CS- Princeton Univ., NJ.
CS- <CODE> P3732113
PY- 1972
PD- 197200
NT- In NASA, Washington 7th Ann. Conf. on Manual Control p 257-263 (SEE N73-10104 01-05)
CN- DA-28-043-AMC-02412(E)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7301
AB- A new performance measure is introduced for multivariable closed loop experiments with a human operator. The essential feature of the phase margin performance measure (PMPM) is that the performance of each control loop can be determined independently, with prescribed disturbance and error levels. A variable filter parameter is used as the PMPM within the loop and it assures a high workload at the same time. There is a straightforward relationship between the PMPM and the inner loop feedback augmentation that can be utilized in trade-off studies. An adjustment scheme that seeks the PMPM automatically is described as employed in a single loop control task. This task applies directly to the experimental study of displays for helicopters and VTOL aircraft. (Author)

DE- <MAJOR> *FEEDBACK CONTROL; *MANUAL CONTROL; *OPERATOR PERFORMANCE;
*PERFORMANCE PREDICTION
DE- HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; OPTIMAL CONTROL; PHASE
CONTROL
SH- <COSATI> 5E Human Factors Engineering
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00623101
AN- <AEROSPACE> N73-10134
TI- Prediction and analysis of human performance in a VTOL hover task
TI- <NOTATION OF CONTENT> Optimal control model for predicting manual VTOL pilot performance in longitudinal hovering tasks
AU- BARON, S.; KLEINMAN, D. L.
CS- Bolt, Beranek, and Newman, Inc., Cambridge, MA.
CS- <CODE> BS628995
PY- 1972
PD- 197200
NT- In NASA, Washington 7th Ann. Conf. on Manual Control p 247-256 (SEE N73-10104 01-05)
CN- NAS12-104
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7301
AB- An optimal control model is used to predict pilot performance in a series of longitudinal hovering tasks. Configurational changes are considered that alter significantly the system response to both control and disturbance inputs. Model predictions of mean-squared performance are compared with measurements obtained in an independent experimental study of the task. In addition, the optimal control model is used to predict describing functions that correspond to the loop closing pilot transfer functions frequently employed in classical multiloop manual control analyses. (Author)
DE- <MAJOR> *HOVERING; *MANUAL CONTROL; *OPTIMAL CONTROL; *PERFORMANCE
PREDICTION; *PILOT PERFORMANCE
DE- DYNAMIC MODELS; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS;
VERTICAL TAKEOFF AIRCRAFT
SH- <COSATI> 5E Human Factors Engineering
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00623069
AN- <AEROSPACE> N73-10102
TI- The incidence of backache among aircrew and groundcrew in the Royal Air Force
TI- <SUPPLEMENT> Technical Report, 1969 - 1970
TI- <NOTATION OF CONTENT> Statistical analysis of occurrence of backache among Royal Air Force flight crews and ground crews to show effects of crew seats on physical comfort
AU- FITZGERALD, J. G.; CROTTY, J.
CS- Flying Personnel Research Committee, London (England).
CS- <CODE> FW375575
PY- 1972
PD- 197202
PG- 45P.
RF- 1
RN- AD-745177; FPRC-1313-REV
LA- English
GL- United Kingdom
CP- United Kingdom
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7301
AB- To determine the incidence of backache in Royal Air Force aircrew a questionnaire-type survey involving two thousand aircrew and groundcrew was carried out in 1969-70. Aircrew showed an incidence significantly higher than that in groundcrew. Among the aircrew group the incidence of backache in pilots was significantly higher than that in navigators and other aircrew combined. Pilots using ejector seats showed a higher incidence than those using static seats; among the latter group helicopter pilots suffer more discomfort than their colleagues using other types of static seats. More than half of the pilots who experience frequent in-flight backache or pain never suffer from backache on the ground. (Author (GRA))
SF- DTIC
DE- <MAJOR> *BACK INJURIES; *FLIGHT CREWS; *GROUND CREWS; *PHYSIOLOGICAL
EFFECTS; *SPINE
DE- EJECTION SEATS; FLIGHT STRESS; HUMAN FACTORS ENGINEERING; STRESS

(PHYSIOLOGY)
SH- <COSATI> 6E Clinical Medicine
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00622989
AN- <AEROSPACE> N73-10019
TI- Helicopter crew/passenger vibration sensitivity -
TI- <NOTATION OF CONTENT> Analysis of helicopter pilot and passenger reaction to vibration environment to determine effects of discrete frequencies and combinations of harmonic frequencies
AU- GABEL, R.; REED, D. A.
CS- Boeing Co., Philadelphia, PA. Vertol Div.
CS- <CODE> BR419320
PY- 1972
PD- 197210
RF- 1
NT- In NASA. Langley Res. Center Symp. on Vehicle Ride Quality p 143-153 (SEE N73-10012 01-02)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7301
AB- Helicopter crew and passenger vibration sensitivity are presented. Pilot subjective ratings are established for discrete frequencies and the impact of combinations of harmonic frequencies is examined. A passenger long term comfort level and a short term limit are defined for discrete frequencies and compared with pilot ratings. The results show reasonable agreement between pilot and passenger. Subjective comfort levels obtained for mixed frequency environments clearly demonstrate the need for a multi-frequency criterion. (Author)
DE- <MAJOR> *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *HUMAN REACTIONS; *VIBRATION EFFECTS; *VIBRATION PERCEPTION
DE- ENVIRONMENTAL TESTS; PHYSIOLOGICAL EFFECTS; PSYCHOLOGICAL EFFECTS
SH- <COSATI> 6S Stress Physiology
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00622985
AN- <AEROSPACE> N73-10015
TI- Ride quality criteria for large commercial helicopters
TI- <NOTATION OF CONTENT> Application of ride-quality criteria to design of commercial helicopters with emphasis on noise and vibration considerations
AU- SCHLEGEL, R. G.; STAVE, A. M.; WOLF, A. A.
CS- United Aircraft Corp., Stratford, CT. Sikorsky Aircraft Div.
CS- <CODE> UK265625
PY- 1972
PD- 197210
NT- In NASA. Langley Res. Center Symp. on Vehicle Ride Quality p 51-66 (SEE N73-10012 01-02)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7301
AB- A review of major ride-quality criteria used in the design of commercial helicopters, some of the limitations of these criteria, research programs conducted to better define these criteria, and some recommended research programs is presented. Primary emphasis is given to the question of noise and vibration criteria for passenger acceptance and comfort. (Author)
DE- <MAJOR> *AERODYNAMIC NOISE; *HELICOPTER DESIGN; *HUMAN FACTORS ENGINEERING; *VIBRATION EFFECTS
DE- COMFORT; PHYSIOLOGICAL EFFECTS; PSYCHOLOGICAL EFFECTS; SAFETY FACTORS
SH- <COSATI> 1A Aerodynamics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00622132
AN- <AEROSPACE> N72-33132
TI- UH-1H job performance tests (VNAF) series SR-2
TI- <NOTATION OF CONTENT> Performance tests to determine proficiency of maintenance personnel in servicing main drive shaft of UH-1 helicoper
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 24P.
CN- F33615-70-C-1550; AF PROJ. 1710
RN- AD-745162
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7224
AB- The SR-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test of main drive shaft servicing, helicopter maintenance tasks, an information sheet on experience and training, a 600-hour servicing test of servicing the main drive shaft, a servicing performance guide, a performance evaluation sheet, and a form for recording test conditions.(DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HELICOPTER PROPELLER DRIVE; *HUMAN PERFORMANCE; *UH-1 HELICOPTER
DE- AIRCRAFT SAFETY; GROUND CREWS; HUMAN FACTORS ENGINEERING
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00622131
AN- <AEROSPACE> N72-33131
TI- UH-1H job performance tests (VNAF) series CO-2
TI- <NOTATION OF CONTENT> Development of job performance tests to determine proficiency of maintenance personnel in troubleshooting and repairing UH-1 helicopter lighting equipment
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 39P.
CN- F33615-70-C-1550; AF PROJ. 1710
RN- AD-745158
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7224
AB- The CO-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test for checking the operation of an aircraft lighting system, procedures for insertion of faults for correction, helicopter maintenance tasks, an information sheet on maintenance experience and training, operational tests of pitot tube heater, panel lights, and interior and exterior lights, a performance guide and operational checklist, a performance evaluation sheet, and a form for recording test administration conditions. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE; *LIGHTING EQUIPMENT; *UH-1 HELICOPTER
DE- AIRCRAFT SAFETY; GROUND CREWS; PHYSICAL WORK
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00622130
AN- <AEROSPACE> N72-33130
TI- UH-1H job performance tests (VNAF) series AD-1
TI- <NOTATION OF CONTENT> Performance tests to determine proficiency of maintenance personnel in servicing power cylinder servo valve on UH-1 helicopter
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 19P.
CN- F33615-70-C-1550; AF PROJ. 1710
RN- AD-745155
LA- MULTIPLE
LA- <NOTE> Partly in ENGLISH and partly in VIETNAMESE
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7224
AB- A series of 10 advanced type job performance tests was developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). The 10 tests were used to evaluate the three types of JPA in use by the VNAF, namely job guidance manuals, maintenance dependency type

troubleshooting aids, and fully proceduralized troubleshooting aids. Series AD-1 covers power cylinder servo value adjustment tests, helicopter maintenance tests, questionnaire on helicopter maintenance experience and training, flight control adjustment test, evaluation of technician's performance, and details of test conditions. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HUMAN PERFORMANCE; *SERVOMECHANISMS; *UH-1 HELICOPTER; *VALVES
DE- AIRCRAFT SAFETY; GROUND CREWS; HUMAN FACTORS ENGINEERING
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00622129
AN- <AEROSPACE> N72-33129
TI- UH-1H job performance tests (VNAF) series AD-2
TI- <NOTATION OF CONTENT> Performance tests to evaluate proficiency of maintenance personnel in trouble shooting and repairing UH-1 helicopter
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 26P.
CN- F33615-70-C-1550; AF PROJ. 1710
RN- AD-745156
LA- MULTIPLE
LA- <NOTE> Partly in ENGLISH and partly in VIETNAMESE
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7224
AB- The AD-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It consists of testing a technician's ability to adjust a misadjusted RPM governor linkage, fault insertion procedures for engine cowlings, helicopter maintenance tasks, an information sheet on experience and training of the technician, RPM governor linkage adjustment tests, test of ability to follow a performance guide, a performance evaluation sheet, and data on test administration conditions. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HUMAN FACTORS ENGINEERING; *HUMAN PERFORMANCE; *UH-1 HELICOPTER
DE- AIRCRAFT SAFETY; GROUND CREWS; PHYSICAL WORK
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00622128
AN- <AEROSPACE> N72-33128
TI- UH-1H job performance tests (VNAF) series CO-1
TI- <NOTATION OF CONTENT> Performance tests to determine proficiency of maintenance personnel in servicing tail rotor of UH-1 helicopter
CS- Matrix Research Co., San Mateo, CA.
CS- <CODE> ML192020
PY- 1971
PD- 197109
PG- 19P.
CN- F33615-70-C-1550; AF PROJ. 1710
RN- AD-745157
LA- MULTIPLE
LA- <NOTE> Partly in ENGLISH and partly in VIETNAMESE
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7224
AB- The CO-1 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test to determine a technician's ability to make an operational check of a tail rotor blade, procedures to insert faults to be corrected, helicopter maintenance tasks, an information sheet on experience and training of the technician, a tail rotor blade operational checking test, a performance evaluation sheet, and a sheet to record the conditions of test administration. (DTIC)
SF- DTIC
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *HELICOPTER PROPELLER DRIVE; *HUMAN PERFORMANCE; *UH-1 HELICOPTER
DE- AIRCRAFT SAFETY; GROUND CREWS; HUMAN FACTORS ENGINEERING

SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00620170
AN- <AEROSPACE> N72-31136
TI- Performance measurement in helicopter training and operations
TI- <NOTATION OF CONTENT> Automated techniques for measuring flight performance of helicopter trainees and pilots
AU- PROPHET, W. W.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1972
PD- 197204
PG- 17P.
NT- Presented at the Am. Psychol. Assoc. 79th ann. meeting, Washington, D. C., Sep. 1971
CN- DAHC19-70-C-0012
RN- AD-743157; HUMRRO-PP-10-72
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7222
AB- For almost 15 years an active research program was conducted on techniques for measuring the flight performance of helicopter trainees and pilots. This program addressed both the elemental aspects of flying (i.e., maneuvers) and the mission- or goal-oriented aspects. A variety of approaches was investigated, with the stress on nonautomated techniques feasible for operational use. The paper describes the work and illustrates its application to and implications for training management, quality control, manpower resources management, and operational capability. Automated human performance monitoring in flight simulators and its implications for automated training is also described. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT TESTS; *HELICOPTERS; *PILOT PERFORMANCE; *PILOT TRAINING
DE- AUTOMATA THEORY; FLIGHT SIMULATORS; MEASURING INSTRUMENTS
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00620166
AN- <AEROSPACE> N72-31132
TI- Transfer of instrument training and the synthetic flight training system
TI- <NOTATION OF CONTENT> Human performance in transfer of instrument flight training with flight simulator
AU- CARO, P. W.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1972
PD- 197203
PG- 12P.
NT- Presented at the Naval Training Device Center and Ind. 5th Conf., Orlando, Fla., Feb. 1972
CN- DAHC19-70-C-0012
RN- AD-743155; HUMRRO-PP-7-72
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7222
AB- One phase of an innovative flight training program, its development, and initial administration is described in this paper. The operational suitability test activities related to a determination of the transfer of instrument training value of the Army's Synthetic Flight Training System (SFTS) Device 2B24. Sixteen active Army members of an Officer Rotary Wing Aviator Course who had completed primary training and 9 Instructor Pilots participated in the study. Instrument training was conducted in the SFTS on a proficiency basis. Aircraft checkrides were administered by independent evaluator personnel. Checkride times and grades showed that much of the training now conducted in aircraft could be conducted more efficiently on the ground. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT SIMULATORS; *FLIGHT TRAINING; *PILOT PERFORMANCE; *TRANSFER OF TRAINING
DE- FLIGHT TESTS; HUMAN PERFORMANCE; MILITARY AVIATION; PILOT TRAINING
SH- <COSATI> 5I Personnel Selection, Training, & Evaluation
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00615955

AN- <AEROSPACE> N72-26828
TI- The dynamic environment of selected military helicopters
TI- <NOTATION OF CONTENT> Dynamic input to cargo from floor of cargo space in selected military helicopters
AU- GENS, M. B.
CS- Sandia National Labs., Albuquerque, NM.
CS- <CODE> SB899064
PY- 1972
PD- 197201
NT- In Shock and Vibration Inform. Center The Shock and Vibration Bull., No. 42, Pt. 1 p 153-161 (SEE N72-26815 17-32)
NT- Supported by AEC
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR7217
AB- A study was conducted to determine the dynamic input to cargo from the floor of the cargo space in the OH-6, UH-1, CH-46, and CH-47 helicopters. The instrumentation, test procedures, data reduction processes, and results are discussed. The vibration regime for helicopters is shown to consist of a base of Gaussian random excitation with superimposed decaying sinusoids which are associated with rotor activity. (Author)
DE- <MAJOR> *CARGO; *DYNAMIC LOADS; *MILITARY HELICOPTERS; *VIBRATION TESTS
DE- DATA REDUCTION; EXCITATION; MEASURING INSTRUMENTS; NORMAL DENSITY FUNCTIONS; SINE WAVES
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00615219
AN- <AEROSPACE> N72-26086
TI- Secondary task performance of helicopter pilots during low-level flight
TI- <NOTATION OF CONTENT> Pilot performance and reaction time in response to auditory signals during low level helicopter flight
AU- NAGARAJARAO, B. K.; GRIFFIN, M. J.
CS- Southampton Univ. (England). Inst. of Sound and Vibration Research.
CS- <CODE> SS536516
PY- 1971
PD- 197112
PG- 61P.
NT- Sponsored by Min. of Defense
RN- ISVR-TR-54
LA- English
GL- United Kingdom
CP- United Kingdom
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7217
AB- An investigation was made into the changes of pilot performance at a complex reaction time task during low-level helicopter flight. The two-choice task required responses to a continuous and a similar tone pulse 6 Hz pitch repetition frequency. The mean reaction times for eight pilots are tabulated and commented upon. An extensive bibliography is appended. (Author (ESRO))
SF- ESA
DE- <MAJOR> *AUDITORY SIGNALS; *HELICOPTERS; *PILOT PERFORMANCE; *REACTION TIME
DE- BIBLIOGRAPHIES; HUMAN FACTORS ENGINEERING; LOW ALTITUDE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00614210
AN- <AEROSPACE> N72-25034
TI- Orientation error accidents in Army aviation aircraft
TI- <NOTATION OF CONTENT> Analysis of military aircraft accidents caused by spatial disorientation
AU- HIXSON, W. C.; NIVEN, J. I.; SPEZIA, E. (Army Board for Aviation Accident Res.)
CS- Naval Aerospace Medical Research Lab., Pensacola, FL.
CS- <CODE> NN881427
PY- 1972
PD- 197203
NT- In AGARD The Disorientation Incident, Part 1 16 p (SEE N72-25031 16-04)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7216
AB- To initiate the action necessary to establish the magnitude of the

orientation-error problem in Army aviation, an interservice research program was organized under the joint sponsorship of the U. S. Army Aeromedical Research Laboratory, the U. S. Army Board for Aviation Accident Research, and the Naval Aerospace Medical Research Laboratory. The first step was the construction of an operational definition of an orientation-error accident. The assimilation of data pertaining to the incidence and cause of such accidents and their actual and relative costs in terms of fatalities, injuries, and aircraft damage was then set as the working objective of the program. Accordingly, the decision was made to implement a five-year longitudinal study of all major and minor orientation-error accidents involving Army aviation flight operations beginning with July 1966. Incidence and cost data are presented for all Army aviation major and minor orientation-error accidents detected in the search of the accident files for the period July 1966 to July 1967. Separate and totalized statistical data are provided for fixed wing and rotary wing aircraft as well as for accidents occurring in Vietnam and those occurring elsewhere. (Author)
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *DISORIENTATION; *MILITARY AIRCRAFT; *VERTIGO
DE- AIRCRAFT ACCIDENT INVESTIGATION; PILOT PERFORMANCE; STATISTICAL ANALYSIS
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00612239
AN- <AEROSPACE> N72-23041
TI- IFR manual formation flight: Display evaluation and investigation of skill acquisition and system failures
TI- <SUPPLEMENT> Final Technical Report, Jul. 1970 - Jun. 1971
TI- <NOTATION OF CONTENT> Simulation of UH-1 helicopter flight characteristics to evaluate performance of manual formation flight display system
AU- ANDERSON, P. A.; HOLLINGSWORTH, S. R.
CS- Honeywell, Inc., Saint Paul, MN. Systems and Research Center.
CS- <CODE> HY608548
PY- 1972
PD- 197201
PG- 148P.
CN- N00014-66-C-0362; NR PROJ. 213-054
RN- AD-737313; JANAIR-710602; HONEYWELL-12543-FR7
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7214
AB- Man-in-the loop simulations were conducted to evaluate pilot/system performance for the UH-1 helicopter under various experimental conditions. The empirical results indicated that there were no major performance differences between the IHAS and IEVD display formats although the IEVD tended to yield lower position errors and control stick rates; experienced and inexperienced pilots learned the formation-flight task in a relatively short period of time when display augmentation (quickening) was provided; approximately the same level of control precision was acquired by both groups of pilots; position control performance degraded drastically when augmentation was downgraded or removed from the display; the pilots could successfully leave formation with or without command information, but the maneuver was more precise with the commands; and acceptable formation-flight performance was obtained with an electromechanical flight director display system although the simulated collision warning system was not capable of avoiding all collisions. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT SIMULATION; *HELICOPTER PERFORMANCE; *INSTRUMENT FLIGHT RULES; *UH-1 HELICOPTER
DE- DISPLAY DEVICES; MAN MACHINE SYSTEMS; PILOT PERFORMANCE; SYSTEMS ENGINEERING
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00611829
AN- <AEROSPACE> N72-22626
TI- Design implications of a better view of the multichannel capacity of a pilot
TI- <NOTATION OF CONTENT> Prediction and measurement of multichannel pilot performance, and system design implications for pilot capability and limitations
AU- LINDQUIST, O. H.
CS- Honeywell, Inc., Minneapolis, MN. Systems and Research Div.
CS- <CODE> HY260724
PY- 1972
PD- 197202
NT- In AGARD Guidance and Control Displays 6 p (SEE N72-22621 13-21)
LA- English

GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7213
AB- A major result of a recently completed study is the prediction and measurement of multichannel pilot performance, which significantly increases his information-handling capability beyond that predicted by today's techniques. Current techniques of predicting man/machine interactions were shown to be in error by an order of magnitude in some measurements related to human channel capacity. The results of this experimental work are presented and system design implications for pilot capability and limitations are discussed. (Author)
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *MAN MACHINE SYSTEMS;
*PILOT PERFORMANCE
DE- COCKPIT SIMULATORS; CONFERENCES; FLIGHT CONTROL; HELICOPTERS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00611277
AN- <AEROSPACE> N72-22040
TI- Dynamic and crashworthy evaluation of the UH-1B, C, D, H, medical attendant's seat
TI- <NOTATION OF CONTENT> Evaluation of medical attendant seat on UH-1 helicopter and recommendations for improving crashworthy characteristics
AU- BARBER, E. B.; KNAPP, S. C.; TORNQUIST, G. E.; DESJARDINS, S. P.; AGUILAR, F. T.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1972
PD- 197201
PG- 97P.
RN- AD-737197; USAARL-72-07
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7213
AB- The challenge was to evaluate the crashworthiness of the UH-1 medical attendant's seat and investigate the feasibility of modifications to improve the seat and its restraint system. This report is a record of USAARL'S involvement, from researching the background to achieve a proper direction for study, through accident statistics, stress analysis, dynamic test program, reduction of data, interpretation, conclusion and, finally, feasible recommendations. The seat was found to be completely noncrashworthy and a direct contributor of serious injuries to its occupants, mostly to the upper torso and head because of poor occupant restraint. Its construction and manufacture did not meet all of the design criteria of military seat specifications. The dynamic tests of the seat demonstrated that with the addition of an inertia reel, shoulder harness, and attachment of the lap belt to the floor a seat occupant could be satisfactorily restrained despite serious seat failure during a crash. The proposed modifications in kit form will provide the seats occupant with the greatest increase in safety and retention, should crash occur, for the lowest dollar investment and down time required for its installation. (Author (GRA))
DE- <MAJOR> *AIRCRAFT EQUIPMENT; *CRASH INJURIES; *SAFETY FACTORS; *SEATS;
*UH-1 HELICOPTER
DE- EQUIPMENT SPECIFICATIONS; FLIGHT SAFETY; HUMAN FACTORS ENGINEERING
SH- <COSATI> 1C Aircraft
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00610317
AN- <AEROSPACE> N72-20996
TI- US naval test pilot training
TI- <NOTATION OF CONTENT> Organization, operation, and curriculum of U.S. Navy Test Pilot School at Patuxent Naval Air Station, Maryland
AU- SALLADA, R. V.
CS- Naval Air Test Center, Patuxent River, MD.
CS- <CODE> NO894573
PY- 1972
PD- 197202
NT- In AGARD Flight Test Tech. 15 p (SEE N72-20976 12-02)
LA- English
GL- United States
CP- International Organization
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7212

AB- The philosophy of instruction, as it pertains to the education of U.S. Naval engineering test pilots and engineers is discussed. Selection processes, the composition of classes, and detailed scope of both academic and flight (fixed and rotary wing) syllabi are included. The fleet of aircraft is described, along with the use of each particular airplane-type in the curriculum. Also provided is a recent staff reorganization and major plans for the future which will substantially improve the student education and Navy test pilot utilization. (Author)
DE- <MAJOR> *EDUCATION; *FLIGHT TESTS; *PILOT TRAINING; *SCHOOLS
DE- CONFERENCES; PILOT PERFORMANCE; PILOT SELECTION; STUDENTS
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00609794
AN- <AEROSPACE> N72-20437
TI- Stabilization and guidance of vehicles using indicating instruments. Part 2: Above the ground indication and artificial horizon
TI- <ORIGINAL> Stabilisierung und lenkung von fahrzeugen mit hilfe der voranzeige. teil 2: uebergrundanzeige und kuenstlicher horizont
TI- <NOTATION OF CONTENT> Manual stabilization and positioning of hovering VTOL aircraft using indicating instrument and artificial horizon
AU- DEY, D.; JOHANNSEN, G.
CS- Technische Univ., Berlin (Germany). Inst. fuer Flugfuehrung und Luftverkehr.
CS- <CODE> TJ477159
PY- 1971
PD- 197102
PG- 93P.
RN- REPT-61
LA- German
GL- Germany
CP- Germany
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7211
AB- An indicating instrument, the main part of which is the display of an extrapolated trajectory element, has been developed, simulated and investigated for the above-the-ground motion of a VTOL aircraft. The improvements acquired from using this pre-indication are depicted by spectral density and power density functions. The results show that the indicator simplifies manual control of the above-ground motion of a hovering aircraft. In addition, an artificial horizon indicating extrapolated position, has been developed for manual position control of a hovering VTOL aircraft. The results show that the extrapolated horizon line simplifies control, shortens learning time, and augments control quality. (ESRO)
SF- ESA
DE- <MAJOR> *HOVERING STABILITY; *INDICATING INSTRUMENTS; *MANUAL CONTROL;
*VERTICAL TAKEOFF AIRCRAFT
DE- EXTRAPOLATION; FLIGHT SIMULATORS; HORIZON; HUMAN FACTORS ENGINEERING;
MAN MACHINE SYSTEMS; POWER SPECTRA; TRAJECTORY ANALYSIS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00608501
AN- <AEROSPACE> N72-19053
TI- Orientation-error accidents in regular Army aircraft during fiscal year 1968: Relative incidence and cost
TI- <NOTATION OF CONTENT> Analysis of aircraft accidents resulting from pilot disorientation and vertigo during flights on military aircraft and helicopters
AU- NIVEN, J. I.; HIXSON, W. C.; SPEZIA, E.
CS- Naval Aerospace Medical Inst., Pensacola, FL.
CS- <CODE> NN868269
PY- 1971
PD- 197109
PG- 45P.
NT- Prepared in cooperation with Army Aeromed. Res. Lab., Fort Rucker, Ala.
RN- AD-735119; NAMRL-1143; USAARL-72-4
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7210
AB- The report is the second in a longitudinal series of reports dealing with the pilot disorientation/vertigo accident problem in Army fixed wing and rotary wing flight operations. Incidence and cost data presented for fiscal year 1968 include a total of 75 major and minor orientation-error accidents (26 of which were fatal), resulting in 91 fatalities, 75 nonfatal injuries, and an over-all aircraft damage cost of $12,381,805. The contribution of rotary wing accidents to these totals was 66 accidents (21 of which were fatal), resulting in 80 fatalities, 70 nonfatal injuries, and an over-all aircraft damage of

$9,077,065. (Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *MILITARY AIRCRAFT; *PILOT PERFORMANCE;
*VERTIGO
DE- HUMAN FACTORS ENGINEERING; MEDICAL SCIENCE; PHYSIOLOGICAL EFFECTS;
STATISTICAL ANALYSIS
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00608500
AN- <AEROSPACE> N72-19051
TI- IRF steep angle approach: Effects of wind, system data rate, and contingency event variables
TI- <SUPPLEMENT> Final Report, Jul. 1970 - Aug. 1971
TI- <NOTATION OF CONTENT> Simulation of wind, system data rate, and contingency event variables during steep descent of vertical lift aircraft under instrument conditions to determine pilot performance
AU- WOLF, J. D.; BARRETT, M. F.
CS- Honeywell, Inc., Saint Paul, MN. Systems and Research Center.
CS- <CODE> HY608548
PY- 1971
PD- 197112
PG- 266P.
CN- N00014-68-C-0191; NR PROJ. 213-061
RN- AD-734702; HONEYWELL-12571-FR; JANAIR-711105
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7210
AB- The primary objective of the study was to investigate, by means of real-time man-in-the-loop simulation techniques, piloting performance as influenced by wind, system data-rate, and contingency-event variables during IFR steep approaches with vertical-lift aircraft. By also simultaneously evaluating effects of display-format, approach-angle and measurement-noise variables to the extent possible within the scope of each study task, an increased degree of generality of study results was obtained. A variable-velocity simulation of the Bell UH-1 helicopter served as the test vehicle in all study tasks. (
Author (GRA))
SF- DTIC
DE- <MAJOR> *AIRCRAFT LANDING; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE;
*VERTICAL TAKEOFF AIRCRAFT
DE- APPROACH INDICATORS; GLIDE PATHS; INSTRUMENT APPROACH; SIMULATION
SH- <COSATI> 1B Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00606291
AN- <AEROSPACE> N72-16822
TI- Characteristics of gunfire induced vibration in helicopters
TI- <NOTATION OF CONTENT> Vibration measurement of helicopters submitted to machine gun, grenade and rocket launcher fire
AU- THOMAS, C. E.; MCINTOSH, V. C.
CS- Air Force Flight Dynamics Lab., Wright-Patterson AFB, OH.
CS- <CODE> AI058438
PY- 1970
PD- 197012
NT- In Shock and Vibration Inform. Center The Shock and Vibration Bull., No. 41, Pt. 4 p 209-219 (SEE N72-16802 07-32)
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <OTHER> Director, Navy Publ. and Printing Serv. Office, Naval District of Washington, Bldg. 157-2, Washington Navy Yard, Washington, D. C. 20390
JA- STAR7207
AB- Flight measurements of vibration induced by armament fire on three types of helicopters are described. Instrumentation and data analysis procedures are discussed briefly. Overall vibration levels as a function of distance from the gun muzzles are presented. The increase in vibration levels during gunfire over those encountered in normal flight, and the variation in vibration spectra with rate of gunfire are illustrated. Amplitude probability density curves and oscillograms of acceleration time histories are utilized to indicate the degree of randomness of armament fire vibration in various frequency bands. (
Author)
DE- <MAJOR> *GUN LAUNCHERS; *GUNFIRE; *HELICOPTERS; *ROCKET LAUNCHERS;
*VIBRATION MEASUREMENT

DE- CONFERENCES; PROBABILITY THEORY; VIBRATIONAL SPECTRA
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00604612
AN- <AEROSPACE> N72-15087
TI- Analysis of visual discriminations in helicopter control
TI- <NOTATION OF CONTENT> Human factors engineering to determine visual discrimination of helicopter pilot and effect on helicopter control
AU- THIELGES, J. R.; MATHENY, W. G.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1971
PD- 197106
PG- 163P.
CN- DAHC19-70-C-0012; DA PROJ. 2Q0-62107-A-712
RN- AD-730500; HUMRRO-TR-71-13
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7206
AB- The visual Discrimination Analysis is a method of examining the cue structure of the helicopter pilot's visual environment. It is hypothesized that the critical cue is the relationship between two referents--a fixed internal referent placed on the helicopter windscreen and an external referent located on the ground plane. Cue value is analyzed through the geometric relationships of these referents for the six degrees-of-freedom: pitch, roll, yaw, altitude, range, and latitude. The pilot's ability to detect perturbation will depend upon its magnitude, initial state of the craft, location of the internal and external referents, and his threshold for detecting the relative motion of two points. A mathematical model is used to generate data for a sample analysis of pitch, and the data are graphed to explore referent placements that provide detectable cues. The information density plot is then developed as a means of examining the cue value of an entire field of external referents with respect to one or more internal referents. (Author (GRA))
SF- DTIC
DE- <MAJOR> *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *PILOT PERFORMANCE; *VISUAL PERCEPTION; *VISUAL SIGNALS
DE- FLIGHT CONTROL; MATHEMATICAL MODELS; TRAINING DEVICES; VISUAL ACUITY
SH- <COSATI> 5J Psychology (Individual & Group Behavior)
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00603162
AN- <AEROSPACE> N72-13621
TI- Target detection and identification performance on infrared imagery collected at different altitudes
TI- <SUPPLEMENT> Final Report
TI- <NOTATION OF CONTENT> Tactical target detection and identification performance on displays of downward looking infrared imagery
AU- MAHER, F. A.; PORTERFIELD, J. L. (AMRL)
CS- Bunker-Ramo Corp., Westlake Village, CA. Defense Systems Div.
CS- <CODE> B4508004
SP- AG749748
PU- <PLACE> Wright-Patterson AFB, Ohio
PU- <PUBLISHER> AMRL
PY- 1971
PD- 197105
PG- 27P.
CN- F33615-70-C-1030; AF PROJ. 7184
RN- AD-728243; AMRL-TR-70-127
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7204
AB- The study investigated observer tactical target detection and identification performance on displays of downward looking infrared imagery collected at 500-, 1,000-, and 2,000-foot altitudes. Six male college students were tested individually under all three altitude conditions. To balance out learning effects, a change-over design was used to vary the order of altitude presentations from subject to subject. The different altitude presentations for each subject were spaced a week apart to minimize learning effects. There were 24 target site locations containing a total of 62 individual targets. The five target types used were vehicles, helicopters, missiles, boats, and bridges. An implication from the study is that a relatively high degree of target detection and identification performance can be expected on a display of pictorial-type imagery in which the scene takes as little

time as 4 seconds to move across the display screen. (Author (GRA))
SF- DTIC
DE- <MAJOR> *DISPLAY DEVICES; *INFRARED IMAGERY; *TARGET ACQUISITION; *TARGET RECOGNITION
DE- AERIAL RECONNAISSANCE; HUMAN FACTORS ENGINEERING; HUMAN PERFORMANCE; STATISTICAL ANALYSIS
SH- <COSATI> 17E Infrared & Ultraviolet Detection
SH- 6523 Physics, General (1965-74)

AN- <DIALOG> 00601490
AN- <AEROSPACE> N72-11933
TI- Helicopter IFR flight path control system
TI- <NOTATION OF CONTENT> Theory and operation of proposed helicopter IFR flight path control system
AU- DUKES, T. A.
CS- Princeton Univ., NJ. Dept. of Aerospace and Mechanical Sciences.
CS- <CODE> P3732113
PY- 1971
PD- 197109
NT- In AGARD Helicopter Guidance and Control Systems 10 p (SEE N72-11915 03-02
CN- DA-28-043-AMC-02412(E)
LA- English
GL- United States
CP- France
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7203
AB- Various aspects of piloted flight path control, including positioning, are discussed according to their significance in making decisions about the structure of the control system. The translational loop requirements, the choice of a nominal error coordinate system, and a discussion of the pilot's role, lead to a control system in which errors and error rates are displayed explicitly and the pilot uses essentially acceleration control in his main effort to control error rates or velocities in three dimensions. An integrated display contains all the information needed for the continuous loop closures. The proposed system is applicable to trajectory control in general so that considerable commonality in flying various tasks can be achieved. (Author)
DE- <MAJOR> *FLIGHT PATHS; *HELICOPTER CONTROL; *INSTRUMENT FLIGHT RULES; *SYSTEMS ENGINEERING
DE- CONFERENCES; DISPLAY DEVICES; MAN MACHINE SYSTEMS; PILOT PERFORMANCE; TRAJECTORY CONTROL
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00600647
AN- <AEROSPACE> N72-11057
TI- Analysis and design study of a pilot assist system for helicopters
TI- <SUPPLEMENT> Final Report, Jan. - Dec. 1970
TI- <NOTATION OF CONTENT> Analysis of flight control system requirements for helicopters and design of pilot assisted control system
AU- WELCH, A. J.; WARREN, E. L.
CS- American Nucleonics Corp., Woodland Hills, CA.
CS- <CODE> AS734256
SP- AY968263
PY- 1971
PD- 197104
PG- 190P.
CN- DAAJ02-70-C-0019
RN- AD-725590; ANC-72R-14; USAAVLABS-TR-71-11
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7202
AB- The purpose of the work performed under this contract was to conduct an analytical investigation of advanced flight control systems (AFCS) requirements for light and medium size helicopters and to design a pilot assist system based on the analytical results. The pilot assist system (PAS) design goal was to develop an AFCS that is relatively light and inexpensive and that can be readily installed in a UH-1B. (Author (GRA))
SF- DTIC
DE- <MAJOR> *FLIGHT CONTROL; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING; *SERVOMECHANISMS
DE- AVIONICS; ELECTRONIC EQUIPMENT; RELIABILITY ENGINEERING; SYSTEMS ENGINEERING
SH- <COSATI> 1C Aircraft

SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00599652
AN- <AEROSPACE> N72-10044
TI- Investigation of display requirements for helicopter IFR manual formation flight under various operational and environmental conditions
TI- <SUPPLEMENT> Final Report, Aug. 1969 - Jun. 1970
TI- <NOTATION OF CONTENT> Evaluation of simulated pilot/system performance in manually controlled IFR formation flight task for UH-1 helicopter under various environmental and operational conditions
AU- TOIVANEN, M. L.; ANDERSON, P. A.; HOLLINGSWORTH, S. R.
CS- Honeywell, Inc., Minneapolis, MN. Systems and Research Center.
CS- <CODE> HY260724
PY- 1971
PD- 197104
PG- 199P.
RF- 255
CN- N00014-66-C-0362; NR PROJ. 213-054
RN- AD-725209; JANAIR-700911; HONEYWELL-12543-FR6
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7201
AB- Systematic man-in-the-loop simulations were conducted to evaluate pilot/system performance in the manually controlled IFR SK/FF task for the UH-1 helicopter under various operational and environmental conditions. Interpreted within the constraints imposed upon and by the simulations, the empirical results indicated that leader heading, even when perturbed by lateral gusts, was an adequate system reference; 250-2000 feet were acceptable separation distances for fixed-formation maneuvers; there were no significant performance differences between the leader or follower frame of reference; the pursuit guidance technique was applicable to the rendezvous phase; display augmentation was not required during the rendezvous, but it reduced the difficulty of the control task and improved performance; the formation grouping concept was feasible from the standpoint of display/control considerations; and the trajectory-following and pursuit guidance control techniques were both suitable for providing control commands to the pilot for formation grouping, although trajectory-following yielded better performance and pursuit guidance was easier to mechanize. (Author (GRA))
SF- DTIC
DE- <MAJOR> *ENVIRONMENTAL TESTS; *FLIGHT SIMULATION; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE; *UH-1 HELICOPTER
DE- DISPLAY DEVICES; FLIGHT INSTRUMENTS; MAN MACHINE SYSTEMS; PLAN POSITION INDICATORS; TASKS
SH- <COSATI> 1D Aircraft Flight Control & Instrumentation
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00598107
AN- <AEROSPACE> A73-44058
TI- Management and control of military and commercial flight test programs at Bell Helicopter Company.
AU- WHEELOCK, R. H. (Bell Helicopter Co., Fort Worth, Tex.)
SO- In: Society of Flight Test Engineers, National Symposium, 3rd, Arlington, Tex., September 11-14, 1972, Proceedings. (A73-44052 23-34) California, Md., Society of Flight Test Engineers, 1973. 13 p.
PY- 1973
PD- 197300
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7323
AB- Problem areas which have to be investigated are related to torsional stability, power management, fuel control characteristics, preflight ground endurance, components fatigue life, static and dynamic stability of the machine, cooling, and throttle response. Aspects of management procedures are considered, taking into account general technical measurements, instruction influence, data management, and cost-time schedule performance. Questions of instrumentation are discussed together with approaches for the efficient evaluation of test data. The responsibilities of various experts involved in the analysis of the test are examined. Attention is given to cost-schedule performance control methods designed to avoid major cost overruns in the development of the aircraft. (G.R.)
SF- AIAA
DE- <MAJOR> *AERONAUTICAL ENGINEERING; *BELL AIRCRAFT; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *MANAGEMENT METHODS; *PROJECT PLANNING

DE- COST ANALYSIS; DATA MANAGEMENT; FATIGUE LIFE; FUEL CONTROL; MILITARY
AIRCRAFT; PROJECT MANAGEMENT; RESEARCH AND DEVELOPMENT; TORSIONAL
STRESS
SH- 6534 General (1965-74)

AN- <DIALOG> 00595204
AN- <AEROSPACE> A73-41155
TI- Stress and strain in student helicopter pilots.
AU- BILLINGS, C. E.; GERKE, R. J.; CHASE, R. C.; EGGSPUEHLER, J. J. (Ohio State University, Columbus, Ohio)
SO- Aerospace Medicine, vol. 44, Sept. 1973, p. 1031-1035.
PY- 1973
PD- 197309
RF- 27
CN- DA-49-193-MD-2615
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7321
AB- The heart rates of nine volunteer subjects were studied during 223 hours of primary helicopter flight training. Heart rates after flights were generally higher than before the same flights. Heart rates on the ground tended to increase over 20 to 25 hours of flight instruction. This trend toward increases in heart rates was also observed during dual flights, whether the instructors or students were flying. During solo flight, in contrast, heart rates tended to decrease in most students. Student heart rates were highest during flight checks in eight of nine subjects. It is concluded that these data are indicative of a moderate and sequentially increasing level of psychological stress in students undergoing dual flight instruction in helicopters. ((Author))
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *FLIGHT TRAINING; *HEART RATE; *PILOT
TRAINING; *STRESS (PSYCHOLOGY)
DE- HELICOPTERS; HUMAN REACTIONS; PHYSIOLOGICAL RESPONSES; PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00595203
AN- <AEROSPACE> A73-41154
TI- Studies of pilot performance. III - Validation of objective performance measures for rotary-wing aircraft.
AU- BILLINGS, C. E.; GERKE, R. J.; CHASE, R. C.; EGGSPUEHLER, J. J. (Ohio State University, Columbus, Ohio)
SO- Aerospace Medicine, vol. 44, Sept. 1973, p. 1026-1030.
PY- 1973
PD- 197309
RF- 5
CN- DA-49-193-MD-2615
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7321
AB- Nine subjects whose fixed-wing piloting experience varied from zero to several thousand hours were given primary helicopter flight training in a Hiller 12-E (CH-23G) helicopter. The vehicle was instrumented to permit recording of rotor velocity and the positions of all flight controls. Computer reduction of the resulting data revealed differences in the precision with which rotor velocity was controlled between the flight instructors and their students, and systematic trends in the students' control of engine rpm during their flight instruction. These findings support the hypothesis that rpm variability is a valid index of pilot skill in helicopters in which this variable is under the direct control of the pilot. ((Author))
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *HELICOPTER CONTROL; *PILOT PERFORMANCE; *PILOT TRAINING; *ROTOR SPEED; *TRANSFER OF TRAINING
DE- COMPUTER TECHNIQUES; DATA REDUCTION; FLIGHT TRAINING; MENTAL PERFORMANCE; ROTARY WING AIRCRAFT; TASK COMPLEXITY
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00594928
AN- <AEROSPACE> A73-40878
TI- A practical approach to motion simulation.
TI- <NOTATION OF CONTENT> Human motion perception in motion drive logic design for flight simulation discussing feedback control, angular velocity and degrees of freedom
AU- SINACORI, J. B. (Northrop Corp., Hawthorne, Calif.)
SO- American Institute of Aeronautics and Astronautics, Visual and Motion Simulation Conference, Palo Alto, Calif., Sept. 10-12, 1973, 15 p.

PY- 1973
PD- 197309
RF- 5
RN- AIAA PAPER 73-931
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7321
AB- A motion drive method is presented which offers the simulator user a means for rapidly designing an effective motion drive logic. Procedures and routines for adapting this method to any type of motion base are also included, together with design charts, tables, and related data which can be used to estimate an initial set of coefficients. User techniques are then presented which relate the logic scheme to the motion base type with consideration of data from human motion perception literature. Refinement procedures are given with some experiental data from simulations of fighters, STOL transports, and large helicopters. The material is organized so as to be useful as both a computer programmer's manual and a brief user's guide. ((Author))
DE- <MAJOR> *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *LOGIC DESIGN; *SPACE PERCEPTION
DE- ANGULAR VELOCITY; BLOCK DIAGRAMS; DEGREES OF FREEDOM; FEEDBACK CONTROL; FIGHTER AIRCRAFT; FLIGHT SIMULATION; HELICOPTERS; HUMAN REACTIONS; LOGIC CIRCUITS; MATRICES (MATHEMATICS); MECHANICAL DRIVES; PILOT TRAINING; SHORT TAKEOFF AIRCRAFT; SYSTEMS ENGINEERING
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00594079
AN- <AEROSPACE> A73-40029
TI- A flight evaluation of pilotage error in area navigation with vertical guidance.
AU- JENSEN, R. S.; ROSCOE, S. N. (Illinois, University, Savoy, Ill.)
SO- Institute of Navigation, Annual Meeting, 29th, St. Louis, Mo., June 19-21, 1973, Paper. 35 p. FAA-sponsored research.
PY- 1973
PD- 197306
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7321
AB- Pilotage error in terminal and approach phases of three-dimensional area navigation operations was measured in flight. Pilot performance was measured in terms of altitude, crosstrack, airspeed, and procedural errors made while flying a complex 18-segment IFR flight plan presenting concentrated high levels of cockpit workload. Analysis of the data showed no statistically reliable difference between overall performances by airline transport pilots and commercial pilots with instrument ratings for any of the four vertical task variables: level flight, three-degree climb, three-degree descent, and six-degree descent. Also, there were no statistically reliable differences between altitude performance with the altimeter and the vertical deviation indicator in level flight. Relatively frequent procedural errors occurred even after four identical flights using VNAV guidance equipment. ((Author))
DE- <MAJOR> *AREA NAVIGATION; *HUMAN PERFORMANCE; *PILOT ERROR; *VERTICAL FLIGHT
DE- AIRLINE OPERATIONS; AIRSPEED; CLIMBING FLIGHT; DESCENT TRAJECTORIES; ERROR ANALYSIS; FLIGHT ALTITUDE; ROOT-MEAN-SQUARE ERRORS; STATISTICAL ANALYSIS; WIND EFFECTS
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00593161
AN- <AEROSPACE> A73-39111
TI- Spatial disorientation and the 'break-off' phenomenon.
TI- <NOTATION OF CONTENT> Aircraft pilot spatial disorientation and illusory perceptual break-off sensations during flight associated with minor vestibular asymmetry
AU- BENSON, A. J. (RAF, Institute of Aviation Medicine, Farnborough, Hants., England)
SO- Aerospace Medicine, vol. 44, Aug. 1973, p. 944-952.
PY- 1973
PD- 197308
RF- 20
LA- English
GL- United Kingdom
CP- United States

DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7320
AB- Out of 78 air crewmembers referred for clinical assessment because of 'disorientation in flight,' 29 pilots described incidents in which they experienced feelings of unreality and detachment. These commonly occurred during monotonous phases of flight in conditions where external visual orientation cues were restricted. In 22 pilots of fixed-wing aircraft, the perceptual disturbances characteristic of the 'break-off' phenomenon occurred when flying at altitudes in excess of 30,000 ft, but seven helicopter pilots had comparable sensory disturbances at 500-10,000 ft. In all but three pilots, the dissociative sensations were coupled with illusory perceptions of aircraft attitude and motion, though only in eight pilots was there a qualitatively false perception of aircraft orientation. Evidence is presented which suggests the 'spatial disorientation' occurring as a concomitant of 'break-off' was caused by minor degrees of vestibular asymmetry. ((Author))
DE- <MAJOR> *AIRCRAFT PILOTS; *DISORIENTATION; *PILOT PERFORMANCE; *SPACE PERCEPTION; *VESTIBULAR TESTS
DE- AIRCRAFT ACCIDENTS; CASE HISTORIES; FLIGHT STRESS (BIOLOGY); OPTICAL ILLUSION; PSYCHOSOMATICS; SENSORIMOTOR PERFORMANCE
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00589114
AN- <AEROSPACE> A73-35063
TI- Pilot-in-the-loop control systems /A different approach/.
TI- <NOTATION OF CONTENT> V/STOL aircraft pilot-in-loop flight control/display system to overcome pilot limitations with performance and decision making flexibility enhancement
AU- MCELREATH, K. W. (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio); KLEIN, J. A.; THOMAS, R. C. (Collins Radio Co., Cedar Rapids, Iowa)
SO- American Helicopter Society, Annual National Forum, 29th, Washington, D.C., May 9-11, 1973, 7 p.
PY- 1973
PD- 197305
RN- AHS PREPRINT 722
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7317
AB- The V/STOL IFR Control/Display Technology Program conducted by the Air Force Flight Dynamics Laboratory has developed a control system to overcome the pilot limitations while enhancing his performance and decision-making flexibility as an active control element. This system includes a highly flexible V/STOL aircraft flight director which feeds only the high-frequency control inputs to a simple, limited-authority automatic stability augmentation system. The low-frequency control commands are displayed to the pilot to be excuted manually. Using the techniques of analysis, simulation, and flight testing, this concept has been verified to improve performance and decrease workload while retaining the natural pilot flexibility. ((Author))
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *FEEDBACK CONTROL; *FLIGHT CONTROL; *PILOT PERFORMANCE; *V/STOL AIRCRAFT
DE- AIRCRAFT STABILITY; DECISION MAKING; FLIGHT SIMULATION; FLIGHT TESTS; HELICOPTER DESIGN; MAN MACHINE SYSTEMS; SYSTEM EFFECTIVENESS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00588652
AN- <AEROSPACE> A73-34601
TI- International Aerospace Instrumentation Symposium, 19th, Las Vegas, Nev., May 21-23, 1973, Proceedings.
AU- WASHBURN, B., (ED.) (California, University, Los Alamos, N. Mex.)
SO- Symposium sponsored by the Instrument Society of America Pittsburgh, Pa., Instrument Society of America (Instrumentation in the Aerospace Industry. Volume 19), 1973. 301 p.
PY- 1973
PD- 197300
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA7317
AB- New developments in measurement instrumentation and procedures are described in papers dealing with aircraft engine testing, air traffic control, space vehicle measurements, in-flight monitoring equipment, automotive safety testing, and monitoring of the environment. Design, construction, and calibration aspects are discussed for various types of equipment, including a satellite IR temperature profile radiometer, solid-state sensors for flight control measurements, reentry-vehicle

heat shield thermodynamic instrumentation, impact gauges for meteoroid detection, differential temperature sensors for aircraft engine fluids, microwave landing systems, wake vortex sensing equipment, and a digital strobe control system for model helicopter testing. Individual items are announced in this issue. (T.M.)
SF- AIAA
DE- <MAJOR> *AEROSPACE ENGINEERING; *AIR TRAFFIC CONTROL; *CONFERENCES; *MEASURING INSTRUMENTS
DE- BIOTELEMETRY; BUOYS; CRASH INJURIES; ELECTRON DENSITY (CONCENTRATION); OCEANOGRAPHY; PRESSURE GAGES; SHARKS; STRAIN GAGES; URBAN TRANSPORTATION; WATER POLLUTION
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00588493
AN- <AEROSPACE> A73-34442
TI- Noise and the helicopter pilot.
TI- <NOTATION OF CONTENT> Pilot operation practices for helicopter noise level reduction, with emphasis on flight altitude increase and routing over noise insensitive areas
AU- GORDON, A. C. (Bristow Helicopters Group, Ltd., Redhill Aerodrome, Surrey, England)
SO- (Royal Aeronautical Society and British Helicopter Advisory Board, Symposium on Heliports, London, England, Mar. 8, 1972.) Aeronautical Journal, vol. 77, May 1973, p. 220-224.
PY- 1973
PD- 197305
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7317
AB- Subject to the economics being satisfactory, the widespread use of helicopters in passenger transport might easily be seriously inhibited by restrictive noise limitations. Pilots can help avoid this if they operate the present generation of noisy helicopters with due regard to this problem. It is noted that at the higher PNdB levels, i.e., below 1000 ft distances, a few hundred feet increase in altitude or increase in horizontal distance can easily bring unacceptable noise levels to within quite acceptable standards. The use of navigational aids such as Decca can ensure specific routing over areas which are not noise sensitive. Steep approach and climb-out paths are beneficial. An important aspect of helicopter noise is blade slap. (F.R.L.)
SF- AIAA
DE- <MAJOR> *BLADE SLAP NOISE; *FLIGHT ALTITUDE; *FLIGHT PATHS; *HELICOPTER PERFORMANCE; *NOISE REDUCTION; *PILOT PERFORMANCE
DE- AIR NAVIGATION; APPROACH; BLADE-VORTEX INTERACTION; NAVIGATION AIDS; NOISE INTENSITY; VERTICAL TAKEOFF
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00587261
AN- <AEROSPACE> A73-33210
TI- A flight research program to define VTOL visual simulator requirements.
AU- MILELLI, R. J.; KEANE, W. A.; KENNEALLY, W. J. (U.S. Army, Electronics Command, Fort Monmouth, N.J.)
SO- In: Flight Simulation Symposium, 2nd, London, England, May 16, 17, 1973, Proceedings. (A73-33201 16-11) London, Royal Aeronautical Society, 1973. 11 p.
PY- 1973
PD- 197300
LA- English
GL- United States
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA7316
AB- During 1972, the U.S. Army Avionics Laboratory developed and flew a unique airborne test helicopter designated as the Research Aircraft for the Visual Environment (RAVE) to obtain comparative data on pilot performance under both direct visual and TV mediated imagery. TV imagery was presented on infinity collimated displays and was variable with respect to both field of view and resolution. Comparative performance for both direct and TV mediated systems was obtained for a wide spectrum of airmobile maneuvers in a confined tactical area as well as terrain following and terrain avoidance over a tactical terrain course. ((Author))
DE- <MAJOR> *FLIGHT SIMULATORS; *FLIGHT TEST VEHICLES; *MILITARY HELICOPTERS; *VERTICAL TAKEOFF AIRCRAFT; *VISUAL FLIGHT
DE- DISPLAY DEVICES; IMAGERY; MANEUVERS; PILOT PERFORMANCE; TELEVISION EQUIPMENT; TERRAIN FOLLOWING AIRCRAFT; VIDEO EQUIPMENT
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00587257
AN- <AEROSPACE> A73-33206
TI- The simulator as a tool for avionics research.
TI- <NOTATION OF CONTENT> Avionics and human factors in flight simulator economics, interrelating aircraft design to simulation system
AU- STRINGER, F. S. (Ministry of Defence, London, England)
SO- In: Flight Simulation Symposium, 2nd, London, England, May 16, 17, 1973, Proceedings. (A73-33201 16-11) London, Royal Aeronautical Society, 1973. 9 p.
PY- 1973
PD- 197300
LA- English
GL- United Kingdom
CP- United Kingdom
DT- CONFERENCE PAPER
JA- IAA7316
AB- The observations here are designed to stimulate the avionics system or ergonics designer to a correct application of simulation to give a cost-effective method of providing an end product which will be a solution to a particular problem with a minimum of in-service modification. It is important that the interrelationship between the aircraft and the avionics system and the man-machine interface should be understood as thoroughly as possible before very expensive decisions are taken to build a prototype system into an aircraft. Much of this preliminary examination of design parameters and total performance envelope can be predicted by simulation. However, the cost of simulation can be high. (F.R.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *AVIONICS; *ECONOMIC FACTORS; *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING
DE- COCKPIT SIMULATORS; COMPUTER TECHNIQUES; COST EFFECTIVENESS; DECISION MAKING; HELICOPTERS; MAN MACHINE SYSTEMS; VISUAL AIDS
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00587252
AN- <AEROSPACE> A73-33201
TI- Flight Simulation Symposium, 2nd, London, England, May 16, 17, 1973, Proceedings.
SO- Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1973. 185 p.
PY- 1973
PD- 197300
LA- English
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS
JA- IAA7316
AB- The papers discuss the use of specific behavioral objectives in simulator development, optimizing the use of the flight simulator, total simulation, the development of visual systems for flight simulation, the simulator as a tool for avionics research, the contribution of integrated product support to the uptime of simulators, and the contribution of the simulator industry to military training requirements. V/STOL research simulation, a flight research program to define VTOL visual simulator requirements, flight simulation in helicopter and V/STOL research, BOAC experience and usage of flight simulators, and pilot opinion on simulation are considered. Individual items are announced in this issue. (F.R.L.)
SF- AIAA
DE- <MAJOR> *AIRLINE OPERATIONS; *CONFERENCES; *FLIGHT SIMULATION; *PILOT TRAINING; *VISUAL AIDS
DE- AVIONICS; COCKPIT SIMULATORS; COMPUTERIZED SIMULATION; FAILURE ANALYSIS ; HUMAN FACTORS ENGINEERING; INSTRUCTORS; MILITARY AIRCRAFT; SURVEYS; TRANSFER OF TRAINING; V/STOL AIRCRAFT
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00586095
AN- <AEROSPACE> A73-32044
TI- Anthropotechnical investigation of an above-ground indication and of an artificial horizon with preindication in connection with the manual control of VTOL aircraft
TI- <ORIGINAL> Anthropotechnische Untersuchung einer Uebergrundanzeige und eines kuenstlichen Horizonts mit Voranzeige zur manuellen Regelung von VTOL-Flugzeugen
AU- DEY, D. (Berlin, Technische Universitaet, Berlin, West Germany); JOHANNSEN, G. (Forschungsinstitut fuer Anthropotechnik, Meckenheim, West Germany)
SO- Zeitschrift fuer Flugwissenschaften, vol. 21, Apr. 1973, p. 140-145. In German.
PY- 1973
PD- 197304
RF- 10

LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7315
DE- <MAJOR> *AIRCRAFT CONTROL; *HOVERING STABILITY; *MAN MACHINE SYSTEMS;
*MANUAL CONTROL; *VERTICAL TAKEOFF AIRCRAFT
DE- ATTITUDE CONTROL; DISPLAY DEVICES; GYRO HORIZONS; HUMAN FACTORS ENGINEERING
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00583397
AN- <AEROSPACE> A73-29345
TI- Avionics.
TI- <NOTATION OF CONTENT> Vertical aircraft flight control and navigation instrumentation avionics developments, emphasizing Inertial-lead Vertical Speed Indicator design and command and advisory information displays
AU- KERNS, J. A. (Teledyne, Inc., Los Angeles, Calif.)
SO- In: Conference on General Aviation-Business Flying, Tullahoma, Tenn., August 17-19, 1972, Proceedings. (A73-29344 13-02) Tullahoma, Tenn., University of Tennessee, 1972, p. 28-34.
PY- 1972
PD- 197200
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7313
AB- It is suggested that the coming decade will witness increased attention to the development and application of flight instrumentation to better facilitate flight control and navigation in the vertical plane. The Inertial-lead Vertical Speed Indicator (IVSI) was designed to provide the pilot with an instrument that would allow positive manual control of vertical speed in addition to indicating steady-state vertical speeds. IVSI has been used very successfully as an aid to capturing and maintaining the glide slope during an ILS approach. The display includes both command and advisory information. (F.R.L.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AVIONICS; *DISPLAY DEVICES; *NAVIGATION
INSTRUMENTS; *SPEED INDICATORS; *VERTICAL FLIGHT
DE- AIRCRAFT CONTROL; COMMAND AND CONTROL; FLIGHT CONTROL; FLIGHT INSTRUMENTS; INERTIAL NAVIGATION; INSTRUMENT LANDING SYSTEMS; MANUAL
CONTROL
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00581227
AN- <AEROSPACE> A73-27175
TI- Prediction of height-velocity boundaries for rotorcraft by application of optimization techniques.
AU- KOMODA, M. (National Aerospace Laboratory, Tokyo, Japan)
SO- Japan Society for Aeronautical and Space Sciences, Transactions, vol. 15, no. 30, 1973, p. 208-228.
PY- 1973
PD- 197300
RF- 12
LA- English
GL- Japan
CP- Japan
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7312
AB- An analytical method utilizing optimization techniques to estimate an ideal height-velocity (HV) diagram and a critical decision point (CDP) of rotorcraft is proposed. The aim is to obtain reasonable expressions of a control program for the model equations which describe rotorcraft dynamics after a critical engine has failed. It is shown that such control inputs, which otherwise must be assumed purely empirically, are obtained as the solution of an adequately stated optimization problem in which the height loss is maximized or minimized, or equivalently, the final rotor rpm is maximized. ((Author))
DE- <MAJOR> *CRITICAL POINT; *ENGINE FAILURE; *ROTARY WING AIRCRAFT; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT CONTROL; FLIGHT ALTITUDE; MATHEMATICAL MODELS; PILOT PERFORMANCE; STRUCTURAL WEIGHT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00577276
AN- <AEROSPACE> A73-23224
TI- Fundamentals of aviation
TI- <ORIGINAL> Osnovy aviatsii

TI- <NOTATION OF CONTENT> Russian book on aviation fundamentals covering aerodynamics and flight theory, designs, components, engines and instrumentation of aircraft, including helicopters, VTOL and STOL
AU- NIKITIN, G. A.; BAKANOV, E. A.
SO- Moscow, Izdatel'stvo Transport, 1972. 280 p. In Russian.
PY- 1972
PD- 197200
RF- 15
LA- Russian
CP- U.S.S.R.
DT- BOOK
JA- IAA7309
AB- The development of aviation is briefly reviewed, and the fundamentals of aerodynamics and flight theory of airplanes and helicopters are discussed. Various aircraft designs and designs of their principal components (wings, tail units, fuselages, landing gears) are studied, together with helicopter and VTOL and STOL aircraft designs. The theory of aircraft piston and jet engines is outlined. Aircraft deicing systems, hydraulic systems, electrical and communications systems, and the principal aircraft instruments are examined. (V.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT DESIGN; *AIRCRAFT ENGINES; *AIRCRAFT INSTRUMENTS; *HELICOPTER DESIGN; *V/STOL AIRCRAFT
DE- AERODYNAMICS; AIRCRAFT COMMUNICATION; AIRCRAFT CONFIGURATIONS; AIRCRAFT CONTROL; AIRCRAFT HYDRAULIC SYSTEMS; AIRCRAFT STRUCTURES; DEICING; FLIGHT CHARACTERISTICS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00576231
AN- <AEROSPACE> A73-22179
TI- AH-56A Compound Helicopter autorotation characteristics.
TI- <NOTATION OF CONTENT> AH-56A rigid rotor compound helicopter configuration and handling qualities under autorotation conditions, discussing flight test program, piloting descent performance
AU- SEGNER, D. R. (Lockheed-California Co., Burbank, Calif.)
SO- (Society of Experimental Test Pilots, Symposium, 16th, Beverly Hills, Calif., Sept. 28-30, 1972.) Society of Experimental Test Pilots, Technical Review, vol. 11, no. 2, 1973, p. 29-47.
PY- 1973
PD- 197300
RF- 5
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7309
AB- The AH-56A Compound Helicopter is described with emphasis on the configuration items unique to this vehicle which affect autorotation characteristics. The Beta propeller, rigid rotor, and the wing are discussed in particular detail. The steady state autorotation descent performance is discussed with emphasis on the analysis and piloting task introduced by the addition of the propeller as an added variable in the performance definition. Autorotation entries are discussed in both the helicopter and compound modes of operation. An engineering test pilot description of the flight test build-up program is presented including the logical engineering progression from entries in low power descents to increasingly critical entries, culminating in entries at maximum airspeed. ((Author))
DE- <MAJOR> *AIRCRAFT CONFIGURATIONS; *AUTOROTATION; *COMPOUND HELICOPTERS; *H-56 HELICOPTER; *PILOT PERFORMANCE; *RIGID ROTORS
DE- AIRCRAFT LANDING; AIRCRAFT PERFORMANCE; CONTROLLABILITY; FLIGHT TESTS; MILITARY AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00570899
AN- <AEROSPACE> A73-16847
TI- Some aspects of instrument flight.
TI- <NOTATION OF CONTENT> S-61N helicopter all-weather IFR operation for North Sea oil rigs supply and harbor pilots transportation, describing onboard instrumentation, navigation and communication systems
AU- VAN DER HARTEN, R. J. (KLM Noordzee Helikopters, Schiphol Airport, Netherlands)
SO- Vertiflite, vol. 18, Nov.-Dec. 1972, p. 4-9.
PY- 1972
PD- 197212
RF- 5
LA- English
GL- Netherlands
CP- United States
DT- JOURNAL ARTICLE

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7305
AB- The development and operation of a 24-hr IFR service aimed at supplying oil rigs in the North Sea and transporting harbor pilots to ships, using the Sikorsky S-61N helicopter, is discussed. The first S-61N was equipped with a dual automatic direction finder (ADF), a VHF omnidirectional range/instrument landing system (VOR/ILS), and a single Decca Mk 19 navigation system. The second S-61N was equipped with the Bendix-Air Equipment RDR-1DM weather and approach radar, two ADF's, one VOR/ILS, and one Decca Mk 19. In the third S-61N, the Decca Mk 19 was replaced by a single Decca Doppler 71. The onboard instrumentation, the communication system, and radar system (used to avoid flying into icing conditions) are described. The certification and training of pilots, and the certification of weather limits is described. (V.P.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT COMMUNICATION; *AIRCRAFT INSTRUMENTS; *ALL-WEATHER AIR NAVIGATION; *INSTRUMENT FLIGHT RULES; *NAVIGATION AIDS; *S-61 HELICOPTER
DE- AIR TRANSPORTATION; AIRCRAFT RELIABILITY; DECCA NAVIGATION; INSTRUMENT LANDING SYSTEMS; METEOROLOGICAL RADAR; NORTH SEA; OIL EXPLORATION; VHF OMNIRANGE NAVIGATION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00570757
AN- <AEROSPACE> A73-16705
TI- Perceptual considerations for a wide field of view, helicopter night landing system /HENILAS/.
AU- LE COCQ, A. D. (Texas Instruments, Inc., Dallas, Tex.)
SO- In: Technology for man 72; Proceedings of the Sixteenth Annual Meeting, Los Angeles, Calif., October 17-19, 1972. (A73-16701 05-05) Santa Monica, Calif., Human Factors Society, Inc., 1972, p. 102-109.
PY- 1972
PD- 197200
RF- 6
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7305
DE- <MAJOR> *AIRCRAFT LANDING; *HELICOPTER CONTROL; *LANDING AIDS; *NIGHT VISION
DE- BIOTECHNOLOGY; BRIGHTNESS DISCRIMINATION; FLICKER; HUMAN FACTORS ENGINEERING; PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00563587
AN- <AEROSPACE> A72-45328
TI- Flight test investigation of the aerodynamic behavior of various-sized stabilizers on a small helicopter.
AU- BOIRUN, B. H. (U.S. Army, Advanced Methodology and Analysis Office, Edwards AFB, Calif.)
SO- In: Atmospheric Flight Mechanics Conference, 2nd, Palo Alto and Moffett Field, Calif., September 11-13, 1972, Informal Papers. (A72-45326 24-01) Moffett Field, Calif., NASA Ames Research Center, 1972, p. 2.1-2.11.
PY- 1972
PD- 197200
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7224
AB- Discussion of data obtained during a flight test program to investigate the autorotational entry characteristics of the TH-55A helicopter. One of the test objectives was to develop a new stabilizer configuration that would reduce nose-down pitching during a stick-fixed autorotational entry following a sudden power reduction. The stabilizer configurations tested were limited to simple geometric changes of the standard TH-55A stabilizer. During this effort, the aerodynamic characteristics of the various stabilizer configurations were determined using relatively simple instrumentation. The engineering techniques required to determine the flow direction and velocity at the horizontal stabilizer are presented, and the results are compared with theory and previous wind tunnel data. The resulting lift and drag coefficients for several stabilizer configurations are also presented, and the results are compared with two-dimensional data of similar aspect ratio tail surfaces. ((Author))
DE- <MAJOR> *AERODYNAMIC CHARACTERISTICS; *AUTOROTATION; *FLIGHT TESTS;

*STABILIZERS (FLUID DYNAMICS); *TH-55 HELICOPTER
DE- AERODYNAMIC CONFIGURATIONS; AERODYNAMIC DRAG; AERODYNAMIC LOADS;
DIRECTIONAL STABILITY; DYNAMIC STABILITY; FLOW EQUATIONS; HELICOPTER
WAKES; LATERAL STABILITY; LIFT; LONGITUDINAL STABILITY; SIDESLIP;
STATIC STABILITY
SH- 6501 Aerodynamics (1965-74)

AN- <DIALOG> 00559691
AN- <AEROSPACE> A72-41432
TI- The influence of a prediction display on the human transfer characteristics.
AU- DEY, D. (Berlin, Technische Universitaet, Berlin, West Germany)
SO- In: Displays and controls; Proceedings of the Advanced Study Institute, Berchtesgaden, West Germany, March 15-26, 1971. (A72-41402 21-05) Amsterdam, Swets en Zeitlinger, 1972, p. 483-491.
PY- 1972
PD- 197200
RF- 5
LA- English
GL- Germany
CP- Netherlands
DT- CONFERENCE PAPER
JA- IAA7221
AB- A quasi-linear human operator model is proposed to describe the effect of a prediction display on the transfer characteristics of a human operator at stick controls. It is shown that a prediction display diminishes the mean square value of human control deviations in manual attitude stabilization of a hovering VTOL aircraft. (V.Z.)
SF- AIAA
DE- <MAJOR> *CONTROL STABILITY; *DISPLAY DEVICES; *HUMAN PERFORMANCE;
*MATHEMATICAL MODELS; *OPERATOR PERFORMANCE; *TRANSFER FUNCTIONS
DE- ATTITUDE STABILITY; BIONICS; FEEDBACK CONTROL; MANUAL CONTROL;
NONLINEAR SYSTEMS; PERFORMANCE PREDICTION; PILOT PERFORMANCE; VERTICAL
TAKEOFF AIRCRAFT
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00559690
AN- <AEROSPACE> A72-41431
TI- Results of the investigation of different extrapolation displays.
AU- DEY, D. (Berlin, Technische Universitaet, Berlin, West Germany)
SO- In: Displays and controls; Proceedings of the Advanced Study Institute, Berchtesgaden, West Germany, March 15-26, 1971. (A72-41402 21-05) Amsterdam, Swets en Zeitlinger, 1972, p. 467-481.
PY- 1972
PD- 197200
RF- 6
LA- English
GL- Germany
CP- Netherlands
DT- CONFERENCE PAPER
JA- IAA7221
AB- Experiments on 5 subjects show that the steering reliability can be increased and the 'lapse time' can be reduced when a prediction display is used in manual aircraft control. It is concluded that a prediction display gives the pilot more exact and faster information about the action of his stick signals and thereby assists in generating an optimal-time steering operation. (V.Z.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *MANUAL CONTROL; *PILOT
PERFORMANCE
DE- HOVERING STABILITY; MAN MACHINE SYSTEMS; PURSUIT TRACKING; VERTICAL
TAKEOFF AIRCRAFT
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00550890
AN- <AEROSPACE> A72-32631
TI- The future of electronic displays; Proceedings of the Joint Symposium, London, England, February 23, 1972.
TI- <NOTATION OF CONTENT> Electronic displays - Conference, London, February 1972
SO- Symposium sponsored by the Royal Aeronautical Society and Institution of Electrical Engineers. London, Royal Aeronautical Society, 1972. 47 p.
PY- 1972
PD- 197200
LA- English
CP- United Kingdom
DT- CONFERENCE PROCEEDINGS

JA- IAA7215
AB- Human factor problems involved in electronic displays (ED), ED use in modern navigator-attack systems, and the views of civil helicopter pilots on ED merits are among the topics covered in papers concerned with electronic displays for military and civil aircraft. Other contributions include an appraisal of the inherent advantages and disadvantages of electronic displays and a discussion of their role in future avionics systems. Individual items are abstracted in this issue. (M.V.E.)
SF- AIAA
DE- <MAJOR> *CONFERENCES; *DISPLAY DEVICES; *ELECTRONIC EQUIPMENT
DE- AIRCRAFT INSTRUMENTS; ATTACK AIRCRAFT; AVIONICS; CIVIL AVIATION; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; SYSTEMS ANALYSIS; WEAPON SYSTEMS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00549356
AN- <AEROSPACE> A72-31097
TI- Continuous ECG recording of helicopter instructor pilots.
TI- <NOTATION OF CONTENT> ECG heart rate recording of helicopter instructor pilots during flight training tasks, administrative work, automobile driving and eating
AU- SCHANE, W. P. (U.S. Army, Aeromedical Research Laboratory, Fort Rucker,Ala.)
SO- Aerospace Medicine, vol. 43, May 1972, p. 560-563.
PY- 1972
PD- 197205
RF- 5
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7214
AB- Fifty-three instructor pilots were studied with one lead of ECG for a full work day. Mean heart rates were tabulated from the record during administrative work, automobile driving, eating, and flying. Using Tukey's multiple comparison of means, significant differences were found between heart rates during flying and heart rates noted while driving, and while performing administrative duties. Means of 'lowest heart rate recorded' and 'highest heart rate recorded' for each subject were reported (means of 71.8 and 140.4 respectively). The activities in which the subjects were engaged at the time are reported. Seventy-one and seven tenths per cent of the subjects engaged in no regular schedules of physical training or sports participation. An 11 x 11 correlation matrix indicates only that subjects who have high heart rates during one activity will have comparably high heart rates during all activities, and vice versa. ((Author))
DE- <MAJOR> *ACTIVITY (BIOLOGY); *ELECTROCARDIOGRAPHY; *FLIGHT TRAINING; *HEART RATE; *INSTRUCTORS; *PILOT PERFORMANCE
DE- DATA CORRELATION; HELICOPTERS; PHYSICAL EXERCISE; STRESS (PHYSIOLOGY)
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00547817
AN- <AEROSPACE> A72-29558
TI- Active vibration isolation for personnel seating.
TI- <NOTATION OF CONTENT> Pilots seating active and passive isolation from LF vibrations in helicopters and jet aircrafts, discussing human factors and dynamic environment
AU- CALCATERRA, P. C. (Barry Wright Corp., Watertown, Mass.)
SO- In: Noise and vibration control engineering; Proceedings of the Purdue Noise Control Conference, Lafayette, Ind., July 14-16, 1971. (A72-29553 13-23) Lafayette, Ind., Purdue University, 1972, p. 209-217.
PY- 1972
PD- 197200
RF- 23
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7213
AB- Real world experience and laboratory experiments indicate that seated personnel are particularly susceptible to vibration excitation in the 4 to 20 Hz region, which encompasses the fundamental whole body resonance as well as eyeball and head-on-shoulder resonances of the human body. It has been determined that active vibration isolation mechanisms are particularly suitable in cases where protection from vibration is required at relatively low frequencies. One such example is the protection of aircraft pilots from either the high-level vibrations experienced on board helicopters, or from the severe vibration environment associated with jet aircraft turbulence encounters and low-altitude high-speed flight. This paper discusses the general nature of human vibration factors and describes the application of active

vibration isolators for protecting aircraft pilots from severe dynamic environments. ((Author))
DE- <MAJOR> *AIRCRAFT PILOTS; *ENVIRONMENTAL CONTROL; *HELICOPTERS; *HUMAN
FACTORS ENGINEERING; *JET AIRCRAFT; *VIBRATION ISOLATORS
DE- CONFERENCES; CRITICAL FREQUENCIES; HUMAN REACTIONS; HUMAN TOLERANCES;
LOW FREQUENCIES; RESONANT FREQUENCIES; RESONANT VIBRATION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00545781
AN- <AEROSPACE> A72-27522
TI- Helicopter automatic approach and hover coupler systems.
TI- <NOTATION OF CONTENT> Helicopter automatic flight control approach/hover coupler systems, hands off stability and handling qualities
AU- COTTON, L.; MILLS, R. (United Aircraft Corp., Sikorsky Aircraft Div., Stratford, Conn.)
SO- Society of Experimental Test Pilots, Technical Review, vol. 11, no. 1, 1972, p. 102-111.
PY- 1972
PD- 197200
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7212
AB- Description of coupler systems which operate in conjunction with automatic flight control systems (AFCS) through limited-authority inner loop servos and full-authority limited-rate outer loop servos. Basic hands-off stability and handling qualities of the helicopter are established by the AFCS, leaving for the coupler the task of positioning the stable aircraft according to the function selected by the pilot. The various systems already developed are discussed. (F.R.L.)
SF- AIAA
DE- <MAJOR> *APPROACH CONTROL; *AUTOMATIC FLIGHT CONTROL; *HELICOPTER
CONTROL; *HOVERING STABILITY
DE- CONTROLLABILITY; COUPLERS; HELICOPTER PERFORMANCE; PILOT PERFORMANCE
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00545734
AN- <AEROSPACE> A72-27475
TI- Computer analysis of eye movement patterns during visual search.
TI- <NOTATION OF CONTENT> Computer analysis of helicopter pilots eye movement patterns dependence on visual task skill and performance time
AU- TROY, M.; CHEN, S. C.; STERN, J. A. (Washington University, St. Louis, Mo.)
SO- Aerospace Medicine, vol. 43, Apr. 1972, p. 390-394.
PY- 1972
PD- 197204
RF- 14
CN- DA-49-193-MD-2715
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7212
AB- Eye movements were recorded from 13 novice and 13 skilled helicopter pilots during a cross-country flight. This analysis is restricted to an evaluation of the pattern of eye movements as a function of skill and time on task. No differences were found as a function of skill. The incidence of nonpatterned search activity was found to decrease as a function of time on task. The results are discussed in terms of a decrease in alertness to 'unexpected' environmental stimuli. The development of a reliable computer-based procedure (utilized in the present study) for analyzing eye movements is also discussed. ((Author))
DE- <MAJOR> *COMPUTER TECHNIQUES; *EYE MOVEMENTS; *PILOT PERFORMANCE; *TIME
DEPENDENCE; *VISUAL TASKS
DE- COMPUTER PROGRAMS; HELICOPTERS; STATISTICAL ANALYSIS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00545672
AN- <AEROSPACE> A72-27413
TI- Investigations regarding the possibility of helicopter landings on ships
TI- <ORIGINAL> Untersuchungen ueber die Moeglichkeit von Hubschrauberlandungen auf Schiffen
TI- <NOTATION OF CONTENT> Helicopter landing on ships, discussing wind, visibility limitations and flight deck motions vs aircraft stability and handling characteristics

AU- SKUBINNA, E. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Abteilung Flugverkehrswissenschaft, Stuttgart, West Germany)
SO- DFVLR-Nachrichten, Apr. 1972, p. 232-235. In German.
PY- 1972
PD- 197204
LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7212
AB- It is pointed out that helicopter landings on ships depend ultimately on the ability of the pilot to adapt the approach and the landing process to the motions of the flight deck. The landing is influenced by wind and visibility conditions. The degree of the difficulty of the landing is partly determined by the stability and other flight characteristics of the helicopter. Various factors involved were quantitatively investigated. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *HELICOPTERS; *SHIPS
DE- AIRCRAFT STABILITY; HELICOPTER CONTROL; HELICOPTER PERFORMANCE; PILOT PERFORMANCE; WIND EFFECTS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00544650
AN- <AEROSPACE> A72-26391
TI- Active vibration isolation for aircraft seating.
TI- <NOTATION OF CONTENT> Aircraft pilot seating protection from dynamic environment by active vibration isolation, discussing human frequency response characteristics
AU- CALCATERRA, P. C. (Barry Wright Corp., Watertown, Mass.)
SO- Sound and Vibration, vol. 6, Mar. 1972, p. 18-23.
PY- 1972
PD- 197203
RF- 26
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7211
AB- The general nature of human response to vibration is briefly discussed, together with the application of active vibration isolators for protecting aircraft pilots from severe environments, such as turbulence encounters of commercial jet transports and general helicopter missions. It is pointed out that human subjects are most susceptible to vibration in the region from 4 to 10 Hz. Active isolation systems can provide the required degree of vibration isolation and displacement control for personnel seating. Continuing human factors research will provide the necessary data to determine trade-offs between vibration isolation and task performance. (G.R.)
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *ENVIRONMENTAL ENGINEERING; *FREQUENCY RESPONSE; *HUMAN FACTORS ENGINEERING; *VIBRATION EFFECTS; *VIBRATION ISOLATORS
DE- ACCELERATION TOLERANCE; ATMOSPHERIC TURBULENCE; CABINS; COMMERCIAL AIRCRAFT; HELICOPTERS; HUMAN REACTIONS; LOW FREQUENCIES; SEATS; SITTING POSITION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00543337
AN- <AEROSPACE> A72-25078
TI- Operational aviation meteorological requirements, present and future.
TI- <NOTATION OF CONTENT> Operational aviation meteorological requirements, reviewing aircraft categories, ATC systems and avionics and navigational aids
AU- LIEURANCE, N. A. (NOAA, Washington, D.C.)
SO- In: Symposium on Meteorological Observations and Instrumentation, 2nd, San Diego, Calif., March 27-30, 1972, Preprints. (A72-25076 10-20) Boston, American Meteorological Society, 1972, p. 32-36.
PY- 1972
PD- 197200
RF- 8
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7210
AB- Operational requirements for meteorological information in aviation are dictated by categories of aircraft, types of users, and varied aircraft avionics and navigational aids. The wide spectrum of users is

categorized (including the air traffic control system), and individual requirements are reviewed. Type of information desired and length of forecast periods are summarized, including specifications of new instrumentation that must be developed to meet projected needs. (T.M.)
SF- AIAA
DE- <MAJOR> *AIR TRAFFIC CONTROL; *AVIONICS; *METEOROLOGICAL FLIGHT; *NAVIGATION AIDS
DE- AIRCRAFT GUIDANCE; AIRCRAFT SAFETY; CONFERENCES; HELICOPTERS; METEOROLOGICAL PARAMETERS; SUPERSONIC AIRCRAFT
SH- 6520 Meteorology (1965-74)

AN- <DIALOG> 00543182
AN- <AEROSPACE> A72-24923
TI- Maneuverability of jet helicopters
TI- <ORIGINAL> Manovrabilita dei velivoli a reazione
TI- <NOTATION OF CONTENT> Combat jet helicopter maneuverability, considering aircraft flying characteristics, pilot capability, flight configuration, altitude and load factor
AU- MALFERTAINER, A.
SO- Rivista Aeronautica, vol. 47, Dec. 1971, p. 2083-2106. In Italian.
PY- 1971
PD- 197112
LA- Italian
CP- Italy
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7210
AB- Review of the factors affecting the maneuverability of jet helicopters during the main types of maneuvers. It is shown that the maneuverability of a jet helicopter does not depend only on the flight characteristics of the helicopter and the capacity of the pilot, but also on other factors, such as the flight configuration and the flight altitude, and, to a considerable extent, also on the load factor. Attention is called to the phenomenon of false altitude readings of the altimeter, especially during diving or rapid climbing. (A.B.K.)
SF- AIAA
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *JET AIRCRAFT; *MANEUVERABILITY; *MILITARY HELICOPTERS
DE- AERODYNAMIC LOADS; FLIGHT ALTITUDE; FLIGHT CONDITIONS; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00540905
AN- <AEROSPACE> A72-22646
TI- A scientist in the cockpit - The case history and analysis of a UFO sighting.
TI- <NOTATION OF CONTENT> UFO sighting case history and analysis, discussing bright light approaching on collision course during night instrument flight rules
AU- WICHMAN, H. (California State College, San Bernardino, Calif.)
SO- Space Life Sciences, vol. 3, Dec. 1971, p. 165-170.
PY- 1971
PD- 197112
RF- 7
LA- English
GL- United States
CP- Netherlands
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7209
AB- A UFO sighting took place during a night instrument training flight on which the author served as flight instructor. The UFO was in the form of a bright light approaching on a collision course at a very high rate of speed - a rapid deceleration and hovering - a rapid acceleration away from the author's plane followed by another deceleration and hovering. This apparent reconnoitering activity was repeated approximately ten times after which the object failed to reappear. The paper describes the struggle the author went through, after the first stages of alarm subsided, in an attempt to explain by means of scientific principles what was being seen. A satisfactory tentative explanation was discovered and the method by which this came about is discussed as is the manner in which the explanation was tested in the cockpit. ((Author))
DE- <MAJOR> *COLLISION AVOIDANCE; *INSTRUMENT FLIGHT RULES; *UNIDENTIFIED FLYING OBJECTS
DE- CASE HISTORIES; ILLUSIONS; PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00540400
AN- <AEROSPACE> A72-22141
TI- Human aspects of vibration and noise in helicopters.
TI- <NOTATION OF CONTENT> Helicopter noise and vibration testing and cabin soundproofing for improved comfort
AU- JACKSON, C. E. P.; GRIMSTER, W. F. (Westland Helicopters, Ltd., Yeovil,

Somerset, England)
SO- (British Acoustical Society, Spring Meeting, Birmingham, England, Apr. 5-7, 1971.) Journal of Sound and Vibration, vol. 20, Feb. 8, 1972, p. 343-351.
PY- 1972
PD- 197202
LA- English
GL- United Kingdom
CP- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7208
AB- A resume is given of the types and sources of helicopter vibration. Methods of vibration testing and monitoring are dealt with, together with the relative merits of various methods of vibration reduction. The paper describes levels which are acceptable in service in terms of a velocity limit and the ISO/BSI proposals. Internal and external noise are briefly discussed and some information is given on results of internal cabin noise reduction. ((Author))
DE- <MAJOR> *AIRCRAFT NOISE; *HELICOPTER PERFORMANCE; *NOISE REDUCTION; *VIBRATION TESTS
DE- ACOUSTIC MEASUREMENT; AIRCRAFT COMPARTMENTS; COMFORT; CONFERENCES; HUMAN FACTORS ENGINEERING
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00534995
AN- <AEROSPACE> A72-16736
TI- Flight control
TI- <ORIGINAL> Flugregelung
TI- <NOTATION OF CONTENT> Flight control systems development, discussing onboard computers use in subsystems functional integration, stabilization and landing systems, inertial navigation and flight simulation
AU- REUTER, W.; SCHWEIZER, G.; SEELMANN, H. (Dornier AG, Friedrichshafen, West Germany)
SO- VDI-Z, vol. 113, Dec. 1971, p. 1414-1417. In German.
PY- 1971
PD- 197112
RF- 74
LA- German
GL- Germany
CP- Germany
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7205
AB- Review of advances made in the last decade in the development of flight control systems, and suggestion of future trends in this field. The role of the onboard computer in integrating the functions of all subsystems is noted, including some possible improvements achievable through the use of a decentralized computer arrangement. The possibility of further improvement in instrumentation, in stabilization and flight control systems (particularly for helicopters), and landing systems is discussed, and some features of inertial navigation and flight simulation are noted. (A.B.K.)
SF- AIAA
DE- <MAJOR> *AIRBORNE/SPACEBORNE COMPUTERS; *AIRCRAFT STABILITY; *AUTOMATIC LANDING CONTROL; *FLIGHT CONTROL; *INERTIAL NAVIGATION
DE- DISPLAY DEVICES; FLIGHT INSTRUMENTS; FLIGHT SIMULATION; HELICOPTER CONTROL; TECHNOLOGY ASSESSMENT
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00530667
AN- <AEROSPACE> A72-12408
TI- Data analysis system for Army flight testing.
TI- <NOTATION OF CONTENT> Army data analysis system for fixed and rotary wing aircraft flight testing, including airborne and computer controlled ground stations equipment
AU- KELLEY, A. L.; HAASE, R. J. (EMR-Telemetry, Sarasota, Fla.)
SO- In: Telemetry applications in the aerospace industry; Proceedings of the Seventeenth International Aerospace Instrumentation Symposium, Las Vegas, Nev., May 10-12, 1971. (A72-12402 02-07) Pittsburgh, Instrument Society of America, 1971, p. 40-47.
PY- 1971
PD- 197100
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
JA- IAA7202
AB- Discussion of the EMR-designed system used presently by the Army Aviation Systems Activity (ASTA) for improvement of fixed and rotary wing aircraft tests. Covered are components of the Advanced Instrumentation and Data Analysis System (AIDAS), including the

Airborne System, the computer-controlled Central Ground Station, and two computer-controlled mobile Remote Ground Stations (RGS). Details are given on the PCM and FM data acquisition packages of the Airborne System, RGS subsystems, computer subsystems, and software. The improvement of data reduction achieved with the AIDAS system is noted.(V.Z.)
SF- AIAA
DE- <MAJOR> *AIRBORNE EQUIPMENT; *DATA SYSTEMS; *FLIGHT TESTS; *GROUND STATIONS
DE- COMPUTERS; CONFERENCES; MILITARY AIR FACILITIES; MILITARY AIRCRAFT; MILITARY HELICOPTERS; SYSTEMS ENGINEERING; TELEMETRY
SH- 6507 Communications (1965-74)

AN- <DIALOG> 00522702
AN- <AEROSPACE> N71-33149
TI- Peer ratings as predictors of success in military aviation
TI- <NOTATION OF CONTENT> Development of procedure for predicting success of personnel in military aviation training
AU- BOYD, H. A.; BOYLES, W. R.; WAHLBERG, J. L.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1971
PD- 197103
PG- 19P.
NT- ITS HUMRRO PROF. PAPER NO. 1-71
NT- PRESENTED AT ALA. PSYCHOLOGICAL ASSOC. ANN. MEETING, ALA., MAY 1970
CN- DAHC19-70-C-0012
RN- AD-724695
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS AVAIL- NTIS
JA- STAR7120
DE- <MAJOR> *FLIGHT TRAINING; *FLYING PERSONNEL; *PERSONNEL SELECTION
DE- HELICOPTERS; HUMAN FACTORS ENGINEERING; HUMAN PERFORMANCE
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00522633
AN- <AEROSPACE> N71-33076
TI- IFR steep angle approach - Effects of system noise aircraft control augmentation variables Final report, Jan. 1969 - Jun. 1970
TI- <NOTATION OF CONTENT> Effects of aircraft system noise and signal fading on pilot performance during IFR approach based on computerized simulation of XV-5 aircraft and UH-1 helicopter
AU- BARRETT, M. F.; WOLF, J. D.
CS- Honeywell, Inc., Saint Paul, MN. RESEARCH DEPT.
CS- <CODE> HY608548
PY- 1970
PD- 197007
PG- 322P.
CN- N00014-68-C-0191
RN- AD-724336; JANAIR-700810; REPT-12571-FR2
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS AVAIL- NTIS
JA- STAR7120
DE- <MAJOR> *AIRCRAFT NOISE; *COMPUTERIZED SIMULATION; *INSTRUMENT FLIGHT RULES; *PILOT PERFORMANCE; *SIGNAL FADING
DE- APPROACH INDICATORS; GLIDE PATHS; UH-1 HELICOPTER; XV-5 AIRCRAFT
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00521521
AN- <AEROSPACE> N71-31957
TI- Evaluation of in-flight simulation using a helicopter of variable stability and control with regard to its use as an auxiliary in aircraft development
TI- <ORIGINAL> Auswertung von freiflugsimulationen mit einem hubschrauber variabler stabilitaet und steuerbarkeit im hinblick auf seine eignung als hilfsmittel bei der flugzeugentwicklung
TI- <NOTATION OF CONTENT> Evaluation of in-flight simulation of flying platform using helicopter with variable stability and maneuverability
AU- SCHMIDTLEIN, H.
CS- Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (Germany).
CS- <CODE> VJ799120

PY- 1971
PD- 197105
NT- IN DGLR FLIGHT MECH. SIMULATION, GROUND BASED OR IN-FLIGHT MAY 1971
P 129-168 /SEE N71-31951 19-11/
LA- German
GL- Germany
CP- Germany
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7119
DE- <MAJOR> *FLIGHT SIMULATION; *FLYING PLATFORMS; *HELICOPTERS; *HOVERING
STABILITY; *MANEUVERABILITY
DE- AIRBORNE EQUIPMENT; AIRBORNE/SPACEBORNE COMPUTERS; CONFERENCES; FLIGHT
CHARACTERISTICS; FLY BY WIRE CONTROL; PILOT PERFORMANCE
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00516420
AN- <AEROSPACE> N71-26801
TI- Equipment device task commonality analysis and transfer of training
TI- <NOTATION OF CONTENT> Task commonality analysis of training equipment and devices to maximize positive transfer of training
AU- CARO, P. W.
CS- Human Resources Research Organization, Alexandria, VA. DIV. 6 /AVIATION/.
CS- <CODE> H6869368
PY- 1970
PD- 197006
PG- 37P.
CN- DAHC19-70-C-0012
RN- AD-709534; HUMRRO-TR-70-7
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS AVAIL- NTIS
JA- STAR7115
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *MAN MACHINE SYSTEMS; *TRAINING
DEVICES; *TRANSFER OF TRAINING
DE- FLIGHT TRAINING; MILITARY TECHNOLOGY; OPERATOR PERFORMANCE; ROTARY WING AIRCRAFT
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00513078
AN- <AEROSPACE> N71-23430
TI- Problems encountered in nap of the earth flying and their effect on aircraft design mission performance
TI- <NOTATION OF CONTENT> Flying safety factors in close to ground operational design of XH-51 helicopter
AU- DEWEY, L. R., JR.
CS- Army Aviation Systems Command, Saint Louis, MO.
CS- <CODE> AZ155219
PY- 1971
PD- 197103
NT- IN AGARD LESSONS WITH EMPHASIS ON FLIGHT MECH. FROM OPERATING EXPERIENCE, INCIDENTS AND ACCIDENTS MAR. 1971 /SEE N71-23410 12-02/
LA- English
GL- International Organization
CP- International Organization
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7112
SF- NASA CASI
DE- <MAJOR> *HUMAN FACTORS ENGINEERING; *SAFETY FACTORS; *STRUCTURAL DESIGN
; *XH-51 HELICOPTER
DE- AIRCRAFT ACCIDENT INVESTIGATION; CONFERENCES; FLIGHT SAFETY; LOW LEVEL
TURBULENCE; MILITARY HELICOPTERS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00510290
AN- <AEROSPACE> N71-20628
TI- The effect of earplugs on passenger speech reception in rotary-wing aircraft
TI- <NOTATION OF CONTENT> Direct person-to-person voice communication in rotary wing aircraft improved by use of earplugs
AU- FORSTALL, J. R.; PARSONS, W. C.; WILLIAMS, C. E.

CS- Naval Aerospace Medical Inst., Pensacola, FL. NAVAL AEROSPACE MEDICAL RESEARCH LAB.
CS- <CODE> NN868269
PY- 1970
PD- 197010
PG- 14P.
RN- AD-716768; NAMRL-1121
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7110
DE- <MAJOR> *EAR PROTECTORS; *ROTARY WING AIRCRAFT; *SPEECH RECOGNITION; *VOICE COMMUNICATION
DE- AIRCRAFT COMMUNICATION; AIRCRAFT NOISE; HUMAN FACTORS ENGINEERING
SH- <COSATI> 6 Biological & Medical Sciences
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00510021
AN- <AEROSPACE> N71-20355
TI- Flight crew adaptability to the helicopter vibration environment
TI- <NOTATION OF CONTENT> Vibration effects on performance of helicopter flight crews
AU- DANAHER, J. W.
CS- Matrix Corp., Alexandria, VA.
CS- <CODE> ML130689
PY- 1971
PD- 197103
NT- IN AGARD ADAPTATION AND ACCLIMATISATION IN AEROSPACE MED. MAR. 1971 /SEE N71-20351 09-04/
NT- SPONSORED BY ONR
LA- English
GL- International Organization
CP- International Organization
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7109
DE- <MAJOR> *FLIGHT CREWS; *HELICOPTERS; *HUMAN PERFORMANCE; *VIBRATION EFFECTS
DE- ADAPTATION; BIOMEDICAL DATA; CONFERENCES; DIGITAL SYSTEMS; DISPLAY DEVICES; SENSE ORGANS
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00508412
AN- <AEROSPACE> N71-18734
TI- Visual detection of illuminating surfaces
TI- <NOTATION OF CONTENT> Feasibility of electroluminescent panels and rotor tip lighting for military helicopters to aid in observation by other vehicles in formation
AU- MARUYAMA, R. T.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1970
PD- 197010
PG- 74P.
RN- AD-715851; HEL-TM-26-70
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7108
DE- <MAJOR> *ELECTROLUMINESCENCE; *LUMINAIRES; *MILITARY HELICOPTERS; *VISUAL OBSERVATION
DE- HUMAN FACTORS ENGINEERING; MATHEMATICAL MODELS; PANELS; ROTARY WINGS; SKY BRIGHTNESS; SURFACE PROPERTIES
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00507697
AN- <AEROSPACE> N71-18018
TI- Functional requirements for ground-based trainers - Helicopter response characteristics
TI- <NOTATION OF CONTENT> Functional requirements for ground-based

trainers, helicopter response characteristics
AU- MATHENY, W. G.; WILKERSON, L. E.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1970
PD- 197010
PG- 121P.
CN- DAHC19-70-C-0012
RN- AD-714954; HUMRRO-TR-70-17
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7107
DE- <MAJOR> *FLIGHT CONTROL; *FLIGHT SIMULATORS; *HELICOPTERS; *MAN MACHINE
SYSTEMS; *PILOT PERFORMANCE
DE- DISPLAY DEVICES; PILOT TRAINING
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00507430
AN- <AEROSPACE> N71-17750
TI- A third study of factors affecting aircrew morale Final report, Sep. 1969 - Apr. 1970
TI- <NOTATION OF CONTENT> Survey of helicopter flight crew morale
AU- DRYDEN, R. S.; HARTMAN, B. O.; KIRSCHNER, L. J.
CS- School of Aerospace Medicine, Brooks AFB, TX.
CS- <CODE> SD261436
PY- 1970
PD- 197010
PG- 19P.
RN- AD-715015; SAM-TR-70-55
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7107
DE- <MAJOR> *FLIGHT CREWS; *MORALE; *SURVEYS
DE- AIRCRAFT SAFETY; HELICOPTERS; MOTIVATION
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00505973
AN- <AEROSPACE> N71-16262
TI- Rotary wing vehicle external stores jettison envelope pilot established requirements Final report, Mar. 1968 - Feb. 1970
TI- <NOTATION OF CONTENT> Rotary wing aircraft external stores jettison systems
AU- DAVIS, W. B.; HOFFMAN, A. L.
CS- Army Aviation Systems Test Activity, Edwards AFB, CA.
CS- <CODE> AZ161666
PY- 1970
PD- 197008
PG- 44P.
RN- AD-713872; USAASTA-68-22
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7106
DE- <MAJOR> *EXTERNAL STORES; *JETTISON SYSTEMS; *ROTARY WING AIRCRAFT
DE- AIRCRAFT CONTROL; AIRCRAFT STABILITY; PILOT PERFORMANCE; SPECIFICATIONS

SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00505730
AN- <AEROSPACE> N71-16019
TI- Suitability flight test of the Kaiser FP-50A display unit in the AH-1G /COBRA/ helicopter
TI- <NOTATION OF CONTENT> Flight test of fire control system in AH-1G helicopter
AU- FOSTER, M., JR.; STOWELL, H. R.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1970

PD- 197009
PG- 30P.
RN- AD-714670; HEL-TN-9-70
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7106
DE- <MAJOR> *DISPLAY DEVICES; *FIRE CONTROL; *MILITARY HELICOPTERS
DE- FLIGHT TESTS; HUMAN FACTORS ENGINEERING; MILITARY TECHNOLOGY; SYSTEMS
ENGINEERING
SH- <COSATI> 19 Ordnance
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00502141
AN- <AEROSPACE> N71-12400
TI- Sonar detection of submarines by helicopter
TI- <NOTATION OF CONTENT> Sonar detection of submarines by helicopter and protection of flight crew hearing
CS- National Academy of Sciences - National Research Council, Washington, DC. COMMITTEE ON HEARING, BIOACOUSTICS, AND BIOMECHANICS.
CS- <CODE> NB210513
PY- 1970
PD- 197008
PG- 11P.
CN- NONR-2300/05/
RN- AD-711910
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7103
DE- <MAJOR> *ANTISUBMARINE WARFARE AIRCRAFT; *FLIGHT CREWS; *HEARING;
*SONAR
DE- AIRBORNE EQUIPMENT; HELICOPTERS; HELMETS; HUMAN FACTORS ENGINEERING;
SUBMARINES
SH- <COSATI> 20 Physics
SH- 6507 Communications (1965-74)

AN- <DIALOG> 00501565
AN- <AEROSPACE> N71-11814
TI- Pilot performance and refractive error
TI- <NOTATION OF CONTENT> Refractive error effects on pilot performance during rotary wing and fixed wing training
AU- CROSLEY, J. K.
CS- Army Aeromedical Research Lab., Fort Rucker, AL.
CS- <CODE> AY826435
PY- 1970
PD- 197009
NT- IN AGARD MED.-LEGAL ASPECTS OF AVIATION SEP. 1970 /SEE N71-11801 02-04/
LA- English
GL- International Organization
CP- International Organization
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7102
DE- <MAJOR> *ASTIGMATISM; *PILOT PERFORMANCE; *VISUAL PERCEPTION
DE- AEROSPACE MEDICINE; CONFERENCES; HUMAN REACTIONS; PILOT TRAINING
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00500467
AN- <AEROSPACE> N71-10705
TI- Airspeed influence on noise within fixed- and rotary-wing aircraft
Research report, Jan. 1966 - Oct. 1969
TI- <NOTATION OF CONTENT> Airspeed contribution to noise level within fixed and rotary wing aircraft
AU- GASAWAY, D. C.
CS- School of Aerospace Medicine, Brooks AFB, TX.
CS- <CODE> SD261436
PY- 1970
PD- 197006
PG- 22P.
RN- AD-711359; SAM-TR-70-27
LA- English
GL- United States

CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7101
DE- <MAJOR> *AERODYNAMIC NOISE; *AIRCRAFT NOISE; *AIRSPEED
DE- COCKPITS; ENGINE NOISE; HUMAN FACTORS ENGINEERING; NOISE INTENSITY;
ROTARY WINGS
SH- <COSATI> 20 Physics
SH- 6523 Physics, General (1965-74)

AN- <DIALOG> 00499597
AN- <AEROSPACE> N70-43030
TI- A new approach to the specification and evaluation of flying qualities Final report
TI- <NOTATION OF CONTENT> Pilot-vehicle analysis method for specification and evaluation of flying qualities with application to vertical takeoff aircraft
AU- ANDERSON, R. O.
CS- Air Force Systems Command, Wright-Patterson AFB, OH. FLIGHT DYNAMICS LAB.
CS- <CODE> AJ773273
PY- 1970
PD- 197006
PG- 74P.
RN- AD-710590; AFFDL-TR-69-120
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7024
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *PERFORMANCE PREDICTION; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- FLIGHT CONTROL; HOVERING STABILITY; MAN MACHINE SYSTEMS; MATHEMATICAL
MODELS; SYSTEMS ENGINEERING
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00496514
AN- <AEROSPACE> N70-39891
TI- A study of the US Coast Guard aviator training requirements
TI- <NOTATION OF CONTENT> Aircraft and simulator training equipment for aviator training and training requirements for Coast Guard search and rescue operations
AU- BROWN, G. E., JR.; CARO, P. W., JR.; HALL, E. R.; JOLLEY, O. B.
CS- Human Resources Research Organization, Alexandria, VA.
CS- <CODE> H6869368
PY- 1969
PD- 196912
PG- 103P.
CN- DOT-CG-92556-A
RN- AD-707677; HUMRRO-TR-69-102
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7022
DE- <MAJOR> *HELICOPTERS; *PILOT TRAINING; *RESCUE OPERATIONS; *TRAINING
AIRCRAFT; *TRAINING SIMULATORS
DE- NAVIGATION; PILOT PERFORMANCE; PROGRAMMED INSTRUCTION
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00495101
AN- <AEROSPACE> N70-38457
TI- Exploratory study of pilot performance during high ambient temperatures/humidity
TI- <NOTATION OF CONTENT> Helicopter pilot performance during high humidity and temperature stress
AU- BARNES, J. A.; MORELAND, S.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1970
PD- 197003
PG- 88P.
RN- AD-707371; HEL-TM-6-70
LA- English
GL- United States
CP- United States

DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7021
DE- <MAJOR> *AIRCRAFT PILOTS; *HIGH TEMPERATURE ENVIRONMENTS; *HUMAN
PERFORMANCE; *HUMIDITY; *STRESS (PHYSIOLOGY)
DE- AMBIENT TEMPERATURE; FLIGHT STRESS (BIOLOGY); MILITARY HELICOPTERS
SH- <COSATI> 6 Biological & Medical Sciences
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00490784
AN- <AEROSPACE> N70-33974
TI- Cockpit noise exposures associated with the operation of fixed and rotary wing aircraft Final report, Jul. 1966 - Jul. 1969
TI- <NOTATION OF CONTENT> Cockpit noise exposures associated with operation of fixed and rotary wing aircraft
AU- GASAWAY, D. C.
CS- School of Aerospace Medicine, Brooks AFB, TX.
CS- <CODE> SD261436
PY- 1970
PD- 197004
PG- 22P.
RN- AD-705964; SAM-TR-70-21
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7018
DE- <MAJOR> *AIRCRAFT NOISE; *FLIGHT CREWS; *NOISE INTENSITY; *ROTARY WINGS
DE- HUMAN FACTORS ENGINEERING
SH- <COSATI> 20 Physics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00490781
AN- <AEROSPACE> N70-33971
TI- Effects of varying levels of autopilot assistance and workload on pilot performance in the helicopter formation flight mode Final technical report, Dec. 1967 - Apr. 1968
TI- <NOTATION OF CONTENT> Varying levels of autopilot assistance and workload effects on pilot performance in helicopter formation flight mode
AU- ANDERSON, P. A.; TOIVANEN, M. L.
CS- Honeywell, Inc., Minneapolis, MN. SYSTEMS AND RESEARCH CENTER.
CS- <CODE> HY260724
PY- 1970
PD- 197003
PG- 244P.
CN- N00014-66-C-0362
RN- AD-706001; REPT-12543-FR4; JANAIR-680610
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7018
DE- <MAJOR> *AUTOMATIC PILOTS; *FLIGHT CONTROL; *HELICOPTERS; *PILOT PERFORMANCE
DE- OPERATIONS RESEARCH; STATISTICAL ANALYSIS; TASK COMPLEXITY; WORK
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00489145
AN- <AEROSPACE> N70-32317
TI- IFR formation flight display/system requirements for advanced rotary-wing and jet- fighter aircraft Final technical report, Jun. 1968 - Jun. 1969
TI- <NOTATION OF CONTENT> Manual IFR formation flight display system requirements for advanced rotary wing and jet fighter aircraft
AU- ANDERSON, P. A.; HOPPE, R. B.; TOIVANEN, M. L.
CS- Honeywell, Inc., Minneapolis, MN. SYSTEMS AND RESEARCH DIV.
CS- <CODE> HY260724
SP- JX983998
PY- 1970
PD- 197003
PG- 315P.
CN- N00014-66-C-0362
RN- AD-705133; HONEYWELL-12543-FR5; JANAIR-690616
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7017
DE- <MAJOR> *AIRCRAFT CONTROL; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS; *JET
AIRCRAFT; *ROTARY WING AIRCRAFT
DE- ELECTRONIC EQUIPMENT; FEEDBACK CONTROL; FIGHTER AIRCRAFT; FLIGHT
SIMULATION; INSTRUMENT FLIGHT RULES; PILOT PERFORMANCE
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00486480
AN- <AEROSPACE> N70-29619
TI- Several man/machine considerations for helicopters
TI- <NOTATION OF CONTENT> Man machine considerations for helicopters
AU- COOPER, D. E.; SZUSTAK, L. S.
CS- United Aircraft Corp., Stratford, CT. SIKORSKY AIRCRAFT DIV.
CS- <CODE> UK265625
PY- 1970
PD- 197003
NT- IN AGARD PROBL. OF THE COCKPIT ENVIRONMENT MAR. 1970 /SEE N70-29618
15-02/
LA- English
GL- International Organization
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7015
DE- <MAJOR> *HELICOPTER CONTROL; *HELICOPTER DESIGN; *MAN MACHINE SYSTEMS
DE- CONFERENCES; DEGREES OF FREEDOM; FLIGHT TESTS; PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00486479
AN- <AEROSPACE> N70-29618
TI- Problems of the cockpit environment
TI- <NOTATION OF CONTENT> Problems of cockpit environment including crew capability under stress, information transfer, correlating crew training with automated assistance, instrumentation, and display control
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1970
PD- 197003
PG- 396P.
NT- PRESENTED AT 16TH AVIONICS PANEL TECH. SYMP., AMSTERDAM, NOV. 1968
RN- AGARD-CP-55
LA- MULTIPLE
LA- <NOTE> MOSTLY IN ENGLISH, PARTLY IN FRENCH
GL- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7015
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPIT SIMULATORS; *CONFERENCES;
*DISPLAY DEVICES; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- AIRCRAFT DESIGN; ALL-WEATHER AIR NAVIGATION; ANTHROPOMETRY; CREWS;
ENGINE MONITORING INSTRUMENTS; HELICOPTERS; NAVIGATION AIDS; V/STOL
AIRCRAFT; VERTICAL TAKEOFF AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00483838
AN- <AEROSPACE> N70-26948
TI- A systems analysis of manual control techniques and display arrangements for instrument landing approaches in helicopters. Volume 1 - Speed and height regulation Final report
TI- <NOTATION OF CONTENT> Systems analysis of manual control techniques and display arrangements for instrument landing approaches in helicopters - speed and height regulation
AU- CLEMENT, W. F.; HOFMANN, L. G.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
SP- JX983998
PY- 1969

PD- 196907
PG- 232P.
NT- SPONSORED IN PART BY THE ARMY ELECTRON COMMAND
CN- N00014-68-C-0443
RN- AD-700946; STI-TR-183-1; JANAIR-690718
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7013
DE- <MAJOR> *HELICOPTERS; *LANDING INSTRUMENTS; *PILOT PERFORMANCE; *SYSTEMS ANALYSIS
DE- AIRSPEED; ALTITUDE CONTROL; DISPLAY DEVICES
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00479225
AN- <AEROSPACE> N70-22195
TI- A hierarchical model of a helicopter pilot
TI- <NOTATION OF CONTENT> Decision making hierarchical model of helicopter model mechanized by computer simulation
AU- BENJAMIN, P. /PH.D. THESIS/
CS- Northwestern Univ., Evanston, IL.
CS- <CODE> N6683851
PY- 1968
PD- 196800
PG- 106P.
LA- English
GL- United States
CP- United States
DT- THESIS
JA- STAR7009
DE- <MAJOR> *COMPUTERIZED SIMULATION; *HELICOPTER CONTROL; *HIERARCHIES; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE
DE- CASCADE CONTROL; DECISION MAKING; DIGITAL COMPUTERS; MATHEMATICAL MODELS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00477466
AN- <AEROSPACE> N70-20362
TI- Effects of vibration on Navy and Marine Corps helicopter flight crews Final report, 1 Feb. - 31 Jul. 1969
TI- <NOTATION OF CONTENT> Vibration effects on military helicopter flight crews
AU- DANAHER, J. W.; KETCHEL, J. M.; MORRISSEY, C. J.
CS- Matrix Corp., Alexandria, VA.
CS- <CODE> ML130689
PY- 1969
PD- 196908
PG- 183P.
CN- N00014-69-C-0289
RN- AD-698194
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7008
DE- <MAJOR> *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *VIBRATION EFFECTS
DE- FLIGHT CONDITIONS; FLIGHT FATIGUE; FLIGHT STRESS (BIOLOGY); PSYCHOMOTOR PERFORMANCE; ROTARY WINGS
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00476888
AN- <AEROSPACE> N70-19781
TI- Energy cost of piloting fixed and rotary wing army aircraft
TI- <NOTATION OF CONTENT> Energy costs of piloting military helicopters and fixed wing aircraft
AU- LITTELL, D. E.
CS- Army Aeromedical Research Unit, Fort Rucker, AL.
CS- <CODE> AY832881
PY- 1969
PD- 196912
NT- IN AGARD MEAS. OF AIRCREW PERFORMANCE DEC. 1969 /SEE N70-19779 08-04/
LA- English
GL- International Organization

CP- International Organization
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7008
DE- <MAJOR> *AIRCRAFT PILOTS; *ENERGY BUDGETS; *FLIGHT STRESS (BIOLOGY);
*MILITARY AIRCRAFT; *OXYGEN METABOLISM
DE- CONFERENCES; ENERGY REQUIREMENTS; FIXED WINGS; MILITARY HELICOPTERS;
PILOT PERFORMANCE; WORK CAPACITY
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00472046
AN- <AEROSPACE> N70-14883
TI- An analysis of pilot adaptation in a simulated multiloop VTOL hovering task
TI- <NOTATION OF CONTENT> Analysis of pilot adaptation in simulated multiloop VTOL hovering task in turbulent air
AU- MILLER, D. P.; VINJE, E. W.
CS- United Aircraft Corp., East Hartford, CT. RESEARCH LABS.
CS- <CODE> UJ140625
PY- 1969
PD- 196900
NT- IN NASA, WASHINGTON FOURTH ANN. NASA- UNIV. CONF. ON MANUAL CONTROL
1969 P 95-117 /SEE N70-14876 04-05/
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR7004
DE- <MAJOR> *HOVERING; *MANUAL CONTROL; *PILOT PERFORMANCE; *VERTICAL
TAKEOFF AIRCRAFT
DE- ATMOSPHERIC TURBULENCE; CONFERENCES; FEEDBACK CONTROL; FLIGHT SIMULATION; MATHEMATICAL MODELS
SH- <COSATI> 5H Man-machine Relations
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00455334
AN- <AEROSPACE> A71-33417
TI- The sound of rotorcraft
TI- <NOTATION OF CONTENT> Rotorcraft sound characteristics, discussing rotor noise spectrum, directivity, measurement and instrumentation
AU- LEVERTON, J. W. /WESTLAND HELICOPTERS, LTD., YEOVIL, SOMERSET, SOUTHAMPTON, U., SOUTHAMPTON, ENGLAND/.
PY- 1971
PD- 197106
RF- 38
NT- AERONAUTICAL JOURNAL, VOL. 75, P. 385- 397.
LA- English
GL- United Kingdom
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7116
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *NOISE SPECTRA; *ROTARY WING AIRCRAFT
DE- ACOUSTIC MEASUREMENT; ROTOR LIFT; SOUND PROPAGATION; TIP SPEED
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00442966
AN- <AEROSPACE> A71-21049
TI- Flight operations to minimize noise
TI- <NOTATION OF CONTENT> Helicopter noise minimization by various piloting maneuvers, discussing takeoff and landing, transition to forward flight, route selection, etc
AU- HALWES, D. R. /BELL HELICOPTER CO., FORT WORTH, TEX./.
PY- 1971
PD- 197102
RF- 5
NT- VERTIFLITE, VOL. 17, P. 4-9.
NT- /AMERICAN HELICOPTER SOCIETY, AMERICAN INST. OF AERONAUTICS AND ASTRONAUTICS, AND U. OF TEXAS, JOINT SYMPOSIUM ON ENVIRONMENTAL EFFECTS
ON VTOL DESIGNS, ARLINGTON, TEX., NOV. 16-18, 1970, PROCEEDINGS./
LA- English
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7108
SF- AIAA

DE- <MAJOR> *AIRCRAFT NOISE; *HELICOPTER PERFORMANCE; *NOISE REDUCTION;
*PILOT PERFORMANCE
DE- AIRCRAFT LANDING; CONFERENCES; GRAPHS (CHARTS); MANEUVERS; VERTICAL
TAKEOFF
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00442038
AN- <AEROSPACE> A71-20121
TI- Mathematical simulation of functional systems estimating distances by visual observations of the size, gradient and velocity of landmarks
TI- <ORIGINAL> /Matematicheskoe modelirovanie funktsional'nykh sistem otsenki udalennosti po vidimoi velichine orientira, ee gradientu i vidimoi skorosti/
TI- <NOTATION OF CONTENT> Mathematical simulation of visual distance perception capacity of man from ground reference landmarks observation during vertical flight
AU- BELIK, IA. IA.
PY- 1970
PD- 197000
NT- PROBLEMY BIONIKI, NO. 2, P. 107-110.
LA- Russian
GL- U.S.S.R.
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7107
SF- AIAA
DE- <MAJOR> *LANDMARKS; *MATHEMATICAL MODELS; *SPACE PERCEPTION; *VERTICAL
FLIGHT; *VISUAL OBSERVATION
DE- BIONICS; PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00437361
AN- <AEROSPACE> A71-15444
TI- Experiments on pilot visibility from a V/STOL in overwater hover
TI- <NOTATION OF CONTENT> V/STOL spray generation tests concerning pilot visibility impairment in low altitude overwater hover
AU- KURYLOWICH, G.; RITTER, A. /CORNELL AERONAUTICAL LAB., INC., BUFFALO, N.Y./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY, INC.
PY- 1970
PD- 197000
PG- 12P.
RF- 11
NT- IN- AMERICAN HELICOPTER SOCIETY, AMERICAN INST. OF AERONAUTICS AND
ASTRONAUTICS, AND U. OF TEXAS, JOINT SYMPOSIUM ON ENVIRONMENTAL EFFECTS
ON VTOL DESIGNS, ARLINGTON, TEX., NOV. 16-18, 1970, PROCEEDINGS.
/A71-15401 04-02/
CN- N00014-66-C-0320; N00014-68-C-0241
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7104
SF- AIAA
DE- <MAJOR> *HOVERING; *PILOT PERFORMANCE; *SPRAY CHARACTERISTICS; *V/STOL
AIRCRAFT; *VISIBILITY
DE- CONFERENCES; GROUND EFFECT MACHINES; HOVERING; LOW ALTITUDE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00437331
AN- <AEROSPACE> A71-15414
TI- An analytical method to predict ideal H-V boundary and C.D.P. of rotorcraft with special attention to the application of optimalizing techniques
TI- <NOTATION OF CONTENT> Rotorcraft ideal height-velocity boundary and critical decision point height prediction, discussing pilots optimal control under emergency conditions
AU- KOMODA, M. /NATIONAL AEROSPACE LAB., TOKYO, JAPAN/.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY, INC.
PY- 1970
PD- 197000
PG- 10P.
RF- 8
NT- IN- AMERICAN HELICOPTER SOCIETY, AMERICAN INST. OF AERONAUTICS AND

ASTRONAUTICS, AND U. OF TEXAS, JOINT SYMPOSIUM ON ENVIRONMENTAL EFFECTS
ON VTOL DESIGNS, ARLINGTON, TEX., NOV. 16-18, 1970, PROCEEDINGS.
/A71-15401 04-02/
LA- English
GL- Japan
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7104
SF- AIAA
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *OPTIMAL CONTROL; *PILOT PERFORMANCE;
*ROTORCRAFT AIRCRAFT
DE- CONFERENCES; EQUATIONS OF STATE; TRAJECTORY OPTIMIZATION
SH- 6501 Aerodynamics (1965-74)

AN- <DIALOG> 00437325
AN- <AEROSPACE> A71-15408
TI- Flight operations to minimize helicopter noise
TI- <NOTATION OF CONTENT> Helicopter noise minimization by various piloting maneuvers, discussing takeoff and landing, transition to forward flight, route selection, etc
AU- HALWES, D. /BELL HELICOPTER CO., FORT WORTH, TEX./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY, INC.
PY- 1970
PD- 197000
PG- 6P.
RF- 5
NT- IN- AMERICAN HELICOPTER SOCIETY, AMERICAN INST. OF AERONAUTICS AND
ASTRONAUTICS, AND U. OF TEXAS, JOINT SYMPOSIUM ON ENVIRONMENTAL EFFECTS
ON VTOL DESIGNS, ARLINGTON, TEX., NOV. 16-18, 1970, PROCEEDINGS.
/A71-15401 04-02/
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7104
SF- AIAA
DE- <MAJOR> *AIRCRAFT NOISE; *HELICOPTER PERFORMANCE; *NOISE REDUCTION;
*PILOT PERFORMANCE
DE- AIRCRAFT LANDING; CONFERENCES; GRAPHS (CHARTS); MANEUVERS; VERTICAL TAKEOFF
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00433293
AN- <AEROSPACE> A71-11376
TI- Survival
TI- <NOTATION OF CONTENT> Helicopter pilot and passengers emergency survival, considering gravitation force, human tolerances, design factors, etc
AU- FERRY, T. S. /SOUTHERN CALIFORNIA, U., LOS ANGELES, CALIF./.
PY- 1970
PD- 197011
NT- VERTIFLITE, VOL. 16, P. 2-5.
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7101
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *GRAVITATIONAL EFFECTS; *HELICOPTER DESIGN;
*HUMAN TOLERANCES; *SURVIVAL
DE- AUTOROTATION; CRASH LANDING; EMERGENCIES; FAIL-SAFE SYSTEMS; HUMAN
FACTORS ENGINEERING; SAFETY DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00429166
AN- <AEROSPACE> A70-43663
TI- Helicopter gravity measuring system
TI- <NOTATION OF CONTENT> Integrated helicopter gravity measuring system for various terrains, describing instrumentation and recording monitors
AU- COBB, G. E. /U.S. ARMY, TOPOGRAPHIC COMMAND, WASHINGTON, D.C./.;
GUMERT, W. R.
PU- <PLACE> PITTSBURGH
PU- <PUBLISHER> INSTRUMENT SOCIETY OF AMERICA
PY- 1970
PD- 197000

PG- 7P.
NT- IN- ADVANCES IN DYNAMIC GRAVIMETRY, PROCEEDINGS OF THE SYMPOSIUM ON
DYNAMIC GRAVIMETRY, FORT WORTH, TEX., MAR. 16, 17, 1970. P. 79-85.
/A70-43656 22-13/
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7022
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *GRAVIMETRY; *HELICOPTERS
DE- CONFERENCES; DATA RECORDING; FLIGHT TESTS; INFRARED SCANNERS;
TERRADYNAMICS; TERRAIN ANALYSIS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00424425
AN- <AEROSPACE> A70-38922
TI- Criteria for the design of helicopter collective controls
TI- <NOTATION OF CONTENT> Comfort plane switch mounting design for
helicopter collective controls, noting mock-up evaluation by test
pilots
AU- STAVE, A. M. /UNITED AIRCRAFT CORP., SIKORSKY AIRCRAFT DIV., STRATFORD, CONN./.
PY- 1970
PD- 197008
NT- HUMAN FACTORS, VOL. 12, P. 387-390.
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7019
SF- AIAA
DE- <MAJOR> *COMFORT; *CONTROL BOARDS; *HELICOPTER CONTROL; *HUMAN FACTORS
ENGINEERING; *PILOT PERFORMANCE
DE- ANGLES (GEOMETRY); HAND (ANATOMY); HELICOPTER DESIGN; MODELS; SWITCHES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00420234
AN- <AEROSPACE> A70-34731
TI- An investigation of the need for improved displays in heavy-lift
helicopters
TI- <NOTATION OF CONTENT> Heavy lift helicopters cockpit display problems,
describing photographic flight research program for data acquisition
AU- SHERBERT, A. T., JR. /BOEING CO., VERTOL DIV., PHILADELPHIA, PA./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY
PY- 1970
PD- 197006
PG- 8P.
NT- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 26TH, WASHINGTON,
D.C., JUN. 16-18, 1970.
LA- English
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7017
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *COCKPITS; *DISPLAY DEVICES; *HELICOPTER
DESIGN
DE- CONFERENCES; DATA ACQUISITION; HUMAN FACTORS ENGINEERING; PHOTOGRAPHIC
RECORDING
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00417826
AN- <AEROSPACE> A70-32323
TI- Instrumentation for measuring fatigue amplitude and phase signatures
TI- <NOTATION OF CONTENT> Analog/digital system for full scale airframe
fatigue amplitude and phase signature measurements on CH-46D tandem
rotor helicopter
AU- HEIDERSCHEIDT, G. A. /BOEING CO., VERTOL DIV., PHILADELPHIA, PA./.;
KADYSZEWSKI, R. V.
PY- 1970
PD- 197005
PG- 27P.
NT- SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS, SPRING MEETING, HUNTSVILLE,
ALA., MAY 19-22, 1970, PAPER.
LA- English

CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7015
SF- AIAA
DE- <MAJOR> *AIRFRAMES; *CH-46 HELICOPTER; *DATA ACQUISITION; *FATIGUE TESTS; *HELICOPTER DESIGN; *HYBRID COMPUTERS
DE- CONFERENCES; PHASE ERROR; SIGNATURE ANALYSIS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00417384
AN- <AEROSPACE> A70-31881
TI- Heat stress in the cockpit of the AH-1G Hueycobra helicopter
TI- <NOTATION OF CONTENT> Heat stress levels in cockpit of AH-1G Hueycobra helicopter parked in sunlight with closed canopy, using sweating copper mannikin
AU- BRECKENRIDGE, J. R.; LEVELL, C. A. /U.S. ARMY, RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS./.
PY- 1970
PD- 197006
RF- 8
NT- AEROSPACE MEDICINE, VOL. 41, P. 621-626.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7015
SF- AIAA
DE- <MAJOR> *CABIN ATMOSPHERES; *COCKPITS; *HEAT FLUX; *HELICOPTERS; *PILOT PERFORMANCE; *SOLAR HEATING
DE- ATMOSPHERIC TEMPERATURE; BIOINSTRUMENTATION; BIONICS; HEAT TOLERANCE; SOLAR RADIATION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00417274
AN- <AEROSPACE> A70-31771
TI- Automatic flight control in civil helicopters
TI- <NOTATION OF CONTENT> Automatic flight control and instrumentation in civil helicopters, examining military developments and Ferranti automatic stabilization system
AU- CURTIES, M. C. /FERRANTI, LTD., HOLLINWOOD, LANCS., ENGLAND/.
PY- 1970
PD- 197005
NT- FLIGHT SAFETY, VOL. 4, P. 3-11.
NT- /ELECTRONICS FOR CIVIL AVIATION, ELECTRONIC ENGINEERING ASSN. AND MINISTRY OF TECHNOLOGY, UNITED KINGDOM SYMPOSIUM, LONDON, ENGLAND, SEP. 15-19, 1969, PROCEEDINGS. PART 1 - ELECTRONICS IN FLIGHT CONTROL./
LA- English
GL- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7015
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *AUTOMATIC FLIGHT CONTROL; *CIVIL AVIATION; *HELICOPTER CONTROL
DE- AIRCRAFT STABILITY; CONFERENCES; CONTROL STABILITY; HELICOPTER DESIGN; MILITARY HELICOPTERS
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00416912
AN- <AEROSPACE> A70-31409
TI- An optimal control model of human response. II - Prediction of human performance in a complex task
TI- <NOTATION OF CONTENT> Model for pilots optimal manual control of hovering VTOL aircraft longitudinal position
AU- BARON, S.; KLEINMAN, D. L.; LEVISON, W. H. /BOLT BERANEK AND NEWMAN, INC., CAMBRIDGE, MASS./.
PY- 1970
PD- 197005
NT- AUTOMATICA, VOL. 6, P. 371-383.
CN- AF 33/615/-68-C-1192
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7014
DE- <MAJOR> *BIONICS; *HOVERING STABILITY; *MANUAL CONTROL; *OPTIMAL CONTROL; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT

DE- HUMAN FACTORS ENGINEERING; LONGITUDINAL STABILITY; MATHEMATICAL MODELS;
TASK COMPLEXITY
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00414945
AN- <AEROSPACE> A70-29441
TI- Physiological and psychological factors in 'The dark night takeoff accident'
TI- <NOTATION OF CONTENT> Pilot disorientation in dark night takeoff accident type, presenting illusory angular displacement of vertical, flight paths and sequential accelerations
AU- BULEY, L. E.; SPELINA, J. /INTERNATIONAL CIVIL AVIATION ORGANIZATION, MONTREAL, CANADA/.
PY- 1970
PD- 197005
RF- 11
NT- AEROSPACE MEDICINE, VOL. 41, P. 553-556.
NT- /AEROSPACE MEDICAL ASSN., ANNUAL SCIENTIFIC MEETING, 40TH, SAN FRANCISCO, CALIF., MAY 5-8, 1969./
LA- English
GL- Canada
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7013
SF- AIAA
DE- <MAJOR> *AIRCRAFT ACCIDENT INVESTIGATION; *OCULOGRAVIC ILLUSIONS; *PILOT ERROR; *TAKEOFF
DE- ACCIDENT PREVENTION; FLIGHT PATHS; HUMAN FACTORS ENGINEERING; PHYSIOLOGICAL FACTORS; PSYCHOLOGICAL FACTORS; VERTICAL PERCEPTION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00413890
AN- <AEROSPACE> A70-28386
TI- On man-machine coupling concerning the control of a machine whose dynamics do not present damping factors
TI- <NOTATION OF CONTENT> Man machine eye-integration coupling in tracking task applied to helicopters, ocean-going craft and propeller aircraft
AU- MEZIERE /COMPAGNIE DES COMPTEURS, S.A., MONTROUGE, HAUTS-DE-SEINE, FRANCE/.; RAOULT
PY- 1970
PD- 197003
PG- 27P.
NT- RESEARCH SUPPORTED BY THE DIRECTION DES RECHERCHES ET MOYENS D'ESSAIS.
NT- INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL, SYMPOSIUM ON AUTOMATIC
CONTROL, 3RD, TOULOUSE, FRANCE, MAR. 2-6, 1970, PAPER.
LA- English
GL- France
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7013
SF- AIAA
DE- <MAJOR> *MAN MACHINE SYSTEMS; *OPTICAL TRACKING; *PILOT PERFORMANCE;
*VISUAL TASKS
DE- AIRCRAFT CONTROL; CONFERENCES; HELICOPTERS; PROPELLER DRIVE; WATER
VEHICLES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00408967
AN- <AEROSPACE> A70-23463
TI- Analysis of visual search activity in skilled and novice helicopter pilots
TI- <NOTATION OF CONTENT> Visual search activity decrease observed as function of time-on-task for skilled and unskilled helicopter pilots, recording eye movements and blinks
AU- BYNUM, J. A. /WASHINGTON U., ST. LOUIS, MO./.; STERN, J. A.
PY- 1970
PD- 197003
NT- AEROSPACE MEDICINE, VOL. 41, P. 300-305.
NT- ARMY-SUPPORTED RESEARCH.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7009
SF- AIAA

DE- <MAJOR> *EYE MOVEMENTS; *HELICOPTERS; *PILOT PERFORMANCE; *SEARCHING;
*VISUAL TASKS
DE- AIRCRAFT PILOTS; PILOT TRAINING; TIME DEPENDENCE; VERTICAL MOTION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00408959
AN- <AEROSPACE> A70-23455
TI- Physiological cost of piloting rotary wing aircraft
TI- <NOTATION OF CONTENT> Metabolic and heart rates determined in experienced and inexperienced pilots during Hiller 12-E and 12-EL helicopters flight through standard maneuvers
AU- BASON, R.; BILLINGS, C. E.; GERKE, R. J. /OHIO STATE U., COLUMBUS, OHIO/.
PY- 1970
PD- 197003
NT- AEROSPACE MEDICINE, VOL. 41, P. 256-258.
NT- ARMY-SUPPORTED RESEARCH.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7009
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HEART RATE; *HELICOPTERS; *METABOLISM; *PILOT PERFORMANCE
DE- HOVERING; MANEUVERS; PHYSIOLOGICAL EFFECTS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00408516
AN- <AEROSPACE> A70-23012
TI- Psychic stress causing factors and psychic stress reactions
TI- <ORIGINAL> Psychische Stressoren und psychische Stress-Reaktionen
TI- <NOTATION OF CONTENT> Psychic stress causing factors and reactions in aircraft pilots on duty, analyzing harmful effects on organism
AU- FALCKENBERG, B. /BUNDESMINISTERIUM DER VERTEIDIGUNG, FLUGMEDIZINISCHES
INSTITUT, FUERSTENFELDBRUCK, WEST GERMANY/.; GERBERT, K.
PU- <PLACE> DARMSTADT
PU- <PUBLISHER> WEHR UND WISSEN VERLAGSGESELLSCHAFT
PY- 1968
PD- 196800
PG- 13P.
NT- IN- STRESS IN FLIGHT AND CURRENT PROBLEMS OF FLIGHT MEDICINE /STRESS
UND FLIEGEN SOWIE AKTUELLE PROBLEME DER FLUGMEDIZIN/. EDITED BY H. W.
KIRCHHOFF. /A70-23002 09-05/ /WEHRDIENST UND GESUNDHEIT. VOLUME 16/, P.
59-71.
LA- German
GL- Germany
DT- ANALYTIC OF COLLECTED WORK
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7009
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *HUMAN REACTIONS; *PILOT PERFORMANCE; *STRESS
(PSYCHOLOGY)
DE- HELICOPTERS; JET AIRCRAFT; ORGANISMS; PROPELLERS; SIGNS AND SYMPTOMS
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00408404
AN- <AEROSPACE> A70-22900
TI- Use of time-lapse photography in flight performance evaluation
TI- <NOTATION OF CONTENT> Time lapse photographic recording and scoring in-flight performance of helicopter aviator trainees during hypothetical tactical instrument mission
AU- CARO, P. W., JR. /U.S. ARMY, HUMAN RESOURCES RESEARCH ORGANIZATION,
FORT RUCKER, ALA./.; ISLEY, R. N.
PY- 1970
PD- 197002
RF- 12
NT- JOURNAL OF APPLIED PSYCHOLOGY, VOL. 54, P. 72-76.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7009
SF- AIAA

DE- <MAJOR> *CHRONOPHOTOGRAPHY; *PHOTOGRAPHIC RECORDING; *PILOT PERFORMANCE
; *PILOT TRAINING
DE- AIRCRAFT INSTRUMENTS; DATA RECORDING; HELICOPTER PERFORMANCE; MILITARY
PSYCHOLOGY; PERFORMANCE TESTS; PSYCHOLOGICAL TESTS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00407845
AN- <AEROSPACE> A70-22341
TI- The helicopter hoist rescue concept - Built-in limitations
TI- <NOTATION OF CONTENT> Helicopter hoist rescue system, considering
helicopter power, cable length, pilot visibility, etc
AU- CROSSEN, A. C. /BREEZE CORPS., INC., UNION, N.J./.
PY- 1970
PD- 197001
NT- SAFE ENGINEERING, VOL. 4, P. 21-26.
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7009
SF- AIAA
DE- <MAJOR> *HELICOPTER PERFORMANCE; *RESCUE OPERATIONS; *WINCHES
DE- CABLES (ROPES); GROUND-AIR-GROUND COMMUNICATION; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00407239
AN- <AEROSPACE> A70-21735
TI- Modifying flight testing techniques in order to obtain more meaningful
operational data
TI- <NOTATION OF CONTENT> Aircraft flight testing techniques modification
to cover maximum performance values
AU- SHAPLEY, J. J., JR. /U.S. ARMY, EDWARDS AFB, CALIF./.
PY- 1969
PD- 196900
RF- 8
NT- SOCIETY OF EXPERIMENTAL TEST PILOTS, TECHNICAL REVIEW, VOL. 9, NO. 4,
P. 87-93.
NT- /SOCIETY OF EXPERIMENTAL TEST PILOTS, SYMPOSIUM, 13TH, BEVERLY HILLS,
CALIF., SEP. 25-27, 1969./
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7008
SF- AIAA
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *FLIGHT TESTS; *PILOT PERFORMANCE
DE- AERONAUTICAL ENGINEERING; AIRCRAFT CONFIGURATIONS; CONFERENCES; FIXED
WINGS; ROTARY WING AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00404636
AN- <AEROSPACE> A70-19132
TI- Blind flight and navigation of helicopters conducting prolonged
maritime survival operations
TI- <ORIGINAL> Le vol sans visibilite et la navigation des helicopteres
effectuant des operations avec survols maritimes prolonges
TI- <NOTATION OF CONTENT> Blind flight and helicopter navigation during
prolonged maritime survival operations
AU- GROS, P. /SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, PARIS, FRANCE/.
PY- 1969
PD- 196900
NT- ASSOCIATION TECHNIQUE MARITIME ET AERONAUTIQUE, BULLETIN, NO. 69, P.
217-231.
NT- /ASSOCIATION TECHNIQUE MARITIME ET AERONAUTIQUE, SESSION, PARIS,
FRANCE, MAY 5-9, 1969./
LA- French
GL- France
DT- JOURNAL ARTICLE; CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7007
DE- <MAJOR> *AUTOMATIC FLIGHT CONTROL; *HELICOPTER CONTROL; *MARINE
TECHNOLOGY; *RESCUE OPERATIONS

DE- AIR NAVIGATION; AIRCRAFT SAFETY; AUTOMATIC PILOTS; CONFERENCES; PILOT
PERFORMANCE; SEA WATER; SURVIVAL
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00404364
AN- <AEROSPACE> A70-18860
TI- Decision processes in the adaptive behavior of human controllers
TI- <NOTATION OF CONTENT> Decision algorithms simulating human controller adaptive behavior in controlling VTOL aircraft in hover following stability augmentation system failure
AU- BEKEY, G. A. /SOUTHERN CALIFORNIA, U., LOS ANGELES, CALIF./.; PHATAK, A. V.
PY- 1969
PD- 196910
NT- IEEE TRANSACTIONS ON SYSTEMS SCIENCE AND CYBERNETICS, VOL. SSC-5, P.
339-351.
CN- NGR-05-018-022
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7007
SF- AIAA
DE- <MAJOR> *ADAPTIVE CONTROL; *ALGORITHMS; *DECISION MAKING; *MANUAL
CONTROL; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- DECISION THEORY; EMERGENCIES; HOVERING STABILITY; MATHEMATICAL MODELS;
SYSTEM FAILURES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00397640
AN- <AEROSPACE> A70-12136
TI- On estimating the capability of an avionic man- machine system
TI- <NOTATION OF CONTENT> Helicopter avionic systems man machine capability estimation based on pilot workload, applying results to design evolution
AU- JONES, A. L.; WINGERT, J. W. /HONEYWELL, INC., MINNEAPOLIS, MINN./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
PY- 1969
PD- 196900
PG- 14P.
NT- /IEEE CONFERENCE RECORD NO. 69 C58-MMS/
NT- IN- INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS AND ERGONOMICS RESEARCH SOCIETY, INTERNATIONAL SYMPOSIUM ON MAN-MACHINE SYSTEMS, ST.
JOHN'S COLL., CAMBRIDGE, ENGLAND, SEP. 8- 12, 1969, PROCEEDINGS. VOLUME
2 - TRANSPORT SYSTEMS AND VEHICLE CONTROL. /A70-12130 02-21/
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7002
SF- AIAA
DE- <MAJOR> *AVIONICS; *HELICOPTER DESIGN; *MAN MACHINE SYSTEMS; *PILOT
PERFORMANCE; *WORK CAPACITY
DE- CONFERENCES; FLIGHT CREWS; MISSION PLANNING; TASKS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00397638
AN- <AEROSPACE> A70-12134
TI- Evaluation of an automatic navigation system for use in helicopters
TI- <NOTATION OF CONTENT> Helicopter automatic hybrid navigation system for increased accuracy over unfamiliar terrain and above-human performance, comparing navigating pilot performance with machine
AU- LEWIS, R. E. F. /DEFENCE RESEARCH BOARD, DEFENCE RESEARCH ESTABLISHMENT, DOWNSVIEW, ONTARIO, CANADA/.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
PY- 1969
PD- 196900
PG- 13P.
NT- /IEEE CONFERENCE RECORD NO. 69 C58-MMS/
NT- IN- INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS AND ERGONOMICS RESEARCH SOCIETY, INTERNATIONAL SYMPOSIUM ON MAN-MACHINE SYSTEMS, ST.
JOHN'S COLL., CAMBRIDGE, ENGLAND, SEP. 8- 12- 1969, PROCEEDINGS. VOLUME
2 - TRANSPORT SYSTEMS AND VEHICLE CONTROL. /A70-12130 02-21/

LA- English
GL- Canada
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7002
SF- AIAA
DE- <MAJOR> *AUTOMATIC CONTROL; *HELICOPTER CONTROL; *HYBRID NAVIGATION
SYSTEMS; *PILOT PERFORMANCE
DE- CONFERENCES; DATA PROCESSING; DATA REDUCTION; DOPPLER RADAR; MAN
MACHINE SYSTEMS; SYSTEMS ENGINEERING
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00396788
AN- <AEROSPACE> A70-11284
TI- Application of moving-map displays in marine and air navigation.
TI- <NOTATION OF CONTENT> Moving map displays applications in marine and air navigation, discussing human factors and impact on ATC
AU- VICKERS, T. K. /ITT NAVIGATOR SYSTEMS, INC./.
PU- <PLACE> LOS ANGELES AND NORTH HOLLYWOOD, CALIF.
PU- <PUBLISHER> SOCIETY FOR INFORMATION DISPLAY AND WESTERN PERIODICALS
CO.
PY- 1969
PD- 196900
PG- 13P.
NT- /SID QUARTERLY PROCEEDINGS. VOLUME 10, NO. 2/
NT- IN- SOCIETY FOR INFORMATION DISPLAY, NATIONAL SYMPOSIUM ON INFORMATION
DISPLAY, 10TH, ARLINGTON, VA., MAY 27-29, 1969, TECHNICAL SESSION PROCEEDINGS. P. 139-151. /A70-11276 01-08/
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA7001
SF- AIAA
DE- <MAJOR> *AIR NAVIGATION; *DISPLAY DEVICES; *MAPS; *SURFACE NAVIGATION
DE- AIR TRAFFIC CONTROL; AIRLINE OPERATIONS; CONFERENCES; HELICOPTERS;
HUMAN FACTORS ENGINEERING; RESCUE OPERATIONS; TECHNOLOGY UTILIZATION
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00391466
AN- <AEROSPACE> N69-37256
TI- Effects of variations in system data rates and measurement accuracies on pilot performance in the helicopter IFR formation flight mode Final technical report, Dec. 1967 - Apr. 1968
TI- <NOTATION OF CONTENT> Pilot performance in helicopter IFR formation flight mode evaluated by system data rate and measurement variations
AU- ANDERSON, P. A.; TOIVANEN, M. L.
CS- Honeywell, Inc., Minneapolis, MN. SYSTEMS AND RESEARCH CENTER.
CS- <CODE> HY260724
PU- <PLACE> WASHINGTON, D. C.
PU- <PUBLISHER> JOINT ARMY-NAVY AIRCRAFT INSTRUMENTATION RES.
PY- 1969
PD- 196904
PG- 174P.
CN- N00014-66-C-0362
RN- AD-688200; REPT-12543-FR3; JANAIR-680408
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6922
DE- <MAJOR> *DATA SYSTEMS; *HELICOPTER PERFORMANCE; *INSTRUMENT FLIGHT
RULES; *PILOT PERFORMANCE; *SYSTEMS ANALYSIS
DE- ACCURACY; DISPLAY DEVICES; FLIGHT CONTROL; HUMAN FACTORS ENGINEERING
SH- <COSATI> 1 Aeronautics
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00387512
AN- <AEROSPACE> N69-33180
TI- Prediction of aviator performance
TI- <NOTATION OF CONTENT> Prediction of pilot performance based on helicopter training
AU- PROPHET, W. W.

CS- George Washington Univ., Alexandria, VA. HUMAN RESOURCES RESEARCH OFFICE.
CS- <CODE> GV744720
PY- 1969
PD- 196902
PG- 17P.
NT- ITS PROFESS. PAPER NO. 5-69
NT- PRESENTED AT ARMY AVIATION INSTRUCTORS CONF., FORT RUCKER, ALA., AUG. 1968
CN- DA-44-188-ARO-2
RN- AD-686619
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6918
DE- <MAJOR> *MANAGEMENT PLANNING; *PERFORMANCE PREDICTION; *PILOT PERFORMANCE
DE- COMBAT; DECISION MAKING; FLIGHT TRAINING; HELICOPTERS; MILITARY AVIATION; PILOT SELECTION; PREDICTIONS
SH- <COSATI> 5 Behavioral & Social Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00378837
AN- <AEROSPACE> N69-24246
TI- VTOL displays and controls for all-weather flight
TI- <NOTATION OF CONTENT> VTOL displays and controls for all-weather flight
AU- BAKER, C. A. /DOT, WASHINGTON, D. C./; CUNDARI, F. L. /ONR, WASHINGTON, D. C./; GURMAN, B. S. /ECOM, FT. MONMOUTH, N. J./; NICHOLSON, R. M.
CS- Honeywell, Inc., Minneapolis, MN.
CS- <CODE> HY260724
PY- 1968
PD- 196811
NT- IN AGARD PROBL. OF THE COCKPIT ENVIRON. NOV. 1968 /SEE N69-24230 12-02/
LA- English
GL- International Organization
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6912
SF- NASA CASI
DE- <MAJOR> *ALL-WEATHER AIR NAVIGATION; *DISPLAY DEVICES; *FLIGHT CONTROL; *VERTICAL TAKEOFF AIRCRAFT
DE- COCKPITS; DATA PROCESSING; ITERATIVE SOLUTION; MILITARY HELICOPTERS; OPTIMIZATION; PILOT PERFORMANCE; SIMULATION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00378822
AN- <AEROSPACE> N69-24231
TI- Special man/machine considerations for large helicopters
TI- <NOTATION OF CONTENT> Large high speed helicopter control and man/machine considerations
AU- COOPER, D. E.; SZUSTAK, L. S.
CS- United Aircraft Corp., East Hartford, CT. SIKORSKY AIRCRAFT DIV.
CS- <CODE> UJ140625
PY- 1968
PD- 196811
NT- IN AGARD PROBL. OF THE COCKPIT ENVIRON. NOV. 1968 /SEE N69-24230 12-02/
LA- English
GL- International Organization
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6912
SF- NASA CASI
DE- <MAJOR> *ENVIRONMENTAL ENGINEERING; *HELICOPTER CONTROL; *HIGH SPEED; *MAN MACHINE SYSTEMS
DE- AERODYNAMIC FORCES; AIRCRAFT CONFIGURATIONS; COCKPITS; CONTROLLERS; FEEDBACK CONTROL; FLIGHT TESTS; PILOT PERFORMANCE; STABILIZATION; VISIBILITY
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00378468
AN- <AEROSPACE> N69-23872
TI- An investigation of the feasibility of reshaping stick commands to

improve hovering control of unstabilized jet-lift aircraft
TI- <NOTATION OF CONTENT> Hydraulic integrating device for jet lift aircraft control in hovering flight
AU- WILSON, R. /QUEENS UNIV., BELFAST/
CS- Aeronautical Research Council, London (England).
CS- <CODE> AF325015
PY- 1968
PD- 196800
PG- 24P.
RN- ARC-R/M-3552; ARC-28532
LA- English
GL- United Kingdom
CP- United Kingdom
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS COPYRIGHT. AVAIL- CFSTI, HMSO
JA- STAR6912
DE- <MAJOR> *AIRCRAFT HYDRAULIC SYSTEMS; *CONTROL SIMULATION; *HOVERING STABILITY; *JET LIFT; *LOW SPEED STABILITY
DE- AIRCRAFT CONTROL; AIRCRAFT SAFETY; ATTITUDE CONTROL; ATTITUDE STABILITY ; CONTROL EQUIPMENT; CONTROLLABILITY; DISPLAY DEVICES; FAILURE; FEEDBACK; GEARS; HOVERING; INTEGRATORS; LINKAGES; LOOPS; OPTIMAL CONTROL; PILOT PERFORMANCE; STEERING; STEP FUNCTIONS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00375080
AN- <AEROSPACE> N69-20381
TI- VTOL IFR technology program
TI- <NOTATION OF CONTENT> Instrument flight rule program for achieving maximum pilot safety in operation of VTOL weapon systems
AU- BONDURANT, R. A., III; KEARNS, J. H., III
CS- Air Force Systems Command, Wright-Patterson AFB, OH. AIR FORCE FLIGHT DYNAMICS LAB.
CS- <CODE> AJ773273
PY- 1968
PD- 196809
PG- 6P.
NT- PRESENTED AT AGARD SYMP. ON ADVANCED CONTROL SYSTEM CONCEPTS, OSLO, 1968
RN- C-153-4
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6909
SF- NASA CASI
DE- <MAJOR> *AUTOMATIC PILOTS; *FLIGHT SIMULATORS; *INSTRUMENT FLIGHT RULES ; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT INSTRUMENTS; AUTOMATIC FLIGHT CONTROL; CH-3 HELICOPTER; DISPLAY DEVICES; MAN MACHINE SYSTEMS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00375006
AN- <AEROSPACE> N69-20303
TI- A study of factors that affect the performance of Army flight crew personnel Interim report
TI- <NOTATION OF CONTENT> Factors influencing flight crew performance
CS- Federation of American Societies for Experimental Biology, Washington, DC. LIFE SCIENCES RESEARCH OFFICE.
CS- <CODE> FN425345
PY- 1969
PD- 196901
PG- 46P.
CN- DAHC19-68-C-0001
RN- AD-681239
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6909
DE- <MAJOR> *FLIGHT CREWS; *HUMAN PERFORMANCE; *MILITARY AVIATION; *STRESS (PHYSIOLOGY)
DE- HELICOPTERS; NUTRITION; PILOTS (PERSONNEL); SLEEP
SH- <COSATI> 6 Biological & Medical Sciences
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00365997

AN- <AEROSPACE> N69-11133
TI- Concept formulation report - Synthetic flight trainer system Final report, Dec. 1967 - Apr. 1968
TI- <NOTATION OF CONTENT> Synthetic flight training systems for military helicopters
AU- HALL, E. R.; YOUNG, F. E.
CS- Melpar, Inc., Falls Church, VA.
CS- <CODE> MS336198
PY- 1968
PD- 196804
PG- 513P.
CN- N61339-68-C-0107
RN- AD-675505; NAVTRADEVCEN-68-C-0107-1
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6901
DE- <MAJOR> *FLIGHT SIMULATORS; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *PILOT TRAINING
DE- COSTS; DISPLAY DEVICES
SH- <COSATI> 1 Aeronautics
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00363747
AN- <AEROSPACE> N68-37344
TI- Measuring instrumentation and in-flight measurements on the helicopter BO 105
TI- <ORIGINAL> Messinstrumentierung und flugmessungen am hubschrauber bo 105
TI- <NOTATION OF CONTENT> Flight test instrumentation and measurements on BO-105 helicopter
AU- GLOECKL, H.
CS- Bolkow Entwicklungen K.G., Munich (Germany).
CS- <CODE> BS048351
PY- 1968
PD- 196805
PG- 31P.
NT- PRESENTED AT THE DGLR CONF. ON ROTARY WING AIRCRAFT AND PROPELLERS, STUTTGART, 30 MAY 1968
RN- DF-75-O
LA- German
GL- Germany
CP- Germany
DT- REPORT
JA- STAR6823
SF- NASA CASI
DE- <MAJOR> *BO-105 HELICOPTER; *FLIGHT LOAD RECORDERS; *FLIGHT TEST INSTRUMENTS; *HELICOPTER PERFORMANCE
DE- DATA RECORDING; FLIGHT TEST VEHICLES; FLIGHT TESTS; STRAIN GAGES; TELEMETRY
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00360998
AN- <AEROSPACE> N68-34543
TI- Operational problems associated with low-altitude flight
TI- <NOTATION OF CONTENT> Navigation problems associated with nap-of-the-earth flying
AU- BAILEY, R. W.
CS- Army Aeromedical Research Unit, Fort Rucker, AL.
CS- <CODE> AY832881
PY- 1968
PD- 196800
NT- IN NAS-NRC VISION RES.- FLYING AND SPACE TRAVEL 1968 P 176-179 /SEE N68-34525 21-05/
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6821
SF- NASA CASI
DE- <MAJOR> *AIR NAVIGATION; *COMBAT; *LOW ALTITUDE; *OPERATIONAL HAZARDS; *PILOT PERFORMANCE; *TERRAIN FOLLOWING AIRCRAFT
DE- AIRCRAFT CONFIGURATIONS; CONFERENCES; FIXED WINGS; HELICOPTERS; HUMAN FACTORS ENGINEERING; MILITARY AIRCRAFT; PERFORMANCE PREDICTION; VISUAL CONTROL; VISUAL TASKS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00360985
AN- <AEROSPACE> N68-34530
TI- Some Langley Research Center plans in the area of visual displays for lunar mission simulation
TI- <NOTATION OF CONTENT> Analytical and simulation study of guidance techniques /visual displays/ for pilot control of tasks planned for Apollo mission
AU- JAQUET, B. M.; RILEY, D. R.
CS- National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CS- <CODE> ND210491
PY- 1968
PD- 196800
NT- IN NAS-NRC VISION RES.- FLYING AND SPACE TRAVEL 1968 P 40-51 /SEE N68-34525 21-05/
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6821
DE- <MAJOR> *APOLLO PROJECT; *CONTROL SIMULATION; *LUNAR EXPLORATION; *MISSION PLANNING; *PILOT PERFORMANCE; *SPACECRAFT GUIDANCE; *VISUAL CONTROL
DE- CONFERENCES; HOVERING; HUMAN FACTORS ENGINEERING; LUNAR LAUNCH; MAN MACHINE SYSTEMS; MIDCOURSE GUIDANCE; PERFORMANCE PREDICTION; RENDEZVOUS GUIDANCE; SPACECRAFT DOCKING; TERMINAL GUIDANCE
SH- <COSATI> 5H Man-machine Relations
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00360980
AN- <AEROSPACE> N68-34525
TI- Vision research - Flying and space travel
TI- <NOTATION OF CONTENT> Vision research - flying and space travel /conference/
AU- BENSON, W.; WHITCOMB, M. A. ED. AAED.
CS- National Academy of Sciences - National Research Council, Washington, DC.
CS- <CODE> NB210513
PY- 1968
PD- 196800
PG- 221P.
NT- PROC. OF SPRING MEETING, 1964
CN- NONR-2300/05/
RN- AD-669266
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6821
DE- <MAJOR> *CONFERENCES; *FLIGHT; *HIGH SPEED; *LOW ALTITUDE; *PILOT PERFORMANCE; *VISUAL TASKS
DE- AIR NAVIGATION; AIRCRAFT PERFORMANCE; COMBAT; CONTROL SIMULATION; DISPLAY DEVICES; EVASIVE ACTIONS; EYE PROTECTION; FLASH BLINDNESS; FLIGHT CONTROL; HELICOPTERS; HUMAN FACTORS ENGINEERING; MAN MACHINE SYSTEMS; MANNED SPACE FLIGHT; MILITARY AIRCRAFT; MISSION PLANNING; NUCLEAR WEAPONS; OPERATIONAL HAZARDS; OPERATORS (PERSONNEL); RADIATION INJURIES; TARGET ACQUISITION; TARGET RECOGNITION; THERMONUCLEAR EXPLOSIONS; TRAINING DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00357705
AN- <AEROSPACE> N68-31102
TI- Acoustical study of the CH-47B /Chinook/ helicopter
TI- <NOTATION OF CONTENT> Sound measurements during CH-47B helicopter flight
AU- BRAGG, T. S.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
PY- 1968
PD- 196803
PG- 83P.
RN- HEL-TN-4-68; AD-670971
LA- English
GL- United States
CP- United States

DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6819
DE- <MAJOR> *ACOUSTIC MEASUREMENT; *AERODYNAMIC NOISE; *CH-47 HELICOPTER;
*FLIGHT CHARACTERISTICS
DE- ENGINE NOISE; HELICOPTER PERFORMANCE; HUMAN FACTORS ENGINEERING; NOISE
REDUCTION; ROTARY WINGS; SOUND INTENSITY
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00349977
AN- <AEROSPACE> N68-23135
TI- Analytical review of military helicopter flying qualities Final report
TI- <NOTATION OF CONTENT> Review of literature and current military
helicopter flying qualities specification analysis
AU- ASHKENAS, I. L.; WALTON, R. P.
CS- Systems Technology, Inc., Hawthorne, CA.
CS- <CODE> S9710660
PU- <PLACE> WASHINGTON
PU- <PUBLISHER> NAVAL AIR SYSTEMS COMMAND
PY- 1967
PD- 196708
PG- 196P.
CN- NOW-64-0601-F
RN- STI-TR-143-1; AD-666827
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6813
DE- <MAJOR> *AERODYNAMIC STABILITY; *AIRCRAFT SPECIFICATIONS; *FLIGHT
CHARACTERISTICS; *MILITARY HELICOPTERS
DE- BIBLIOGRAPHIES; FEEDBACK CONTROL; GUST LOADS; PILOT PERFORMANCE;
SERVOCONTROL
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00349662
AN- <AEROSPACE> N68-22807
TI- A study of the mechanics of human balancing for potential application
to the control of vehicles. Part 2 - Toward a mathematical model of
vertical balancing in earth gravity
TI- <NOTATION OF CONTENT> Mathematical model of vertical human balancing
hovering platform in earth gravity
AU- BREUL, H.; KELLER, T.; SECKEL, E. /AERON. RES. ASSOCIATES OF PRINCETON/
; SUH, S.; WESTON, R.
CS- Grumman Aircraft Engineering Corp., Bethpage, NY. RESEARCH DEPT.
CS- <CODE> G7039894
PY- 1967
PD- 196707
PG- 45P.
RN- RM-369
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6812
DE- <MAJOR> *BALANCING; *HOVERING STABILITY; *HUMAN FACTORS ENGINEERING;
*MAN MACHINE SYSTEMS; *MATHEMATICAL MODELS
DE- ATTITUDE STABILITY; CONTROL STABILITY; DIFFERENTIAL EQUATIONS; HUMAN
REACTIONS; LONGITUDINAL STABILITY; OPERATOR PERFORMANCE; STABILIZATION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00346794
AN- <AEROSPACE> N68-19895
TI- Display requirements study for helicopter IFR formation flight
Technical report, 27 Jun. 1966 - 15 Jul. 1967
TI- <NOTATION OF CONTENT> Display requirements for helicopter instrument
flight rule formation flight
AU- CLIFFORD, R. R.; NICHOLSON, R. M.; WOLF, J. D.
CS- Honeywell, Inc., Minneapolis, MN. SYSTEMS AND RESEARCH DIV.
CS- <CODE> HY260724
PY- 1968
PD- 196801
PG- 263P.
CN- N00014-66-C-0362
RN- REPT.-12543-FR1; AD-665277

LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6810
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT INSTRUMENTS; *HELICOPTERS; *HUMAN
FACTORS ENGINEERING; *STATIONKEEPING
DE- FEEDBACK CONTROL; FLIGHT SIMULATION; INSTRUMENT FLIGHT RULES; LANDING
AIDS; MANEUVERS; NAVIGATION AIDS; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00346234
AN- <AEROSPACE> N68-19329
TI- Hazards of the helicopters
TI- <NOTATION OF CONTENT> Icing, overwater hazards, personnel escape, protection, and survival systems, crash landing and ditching techniques for helicopters
AU- COLLEY, I. H.; PRICE, R. D.; RINGER, T. R.; STALLABRASS, J. R.; THOMASSON, F. T.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1967
PD- 196705
NT- IN ITS AEROMED. ASPECTS OF HELICOPTER OPERATIONS IN THE TACTICAL SITUATION MAY 1967 P 191-272 /SEE N68-19325 09-02/
LA- English
GL- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6809
SF- NASA CASI
DE- <MAJOR> *DITCHING (LANDING); *HELICOPTERS; *ICE FORMATION
DE- AIRCRAFT SAFETY; HAZARDS; HELICOPTER PERFORMANCE; HUMAN FACTORS
ENGINEERING; RESCUE OPERATIONS; SAFETY DEVICES; SAFETY FACTORS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00346233
AN- <AEROSPACE> N68-19328
TI- Aircrew problems in helicopter operations
TI- <NOTATION OF CONTENT> Aircrew problems in aeromedical helicopter operations
AU- ADAMS, J. T.; AUFFRET, A.; MACKIE, W. A. N.; NEEL, S.; SERIS, H.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1967
PD- 196705
NT- IN ITS AEROMED. ASPECTS OF HELICOPTER OPERATIONS IN THE TACTICAL SITUATION MAY 1967 P 147-189 /SEE N68-19325 09-02/
LA- MULTIPLE
LA- <NOTE> IN ENGLISH AND IN FRENCH
GL- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6809
SF- NASA CASI
DE- <MAJOR> *EVACUATING (TRANSPORTATION); *FLIGHT TRAINING; *HELICOPTERS;
*RESCUE OPERATIONS
DE- FATIGUE (BIOLOGY); FLIGHT SIMULATORS; HELICOPTER PERFORMANCE; HUMAN
FACTORS ENGINEERING; MEDICAL SERVICES; PILOT PERFORMANCE; PROBLEM
SOLVING; TOXICITY; VISION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00346231
AN- <AEROSPACE> N68-19326
TI- The helicopter as a carrier of personnel and material
TI- <NOTATION OF CONTENT> Military and medical aspects of helicopter operations
AU- BUCKLEY, C. J.; CODY, R. L.; ELEY, D. L.; WATSON, M. W. B.; WILLIAMS, P. J.
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1967
PD- 196705
NT- IN ITS AEROMED. ASPECTS OF HELICOPTER OPERATIONS IN THE TACTICAL SITUATION MAY 1967 P 1-59 /SEE N68-19235 09-02/
LA- English
GL- France
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR6809
SF- NASA CASI
DE- <MAJOR> *EVACUATING (TRANSPORTATION); *HELICOPTERS; *MEDICAL SERVICES;
*RESCUE OPERATIONS
DE- CASUALTIES; DOWNWASH; HELICOPTER PERFORMANCE; HUMAN FACTORS ENGINEERING
; HUMAN PERFORMANCE; HUMAN REACTIONS; MEDICAL EQUIPMENT; MEDICAL PERSONNEL
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00346230
AN- <AEROSPACE> N68-19325
TI- Aeromedical aspects of helicopter operations in the tactical situation
TI- <NOTATION OF CONTENT> Helicopter rescue and evacuation operations
CS- Advisory Group for Aerospace Research and Development, Paris (France).
CS- <CODE> AD481245
PY- 1967
PD- 196705
PG- 279P.
NT- PROC. OF AGARD AEROSPACE MED. PANEL SYMP., PARIS, 22-24 MAY 1967
RN- AGARD-CP-24
LA- MULTIPLE
LA- <NOTE> IN ENGLISH AND FRENCH
GL- France
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6809
DE- <MAJOR> *HELICOPTERS; *MEDICAL SERVICES; *RESCUE OPERATIONS
DE- CASUALTIES; CONFERENCES; EVACUATING (TRANSPORTATION); HELICOPTER
PERFORMANCE; HUMAN FACTORS ENGINEERING; ICE FORMATION; MEDICAL PERSONNEL; SAFETY FACTORS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00345304
AN- <AEROSPACE> N68-18391
TI- Feasibility of measuring vertical electric fields in cumulus clouds using a hot-air balloon and a helicopter Final report, 3 Jan. 1966 - 30 Sep. 1967
TI- <NOTATION OF CONTENT> Electrostatic field measurements in cumulus clouds by helicopter instrumentation
AU- HANDMAN, A. L.
CS- Litton Systems, Inc., Minneapolis, MN. APPLIED SCIENCE DIV.
CS- <CODE> LX837765
SP- A0070657
PY- 1967
PD- 196712
PG- 30P.
CN- DA-28-043-AMC-01834/E/
RN- ASD-3143; ECOM-01834-F; AD-664187
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6809
DE- <MAJOR> *CUMULUS CLOUDS; *ELECTRIC FIELDS; *ELECTRICAL MEASUREMENT;
*HELICOPTERS; *METEOROLOGICAL FLIGHT
DE- AIRCRAFT INSTRUMENTS; ELECTROMAGNETIC INTERACTIONS; ELECTROSTATICS;
ONBOARD EQUIPMENT
SH- 6520 Meteorology (1965-74)

AN- <DIALOG> 00344713
AN- <AEROSPACE> N68-17792
TI- Aeromedical factors in air-refueled extended helicopter flight Final report
TI- <NOTATION OF CONTENT> Physiological and aeromedical effects on crews of air refueled prolonged helicopter flights
AU- OBRIANT, C. R.
CS- Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, OH.
CS- <CODE> AG627259
PY- 1967
PD- 196711
PG- 12P.
RN- AMRL-TR-67-47; AD-663727
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library

JA- STAR6808
DE- <MAJOR> *AIR TO AIR REFUELING; *FLIGHT CREWS; *FLIGHT STRESS (BIOLOGY);
*HELICOPTERS; *PHYSIOLOGICAL EFFECTS
DE- AEROSPACE MEDICINE; FLIGHT FATIGUE; HUMAN FACTORS ENGINEERING; NOISE
TOLERANCE; PROLONGATION; VIBRATION EFFECTS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00344504
AN- <AEROSPACE> N68-17581
TI- Flicker as a helicopter pilot problem - Use of photic stimulation and EEG as screening techniques
TI- <NOTATION OF CONTENT> Photic stimulation and electroencephalograms as screening techniques to study flicker in helicopter pilots
AU- JOHNSON, L. C.
CS- Navy Medical Neuropsychiatric Research Unit, San Diego, CA.
CS- <CODE> NV420817
PY- 1967
PD- 196700
NT- IN AGARD ELECTROENCEPHALOG. IN AEROSPACE MED. 1967 /SEE N68-17574
08-04/ P 93-109
LA- English
GL- International Organization
CP- International Organization
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6808
DE- <MAJOR> *FLICKER; *HELICOPTERS; *PILOT PERFORMANCE; *SENSORY STIMULATION
DE- HELICOPTER CONTROL; PHOTOSENSITIVITY
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00343086
AN- <AEROSPACE> N68-16121
TI- Integrated electronic vertical display research Interim technical report, 1 Jul. - 31 Dec. 1966
TI- <NOTATION OF CONTENT> Requirements, sensing techniques, and design proposals for integrated electronic vertical display instrumentation in military aircraft of 1970s
AU- SIMPSON, J. A.; WOODING, H. C., JR.
CS- United Aircraft Corp., Norwalk, CT. NORDEN DIV.
CS- <CODE> UJ703125
PY- 1967
PD- 196702
PG- 116P.
CN- NONR-4489/00/
RN- REPT.-1161-R-0028; AD-657951
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6807
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *FLIGHT INSTRUMENTS
DE- ELECTRONIC EQUIPMENT; FLIGHT SIMULATION; HUMAN FACTORS ENGINEERING;
MILITARY AIRCRAFT; ROTARY WING AIRCRAFT; V/STOL AIRCRAFT
SH- 6509 Electronic Equipment (1965-74)

AN- <DIALOG> 00342901
AN- <AEROSPACE> N68-15933
TI- Interpretation of pilot opinion by application of multiloop models to a VTOL flight simulator task
TI- <NOTATION OF CONTENT> Mathematical model for interpreting pilot opinion and selection of optimum control sensitivity for VTOL aircraft hovering task
AU- MILLER, D. P.; VINJE, E. W.
CS- United Aircraft Corp., East Hartford, CT.
CS- <CODE> UJ140625
PY- 1967
PD- 196700
NT- IN NASA 3D ANN. NASA UNIV. CONF. ON MANUAL CONTROL 1967 /SEE N68-15901 06-05/ P 415-440
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6806
DE- <MAJOR> *CONTROL SIMULATION; *FLIGHT SIMULATION; *HOVERING STABILITY;

*MATHEMATICAL MODELS; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- AIR CURRENTS; CASCADE CONTROL; CONFERENCES; DECISION MAKING; DYNAMIC
RESPONSE; HUMAN FACTORS ENGINEERING; LONGITUDINAL CONTROL; OPERATOR
PERFORMANCE; OPTIMAL CONTROL; TURBULENT FLOW; VERTICAL LANDING;
VERTICAL TAKEOFF
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00342156
AN- <AEROSPACE> N68-15180
TI- Effects of downwash upon man
TI- <NOTATION OF CONTENT> Effects of helicopter and VTOL aircraft downwash on man
AU- SCHANE, W. P.
CS- Army Aeromedical Research Unit, Fort Rucker, AL.
CS- <CODE> AY832881
PY- 1967
PD- 196711
PG- 44P.
RN- USAARU-68-3; AD-662208
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6806
DE- <MAJOR> *DOWNWASH; *HELICOPTER WAKES; *STRESS (PHYSIOLOGY); *VERTICAL
TAKEOFF AIRCRAFT
DE- ACCIDENTS; BIOLOGICAL EFFECTS; DEBRIS; DUST; EYE (ANATOMY); HAZARDS;
HUMAN FACTORS ENGINEERING; INJURIES; WIND EFFECTS
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00339387
AN- <AEROSPACE> N68-12368
TI- Improving helicopter conspicuity through the use of painted main rotor blades
TI- <NOTATION OF CONTENT> In-flight study of main rotor blade paint schemes to improve helicopter safety through increased conspicuity
AU- BAILEY, R. W.; CROSLEY, J. K.; NIX, M. S., JR.
CS- Army Aeromedical Research Unit, Fort Rucker, AL.
CS- <CODE> AY832881
PY- 1967
PD- 196710
PG- 15P.
RN- USAARU-68-2; AD-661067
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6803
DE- <MAJOR> *FLIGHT HAZARDS; *HELICOPTER WAKES; *PAINTS; *ROTARY WINGS;
*VISUAL FLIGHT
DE- AIRCRAFT SAFETY; BRIGHTNESS DISCRIMINATION; COLLISION AVOIDANCE; COLOR
VISION; HUMAN FACTORS ENGINEERING; MILITARY HELICOPTERS; VISUAL
PERCEPTION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00335596
AN- <AEROSPACE> A69-42364
TI- The body image of the aviator.
TI- <NOTATION OF CONTENT> Pilots body images determined by inkblot tests, considering effects of aircraft type, pilots experience, etc
AU- CLARKE, N. B.; REINHARDT, R. E.; TUCKER, G. J.
PY- 1969
PD- 196909
NT- FLIGHT SAFETY, VOL. 3, P. 6-8.
LA- English
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6923
SF- AIAA
DE- <MAJOR> *AIRCRAFT PILOTS; *IMAGES; *PILOT PERFORMANCE; *RORSCHACH TESTS
DE- HELICOPTERS; JET AIRCRAFT; PILOT SELECTION; PSYCHOMOTOR PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00335039
AN- <AEROSPACE> A69-41807
TI- Night vision requirements for combat pilots in South Vietnam.
TI- <NOTATION OF CONTENT> Night vision requirements of Vietnam combat pilots investigated for relationship to Skyraider fatal crash during target strafing and H-34 helicopter crash landing
AU- GIU, D. X. /VIETNAMESE AIR FORCE, OFFICE OF THE SURGEON, TAN SON NHUT AIR BASE, SOUTH VIETNAM/.
PU- <PLACE> OSLO
PU- <PUBLISHER> UNIVERSITETSFORLAGET
PY- 1969
PD- 196900
PG- 4P.
NT- IN- AVIATION AND SPACE MEDICINE, PROCEEDINGS OF THE SEVENTEENTH INTERNATIONAL CONGRESS, OSLO, NORWAY, AUG. 5-8, 1968, P. 219- 222. /A69-41783 23-05/
LA- English
GL- Other
CP- Other
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6923
SF- AIAA
DE- <MAJOR> *A-1 AIRCRAFT; *CH-34 HELICOPTER; *COMBAT; *CRASH LANDING; *NIGHT VISION; *PILOT PERFORMANCE
DE- COCKPITS; CONFERENCES; ILLUMINATING; TARGET ACQUISITION; VIETNAM
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00333450
AN- <AEROSPACE> A69-40218
TI- Energy cost of piloting fixed- and rotary-wing aircraft.
TI- <NOTATION OF CONTENT> Energy cost of piloting helicopters and fixed wing aircraft calculated from expired minute volume and air oxygen content measured during basal state and flight
AU- JOY, R. J. T. /U.S. ARMY, RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS./.; LITTELL, D. E. /U.S. ARMY, AEROMEDICAL RESEARCH UNIT, FORT RUCKER, ALA./
PY- 1969
PD- 196903
RF- 11
NT- JOURNAL OF APPLIED PHYSIOLOGY, VOL. 26, P. 282-285.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6922
SF- AIAA
DE- <MAJOR> *ENERGY REQUIREMENTS; *OXYGEN CONSUMPTION; *PILOT PERFORMANCE
DE- DATA ACQUISITION; EXPIRED AIR; FIXED WINGS; FLIGHT CONDITIONS; FLIGHT FITNESS; HELICOPTERS; HUMAN REACTIONS; PHYSIOLOGICAL TESTS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00326771
AN- <AEROSPACE> A69-33539
TI- New experimental techniques in rotorcraft aerodynamics and their application.
TI- <NOTATION OF CONTENT> Instrumentation for rotorcraft aerodynamics, considering boundary layer measurements, hot-wire anemometer and schlieren system for rotors and propellers
AU- TANNER, W. H.; WOHLFELD, R. M. /BELL AEROSPACE CORP., BELL HELICOPTER CO., FORT WORTH, TEX./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY
PY- 1969
PD- 196905
PG- 10P.
NT- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 25TH, WASHINGTON, D.C., MAY 14-16, 1969.
RN- AHS PAPER 320
LA- English
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6917
SF- AIAA
DE- <MAJOR> *MEASURING INSTRUMENTS; *ROTARY WING AIRCRAFT; *ROTOR AERODYNAMICS
DE- BOUNDARY LAYER FLOW; CONFERENCES; FLOW VELOCITY; HOT-WIRE ANEMOMETERS; SCHLIEREN PHOTOGRAPHY

SH- 6501 Aerodynamics (1965-74)

AN- <DIALOG> 00326753
AN- <AEROSPACE> A69-33521
TI- Flight simulation of the CH-46 helicopter.
TI- <NOTATION OF CONTENT> CH-46 helicopter flight simulation program for pilot response to large perturbation maneuvers, using six degrees of freedom mathematical models
AU- ALBION, N.; BLAKE, B. B.; RADFORD, R. C. /BOEING CO., VERTOL DIV., PHILADELPHIA, PA./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY
PY- 1969
PD- 196905
PG- 10P.
NT- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 25TH, WASHINGTON, D.C., MAY 14-16, 1969.
RN- AHS PAPER 361
LA- English
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6917
SF- AIAA
DE- <MAJOR> *CH-46 HELICOPTER; *FLIGHT SIMULATION; *HUMAN REACTIONS; *PILOT PERFORMANCE
DE- CONFERENCES; DEGREES OF FREEDOM; HELICOPTER CONTROL; MATHEMATICAL MODELS; PHYSIOLOGICAL RESPONSES
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00326407
AN- <AEROSPACE> A69-33175
TI- Painted helicopter main rotor blades and flicker-induced vertigo.
TI- <NOTATION OF CONTENT> Painted helicopter rotor blades ruled out as cause of flicker induced vertigo, reporting pilots psychophysiological responses to formation flying
AU- BYNUM, J. A. /U.S. ARMY, AEROMEDICAL RESEARCH LAB., FORT RUCKER, ALA./; STERN, J. A. /WASHINGTON U., DEPT. OF PSYCHOLOGY, ST. LOUIS, MO./.
PY- 1969
PD- 196906
RF- 11
NT- AEROSPACE MEDICINE, VOL. 40, P. 622-626.
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6917
SF- AIAA
DE- <MAJOR> *FLICKER; *PAINTS; *PILOT PERFORMANCE; *PSYCHOPHYSIOLOGY; *ROTARY WINGS; *VERTIGO
DE- COLLISION AVOIDANCE; FORMATIONS; PHOTICS; PHYSIOLOGICAL EFFECTS; SENSORY STIMULATION
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00320314
AN- <AEROSPACE> A69-27082
TI- A model for predicting man's control behavior in a man-machine system.
TI- <NOTATION OF CONTENT> Man machine model for prediction of human control behavior, generating model from analysis of helicopter pilot tasks
AU- MATHENY, W. G. /LIFE SCIENCES, INC., FORT WORTH, TEX./.
PU- <PLACE> PARIS
PU- <PUBLISHER> DUNOD EDITEUR
PY- 1969
PD- 196900
PG- 13P.
NT- /SCIENCES DU COMPORTEMENT. VOLUME 7/
NT- IN- THE SIMULATION OF HUMAN BEHAVIOR, NATO, SYMPOSIUM, PARIS, FRANCE, JUL. 17-21, 1967, PROCEEDINGS <LA SIMULATION DU COMPORTEMENT HUMAIN, NATO, SYMPOSIUM, PARIS, FRANCE, JUL. 17-21, 1967, PROCEEDINGS<. P. 363-375. <A69-27079 12-05<
LA- English
DT- CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6912
DE- <MAJOR> *HUMAN BEHAVIOR; *MAN MACHINE SYSTEMS; *MATHEMATICAL MODELS;

*PERFORMANCE PREDICTION
DE- CONFERENCES; FEEDBACK CONTROL; HELICOPTER CONTROL; PILOT PERFORMANCE;
PILOT TRAINING; TASK COMPLEXITY; THRESHOLDS (PERCEPTION); TRAINING SIMULATORS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00317579
AN- <AEROSPACE> A69-24347
TI- Biotelemetric examinations of the heart and circulatory systems of helicopter pilots to determine various in-flight stresses
TI- <ORIGINAL> Biotelemetrische Untersuchungen des Herz- Kreislauf-Systems bei Hubschrauberpiloten zur Feststellung der unterschiedlichen fliegerischen Belastung
TI- <NOTATION OF CONTENT> Psychic stress effect on physiological parameters of helicopter pilots during critical flight situations, considering biotelemetric examination of heart and circulatory systems
AU- HOFFMANN, H. /ST.-JOHANNES-HOSPITAL, MEDIZINISCHE KLINIK, DORTMUND,
WEST GERMANY/,; KOCH, M. /MEDIZINISCHE UNIVERSITAETSKLINIK, BONN, ST.-JOHANNES- HOSPITAL, MEDIZINISCHE KLINIK, DORTMUMD, WEST GERMANY/.;
RAABE, H.; STRUBEL, H.
PY- 1969
PD- 196901
RF- 34
NT- ZENTRALBLATT FUER VERKEHRS-MEDIZIN, VERKEHRS-PSYCHOLOGIE, LUFT- UND
RAUMFAHRT- MEDIZIN, VOL. 15, P. 1-26.
LA- German
GL- Germany
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6911
SF- AIAA
DE- <MAJOR> *BIOTELEMETRY; *CIRCULATORY SYSTEM; *FLIGHT STRESS; *HEART
FUNCTION; *PILOT PERFORMANCE; *PSYCHOLOGICAL EFFECTS
DE- AIRCRAFT PILOTS; FLIGHT ALTITUDE; HEART RATE; HELICOPTERS;
PHYSIOLOGICAL EFFECTS; RESPIRATORY RATE; VERTICAL LANDING
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00317110
AN- <AEROSPACE> A69-23878
TI- An analysis of pilot adaptation in a simulated multiloop VTOL hovering task.
TI- <NOTATION OF CONTENT> Human pilot adaptation in simulated multiloop VTOL hovering task with series loop closure model
AU- VINJE, E. W. /UNITED AIRCRAFT CORP., UNITED AIRCRAFT RESEARCH LABS., EAST HARTFORD, CONN./.
PY- 1968
PD- 196812
RF- 5
NT- IEEE TRANSACTIONS ON MAN-MACHINE SYSTEMS, VOL. MMS-9, P. 110-120.
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6910
SF- AIAA
DE- <MAJOR> *CONTROL EQUIPMENT; *FLIGHT SIMULATORS; *HOVERING; *MATHEMATICAL MODELS; *PILOT PERFORMANCE; *VERTICAL TAKEOFF AIRCRAFT
DE- AIRCRAFT CONFIGURATIONS; BIONICS; DEGREES OF FREEDOM; DYNAMIC CHARACTERISTICS; PITCH (INCLINATION); TRANSFER FUNCTIONS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00316010
AN- <AEROSPACE> A69-22778
TI- All-weather operation for helicopters - Flight control systems for helicopters.
TI- <NOTATION OF CONTENT> Helicopter all-weather flight control system, using autostabilization and artificial horizon
AU- COLLOMOSSE, H. /LOUIS NEWMARK, LTD., CROYDON, SURREY, ENGLAND/.
PY- 1969
PD- 196902
NT- AERONAUTICAL JOURNAL, VOL. 73, P. 129-137.
NT- /ROYAL AERONAUTICAL SOCIETY, ROTORCRAFT HALF-DAY SYMPOSIUM, LONDON,
ENGLAND, NOV. 26, 1965./
LA- English
GL- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6909

SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *ALL-WEATHER AIR NAVIGATION; *FLIGHT CONTROL; *HELICOPTERS
DE- ATTITUDE STABILITY; AUTOMATIC FLIGHT CONTROL; CONFERENCES; FLIGHT PATHS
; HORIZON SCANNERS; PILOT PERFORMANCE; STABILIZATION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00310008
AN- <AEROSPACE> A69-16776
TI- Aerodynamic instrumentation for improving helicopter take-off and landing piloting performance.
TI- <NOTATION OF CONTENT> Aerodynamic instrumentation to improve helicopter takeoff and landing piloting performance under high gross weight conditions
AU- DURBIN, E. J. /PRINCETON U., PRINCETON, N.J./.; MILLS, J. W.
PU- <PLACE> LONDON
PU- <PUBLISHER> PETER PEREGRINUS, LTD.
PY- 1968
PD- 196800
PG- 8P.
NT- SYMPOSIUM SPONSORED BY THE COLL. OF AERONAUTICS AND THE INSTRUMENT
SOCIETY OF AMERICA.
NT- IN- INTERNATIONAL AEROSPACE INSTRUMENTATION SYMPOSIUM, 5TH, CRANFIELD,
BEDS., ENGLAND, MAR. 25-28, 1968, PROCEEDINGS. P. 225-232. <A69-16747 05-14<
LA- English
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6905
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *VERTICAL LANDING; *VERTICAL TAKEOFF
DE- CONFERENCES; DIFFERENTIAL EQUATIONS; HELICOPTER CONTROL; TRAJECTORY
OPTIMIZATION
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00303684
AN- <AEROSPACE> A69-10452
TI- Human factors in V/STOL aircraft operation.
TI- <NOTATION OF CONTENT> Man machine relationship in V/STOL control display, discussing inflight simulators, emphasizing NASA X-14 and CH-3C programs
AU- MILLER, J. G. /LEAR SIEGLER, INC., ASTRONICS DIV., VTOL PROGRAMS DEPT.,
SANTA MONICA, CALIF./.
PU- <PLACE> NORTH HOLLYWOOD, CALIF.
PU- <PUBLISHER> WESTERN PERIODICALS CO.
PY- 1968
PD- 196800
PG- 16P.
NT- IN- HUMAN FACTORS IN AVIATION- 1968, HUMAN FACTORS SOCIETY, ANNUAL SYMPOSIUM, 5TH, LOS ANGELES, CALIF., JUN. 1968, PROCEEDINGS. P. 29-44. <A69-10448 01-02<
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6901
SF- AIAA
DE- <MAJOR> *DISPLAY DEVICES; *MAN MACHINE SYSTEMS; *NASA PROGRAMS; *PILOT
TRAINING; *SIMULATORS; *V/STOL AIRCRAFT
DE- AIRCRAFT CONTROL; CH-3 HELICOPTER; CONFERENCES; VERTICAL TAKEOFF
AIRCRAFT; X-14 AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00302478
AN- <AEROSPACE> A68-45407
TI- Dual versus solo pilot navigation in helicopters at low level.
TI- <NOTATION OF CONTENT> Low level helicopter navigation accuracy on military missions, comparing performance of single pilot and pilot and navigator team
AU- DE LA RIVIERE, W. D.; LEWIS, R. E. F.; SWEENEY, D. M. /DEFENCE RESEARCH ESTABLISHMENT, TORONTO, CANADA/.
PY- 1968
PD- 196800
RF- 6
NT- ERGONOMICS, VOL. 11, NO. 2, P. 145-155.
LA- English
GL- Canada

CP- Canada
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6824
SF- AIAA
DE- <MAJOR> *FLIGHT CREWS; *HUMAN FACTORS ENGINEERING; *MILITARY HELICOPTERS; *NAVIGATORS; *PILOT PERFORMANCE
DE- AIRCRAFT LANDING; PILOT ERROR
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00297923
AN- <AEROSPACE> A68-40852
TI- A simplified model of helicopter pitch and roll dynamics
TI- <ORIGINAL> Uproszczony model dynamiki smiglowca dla pochylenia i przechylenia
TI- <NOTATION OF CONTENT> Helicopter pitch and roll dynamics, discussing pendulum model approximating control
AU- BRAMSKI, S.; MORAWSKI, J.
PY- 1968
PD- 196800
RF- 7
NT- INSTYTUT LOTNICTWA, PRACE, NO. 34, P. 3-10.
LA- Polish
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6821
SF- AIAA
DE- <MAJOR> *EQUATIONS OF MOTION; *HELICOPTER CONTROL; *PENDULUMS; *PITCH (INCLINATION); *ROLL
DE- AERODYNAMICS; APPROXIMATION; AUTOMATIC CONTROL; MATHEMATICAL MODELS; PILOT PERFORMANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00294678
AN- <AEROSPACE> A68-37607
TI- Evolutionary growth of helicopter maintainability, reliability and safety.
TI- <NOTATION OF CONTENT> Helicopter maintainability, reliability and safety, discussing evolutionary growth and design
AU- IRETON, E. T. /BOEING CO., VERTOL DIV., PHILADELPHIA, PA./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN SOCIETY OF MECHANICAL ENGINEERS
PY- 1968
PD- 196800
PG- 10P.
NT- CONFERENCE SPONSORED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, THE SOCIETY OF AUTOMOTIVE ENGINEERS, AND THE AMERICAN INST. OF AERONAUTICS AND ASTRONAUTICS.
NT- IN- ANNALS OF ASSURANCE SCIENCES, PROCEEDINGS OF THE SEVENTH RELIABILITY AND MAINTAINABILITY CONFERENCE, SAN FRANCISCO, CALIF., JUL. 14-17, 1968. <A68-37596 19-15< P. 167-176.
LA- English
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6819
SF- AIAA
DE- <MAJOR> *AIRCRAFT MAINTENANCE; *AIRCRAFT RELIABILITY; *AIRCRAFT SAFETY; *HELICOPTER DESIGN
DE- CONFERENCES; HUMAN FACTORS ENGINEERING
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00292840
AN- <AEROSPACE> A68-35769
TI- Concerning pulse rate increments of helicopter pilots as a measurement of their stress
TI- <ORIGINAL> Ueber Pulsfrequenzsteigerungen bei Hubschrauberpiloten als Mass fuer ihre Beanspruchung
TI- <NOTATION OF CONTENT> Helicopter pilot pulse rate increments during flight maneuvers as measurement of stress noting age, flying experience and vegetative excitability
AU- KOETZ, H.
PY- 1968
PD- 196806
NT- ZENTRALBLATT FUER VERKEHRS-MEDIZIN, VERKEHRS-PSYCHOLOGIE, LUFT- UND RAUMFAHRT- MEDIZIN, VOL. 14, P. 65-70.
LA- German
GL- Germany
DT- JOURNAL ARTICLE

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6818
SF- AIAA
DE- <MAJOR> *FLIGHT STRESS (BIOLOGY); *HEART RATE; *PILOT PERFORMANCE; *PULSE RATE
DE- ELECTROCARDIOGRAPHY; EXCITATION; HELICOPTERS; INSTRUCTORS; MANEUVERS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00291503
AN- <AEROSPACE> A68-34432
TI- Pathogenesis of the Wolff-Parkinson-White syndrome
TI- <ORIGINAL> Sulla patogenesi della sindrome di Wolff-Parkinson-White
TI- <NOTATION OF CONTENT> Pathogenesis of Wolf-Parkinson-White syndrome in helicopter pilot with normal flight, electrocardiographic and clinical records
AU- CASTORINA, S.
PY- 1968
PD- 196803
RF- 15
NT- RIVISTA DI MEDICINA AERONAUTICA E SPAZIALE, VOL. 31, P. 88-98.
LA- Italian
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6817
SF- AIAA
DE- <MAJOR> *FLIGHT FITNESS; *HEART DISEASES; *HEART FUNCTION; *PATHOGENESIS; *PILOT PERFORMANCE
DE- CASE HISTORIES; ELECTROCARDIOGRAPHY; PHYSICAL EXAMINATIONS
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00288041
AN- <AEROSPACE> A68-30970
TI- Steep descent landing systems for VTOL aircraft.
TI- <NOTATION OF CONTENT> Steep descent landing system for VTOL aircraft, discussing present helicopter and next generation VTOL aircraft flight techniques and instrumentation
AU- KESSELRING, C. B. /LOS ANGELES AIRWAYS, INC., LOS ANGELES, CALIF./.
PU- <PLACE> NEW YORK
PU- <PUBLISHER> AMERICAN HELICOPTER SOCIETY
PY- 1968
PD- 196805
PG- 3P.
NT- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 24TH, WASHINGTON, D.C., MAY 8- 10, 1968.
LA- English
CP- United States
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6815
SF- AIAA
DE- <MAJOR> *AIRCRAFT LANDING; *APPROACH CONTROL; *HELICOPTER CONTROL; *LANDING AIDS; *VERTICAL TAKEOFF AIRCRAFT
DE- CONFERENCES; FLIGHT CONTROL; INSTRUMENT APPROACH; NAVIGATION AIDS
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00286188
AN- <AEROSPACE> A68-29117
TI- Helicopter displays for IFR station keeping flight.
TI- <NOTATION OF CONTENT> Display requirements for helicopter IFR stationkeeping flight defined using pilot performance data
AU- BAKER, C. A. /HONEYWELL, INC., MINNEAPOLIS, MINN./,; CUNDARI, F. /U.S. NAVY, OFFICE OF NAVAL RESEARCH, WASHINGTON, D.C./.; GURMAN, B. /U.S. ARMY, ELECTRONICS COMMAND, FORT MONMOUTH, N.J./,; NICHOLSON, R. M.
PU- <PLACE> WASHINGTON, D.C.
PU- <PUBLISHER> INST. OF NAVIGATION
PY- 1968
PD- 196800
PG- 16P.
NT- IN- INST. OF NAVIGATION, NATIONAL SPACE MEETING ON SIMPLIFIED MANNED GUIDANCE, NAVIGATION AND CONTROL, COCOA BEACH, FLA., FEB. 19-21, 1968, PROCEEDINGS. <A68-29101 13-21< P. 417-432.
CN- N00014-66-C-0362
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6813
SF- AIAA

DE- <MAJOR> *DISPLAY DEVICES; *HELICOPTER CONTROL; *INSTRUMENT FLIGHT RULES
; *PILOT PERFORMANCE; *STATIONKEEPING
DE- COMPUTER PROGRAMMING; CONFERENCES; FLIGHT CONTROL; PERFORMANCE
PREDICTION
SH- 6521 Navigation (1965-74)

AN- <DIALOG> 00282947
AN- <AEROSPACE> A68-25876
TI- Helicopter all-weather operation - Equipment for the transport role.
TI- <NOTATION OF CONTENT> All weather transport helicopter noting automatic stabilization, flight instrumentation, navigation system and terminal guidance
AU- CURTIES, M. C. /FERRANTI, LTD., HOLLINWOOD, LANCS., ENGLAND/.
PY- 1968
PD- 196803
NT- AERONAUTICAL JOURNAL, VOL. 72, P. 229-236.
NT- /ROYAL AERONAUTICAL SOCIETY, ROTORCRAFT SECTION, HALF-DAY SYMPOSIUM,
LONDON, ENGLAND, NOV. 26, 1965./
LA- English
GL- United Kingdom
DT- JOURNAL ARTICLE; CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6811
SF- AIAA
DE- <MAJOR> *AIRCRAFT STABILITY; *ALL-WEATHER AIR NAVIGATION; *FLIGHT INSTRUMENTS; *HELICOPTER PERFORMANCE; *TRANSPORT AIRCRAFT
DE- CONFERENCES; FLIGHT CONTROL; RADAR EQUIPMENT; TERMINAL GUIDANCE
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00275225
AN- <AEROSPACE> A68-18154
TI- An airborne meteorological laboratory for microscale measurements.
TI- <NOTATION OF CONTENT> Helicopter-borne meteorological instrumentation array for microscale measurements of clear air turbulence
AU- MIYASAKI, M. T. /JOHNS HOPKINS U., APPLIED PHYSICS LAB., SILVER SPRING,
MD./.
PU- <PLACE> BOSTON
PU- <PUBLISHER> AMERICAN METEOROLOGICAL SOCIETY, P. 306-311.
PY- 1967
PD- 196700
PG- 6P.
NT- IN- AMERICAN METEOROLOGICAL SOCIETY, CONFERENCE ON RADAR METEOROLOGY,
12TH, U. OF OKLAHOMA, NORMAN, OKLA., OCT. 17-20, 1966, PROCEEDINGS.
<A68-18122 06-20<
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6806
SF- AIAA
DE- <MAJOR> *AIRBORNE EQUIPMENT; *CLEAR AIR TURBULENCE; *MEASURING INSTRUMENTS; *METEOROLOGICAL INSTRUMENTS
DE- CONFERENCES; HOT-WIRE ANEMOMETERS; MICROWAVE EQUIPMENT; REFRACTOMETERS;
RESISTANCE THERMOMETERS; TEMPERATURE PROBES
SH- 6520 Meteorology (1965-74)

AN- <DIALOG> 00275224
AN- <AEROSPACE> A68-18153
TI- Simultaneous probing of the atmosphere by radar and meteorological sensors.
TI- <NOTATION OF CONTENT> Atmospheric conditions investigation by simultaneous sampling of volume of space by radar and aircraft-borne meteorological instrumentation
AU- KONRAD, T. G. /JOHNS HOPKINS U., APPLIED PHYSICS LAB., SILVER SPRING, MD./; RANDALL, D. /U.S. NAVY, OFFICE OF NAVAL RESEARCH, NAVAL RESEARCH
LAB., WASHINGTON, D.C./.
PU- <PLACE> BOSTON
PU- <PUBLISHER> AMERICAN METEOROLOGICAL SOCIETY, P. 300-305.
PY- 1967
PD- 196700
PG- 6P.
NT- IN- AMERICAN METEOROLOGICAL SOCIETY, CONFERENCE ON RADAR METEOROLOGY,
12TH, U. OF OKLAHOMA, NORMAN, OKLA., OCT. 17-20, 1966, PROCEEDINGS.
<A68-18122 06-20<
LA- English

GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6806
SF- AIAA
DE- <MAJOR> *AIR SAMPLING; *AIRBORNE EQUIPMENT; *AIRCRAFT INSTRUMENTS;
*METEOROLOGICAL INSTRUMENTS; *METEOROLOGICAL RADAR
DE- ATMOSPHERIC STRATIFICATION; CONFERENCES; RADAR TRACKING; ROTARY WING
AIRCRAFT
SH- 6520 Meteorology (1965-74)

AN- <DIALOG> 00275152
AN- <AEROSPACE> A68-18081
TI- Studies of pilot performance. II.
TI- <NOTATION OF CONTENT> Pilot performance under fatigue induced stress in flight environment, discussing quantitative evaluation techniques for low altitude helicopter mission
AU- BILLINGS, C. E.; CHASE, R. C. /OHIO STATE U., DEPT. OF PREVENTIVE MEDICINE AND DEPT. OF AVIATION, COLUMBUS, OHIO/.; EGGSPUEHLER, J. J.; GERKE, R. J.
PU- <PUBLISHER> AEROSPACE MEDICINE, VOL. 39, P. 19-31.
PY- 1968
PD- 196801
PG- 13P.
CN- DA-49-193-MD-2615
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6806
SF- AIAA
DE- <MAJOR> *FATIGUE (BIOLOGY); *FLIGHT CONDITIONS; *FLIGHT STRESS (BIOLOGY); *PILOT PERFORMANCE
DE- HELICOPTER PERFORMANCE; IN-FLIGHT MONITORING; LOW ALTITUDE; STRESS
(PHYSIOLOGY)
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00268689
AN- <AEROSPACE> A68-11617
TI- Rotary wing cockpit instrumentation.
TI- <NOTATION OF CONTENT> Rotary wing cockpit instrumentation, adapting fixed wing instruments to low altitude low speed conditions
AU- DOMESHEK, S.; ROWLAND, G. /PENNSYLVANIA, U., PHILADELPHIA, PA./, DOMESHEK, S. /U.S. ARMY, FORT MONMOUTH, N.J./.; YINGLING, G. /USAF, SYSTEMS COMMAND, RESEARCH AND TECHNOLOGY DIV., WRIGHT-PATTERSON AFB,
OHIO/,
PU- <PLACE> NEW YORK
PU- <PUBLISHER> INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC., P.
35-41.
PY- 1967
PD- 196700
PG- 7P.
RF- 9
NT- IN- INST. OF ELECTRICAL AND ELECTRONICS ENGINEERS, INTERNATIONAL CONVENTION, NEW YORK, N.Y., MAR. 20-23, 1967, 1967 IEEE INTERNATIONAL CONVENTION RECORD, VOLUME 15, PART IV - AEROSPACE SYSTEMS. <A68-11612
02-09<
LA- English
GL- United States
CP- United States
DT- CONFERENCE PAPER
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6802
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *PILOT PERFORMANCE; *ROTARY WING AIRCRAFT; *VISUAL CONTROL
DE- AEROSPACE SYSTEMS; COCKPITS; CONFERENCES; MILITARY HELICOPTERS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00267237
AN- <AEROSPACE> A68-10165
TI- Continental T67-T-1 twin turbine powerplant.
TI- <NOTATION OF CONTENT> T67-T-1 helicopter engine provides twin engine safety within helicopter-power-management capabilities of single pilot
AU- NICKOLS, F. /CONTINENTAL AVIATION AND ENGINEERING CORP., DETROIT, MICH./.
PU- <PUBLISHER> VERTI-FLITE, VOL. 13, P. 2-12, 14.

PY- 1967
PD- 196710
PG- 12P.
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6801
SF- AIAA
DE- <MAJOR> *ENGINE DESIGN; *GAS TURBINE ENGINES; *HELICOPTER CONTROL;
*HELICOPTER ENGINES; *PILOT PERFORMANCE
DE- AIRCRAFT SAFETY; HELICOPTER PERFORMANCE
SH- 6528 Propulsion Systems (1965-74)

AN- <DIALOG> 00262297
AN- <AEROSPACE> N67-35742
TI- Human factors research in support of Army aviation
TI- <NOTATION OF CONTENT> Human factors in aerial reconnaissance and surveillance, helicopter training devices, and pilot performance under stress
AU- BOYLES, W. R.; CARO, P. W., JR.; THOMAS, F. H.
CS- George Washington Univ., Alexandria, VA. HUMAN RESOURCES RESEARCH OFFICE.
CS- <CODE> GV744720
SO- JUN. 1967 21 P REFS PRESENTED AT THE 13TH ANN. SYMP. OF THE SOUTHEASTERN PSYCHOLOGICAL ASSOC., ATLANTA, APR. 1967 ITS PROFESS.
PAPER NO. 27-67
PY- 1967
PD- 196704
CN- DA-44-188-ARO-2
RN- AD-655126
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6721
DE- <MAJOR> *AERIAL RECONNAISSANCE; *CONFERENCES; *HELICOPTERS; *HUMAN
FACTORS ENGINEERING; *HUMAN FACTORS ENGINEERING?; *PILOT PERFORMANCE;
*STRESS (BIOLOGY); *TRAINING DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00259917
AN- <AEROSPACE> N67-33327
TI- Studies of pilot performance in helicopters Progress report, 1 Jun. 1966 - 31 May 1967
TI- <NOTATION OF CONTENT> Changes in piloting performance during four hours of very low altitude flight in helicopters
AU- BILLINGS, C. E.; CHASE, R. C.; EGGSPUEHLER, J. J.; GERKE, R. J.
CS- <CODE> OM789414
SO- JUN. 1967 64 P REFS
PY- 1967
PD- 196706
CN- DA-49-193-MD-2615
RN- RF-1857-3; AD-654045
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6719
DE- <MAJOR> *FATIGUE (BIOLOGY); *HELICOPTERS; *LOW ALTITUDE; *PILOT PERFORMANCE; *STRESS (BIOLOGY)
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00249813
AN- <AEROSPACE> N67-23058
TI- JANAIR - Joint Army Navy Aircraft Instrumentation Research Final technical report, May 1, 1964 - Feb. 28, 1966
TI- <NOTATION OF CONTENT> Flight evaluation of instrumentation for army helicopter
AU- DOUGHERTY, D. J.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- FEB. 1966 41 P REFS
PY- 1966
PD- 196602
CN- NONR-4429/00/
RN- D228-100-011; AD-645492
LA- English

GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6711
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *FLIGHT TESTS; *HELICOPTER PERFORMANCE;
*HELICOPTERS; *NAVY
SH- 6511 Facilities, Research & Support (1965-74)

AN- <DIALOG> 00248778
AN- <AEROSPACE> N67-22002
TI- Instrumentation for meteorological observations from helicopters
TI- <NOTATION OF CONTENT> Electrometeorograph device for meteorological measurements from helicopters
AU- BELYAEV, V. P.; PAKHOMOV, L. A.; VINNICHENKO, N. K.
CS- Central Aerological Observatory, Dolgoprudnyi (USSR).
CS- <CODE> CJ219025
SO- IN ISRAEL PROGRAM FOR SCI. TRANSL., LTD. INSTR. AND METHODS FOR METEOROL. OBSERVATIONS 1966 P 126-133 /SEE N67- 21984 11-20/ CFSTI-HC $3.00/MF $0.65
PY- 1966
PD- 196600
LA- English
GL- U.S.S.R.
DT- REPORT
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6711
SF- NASA CASI
DE- <MAJOR> *CONFERENCES; *HELICOPTERS; *MEASURING INSTRUMENTS; *METEOROLOGICAL INSTRUMENTS; *METEOROLOGICAL PARAMETERS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00228644
AN- <AEROSPACE> N66-31322
TI- Contact analog simulator evaluations - Numeric augmentation of grid plane encodement
TI- <NOTATION OF CONTENT> Pilot performance at simulated helicopter maneuvers using numeric augmentation of contact analog flight simulator
AU- EMERY, J. H.; KOCH, C. A.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- DEC. 1965 35 P REFS
PY- 1965
PD- 196512
CN- NONR-4429/00/
RN- D228-420-007; AD-633107
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6617
DE- <MAJOR> *ANALOG SIMULATION; *AUGMENTATION; *DIALS; *FLIGHT SIMULATION;
*FLIGHT SIMULATORS; *HELICOPTERS; *MAN MACHINE SYSTEMS; *PILOT PERFORMANCE; *SIMULATORS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00223354
AN- <AEROSPACE> N66-25685
TI- Changes in flight trainee performance following synthetic helicopter flight training
TI- <NOTATION OF CONTENT> Helicopter flight simulator to improve pilot performance during contact flight training
AU- CARO, P. W., JR.; ISLEY, R. N.
CS- George Washington Univ., Washington, DC. HUMAN RESOURCES RESEARCH OFFICE.
CS- <CODE> GV805122
SO- APR. 1966 14 P REFS PRESENTED AT THE 12TH ANN. MEETING, SOUTHEASTERN
PSYCHOLOGICAL ASSOC., NEW ORLEANS, 2 APR. 1966 ITS PROFESS. PAPER NO.
1-66
PY- 1966
PD- 196604
CN- DA-44-188-ARO-2
RN- AD-630484
LA- English
GL- United States
CP- United States
DT- REPORT; CONFERENCE PAPER

AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6614
DE- <MAJOR> *FLIGHT CHARACTERISTICS; *FLIGHT SIMULATORS; *FLIGHT TRAINING;
*HELICOPTERS; *PILOT PERFORMANCE; *PILOT TRAINING; *STUDENTS; *TRAINING DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00217847
AN- <AEROSPACE> N66-19933
TI- Air flight technology - Survey of literature
TI- <ORIGINAL> Luchtvaarttechniek literatuuroverzicht
TI- <NOTATION OF CONTENT> Abstracts and bibliography on aircraft, ground effect machine, and helicopter aerodynamics propulsion, control, and instrumentation, and air traffic control and navigation
CS- Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, The Hague (Netherlands).
CS- <CODE> TG477195
SO- 26 JAN. 1966 23 P REFS IN DUTCH, FRENCH, ENGLISH, AND GERMAN ITS VOL. 14, NO. L-290
PY- 1966
PD- 196601
LA- MULTIPLE
GL- Netherlands
CP- Netherlands
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6610
SF- NASA CASI
DE- <MAJOR> *ABSTRACTS; *AERODYNAMICS; *AIR TRAFFIC CONTROL; *AIRCRAFT;
*BIBLIOGRAPHIES; *GROUND EFFECT MACHINES; *HELICOPTER CONTROL; *NAVIGATION; *PROPULSION; *SURVEYS
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00214604
AN- <AEROSPACE> N66-16537
TI- Helicopter cyclic control grips - A human engineering design study
TI- <NOTATION OF CONTENT> Cyclic grip for helicopter control - human engineering design study
AU- CORONA, B. M.
CS- Human Engineering Labs., Aberdeen Proving Ground, MD.
CS- <CODE> H6521544
SO- IN ARMY RES. OFFICE TENTH ANN. ARMY HUMAN FACTORS RES. AND DEVELOP.
CONF. OCT. 1964 P 183-196 REFS /SEE N66-16526 07-05/
PY- 1964
PD- 196410
LA- English
GL- United States
CP- United States
DT- REPORT
JA- STAR6607
SF- NASA CASI
DE- <MAJOR> *CONFERENCES; *HELICOPTER CONTROL; *HUMAN FACTORS ENGINEERING;
*PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00214603
AN- <AEROSPACE> N66-16536
TI- Training oriented human factors engineering of Army aircraft
TI- <NOTATION OF CONTENT> Control analog vertical attitude indicator and VTOL flight display for helicopter pilot training
AU- WRIGHT, R. H.
CS- Army Aviation Human Research Unit, Fort Rucker, AL.
CS- <CODE> AZ116538
SO- IN ARMY RES. OFFICE TENTH ANN. ARMY HUMAN FACTORS RES. AND DEVELOP.
CONF. OCT. 1964 P 169-182 REF /SEE N66-16526 07-04/
PY- 1964
PD- 196410
LA- English
GL- United States
CP- United States
DT- REPORT
JA- STAR6607
SF- NASA CASI
DE- <MAJOR> *ATTITUDE INDICATORS; *CONFERENCES; *CONTROL SIMULATION; *EDUCATION; *HELICOPTER CONTROL; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *PILOT TRAINING; *VERTICAL TAKEOFF AIRCRAFT
SH- 6504 Biosciences (1965-74)

AN- <DIALOG> 00214600
AN- <AEROSPACE> N66-16533
TI- Aviator performance in the light weapons helicopter during nap-of-the-earth flight
TI- <NOTATION OF CONTENT> Aviator performance in light weapons helicopter during nap-of-earth flight simulated combat mission
AU- THOMAS, F. H.
CS- Army Aviation Human Research Unit, Fort Rucker, AL.
CS- <CODE> AZ116538
SO- IN ARMY RES. OFFICE TENTH ANN. ARMY HUMAN FACTORS RES. AND DEVELOP.
CONF. OCT. 1964 P 133-141 REFS /SEE N66-16526 07-05/
PY- 1964
PD- 196410
LA- English
GL- United States
CP- United States
DT- REPORT
JA- STAR6607
SF- NASA CASI
DE- <MAJOR> *AIRCRAFT PILOTS; *COMBAT; *DISORIENTATION; *FLIGHT SIMULATION;
*HELICOPTER CONTROL; *LIGHT HELICOPTERS; *NAP-OF-THE-EARTH NAVIGATION;
*PILOT PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00205112
AN- <AEROSPACE> A67-39849
TI- Human factors and VIPRE FIRE.
TI- <NOTATION OF CONTENT> Simplified fire control system for helicopters, noting helmet sight, error source corrections and sighting and tracking convenience
AU- KELLER, C. L. /SPERRY RAND CORP., SPERRY UTAH CO., SALT LAKE CITY, UTAH/.
SO- SPERRY ENGINEERING REVIEW, VOL. 20, NO. 2, 1967, P. 17-23.
PY- 1967
PD- 196700
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6722
SF- AIAA
DE- <MAJOR> *CORRECTION; *ERROR CORRECTING DEVICES; *ERRORS; *FIRE CONTROL;
*FIRES; *HELICOPTERS; *HELMETS; *HUMAN FACTORS ENGINEERING; *HUMAN FACTORS ENGINEERING?; *LINE OF SIGHT; *SIMPLIFICATION; *VISUAL PERCEPTION; *WEAPON SYSTEMS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00194346
AN- <AEROSPACE> A67-29082
TI- A path-damping system for VTOL aircraft.
TI- <NOTATION OF CONTENT> Hover augmentation system reducing VTOL pilot task in maintaining position by providing damping signals for automatic flight modes with accurate path control
AU- BUFFUM, R. S. /SPERRY RAND CORP., SPERRY PHOENIX CO., FLIGHT CONTROLS
DEPT., PHOENIX, ARIZ./; TRIBKEN, E. R. /SPERRY RAND CORP., SPERRY PHOENIX CO., INSTRUMENTATION AND ELECTRO- MECHANICAL DEPT., PHOENIX,
ARIZ./.
SO- SPERRY ENGINEERING REVIEW, VOL. 20, NO. 1, 1967, P. 23-29.
PY- 1967
PD- 196700
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6714
SF- AIAA
DE- <MAJOR> *AUGMENTATION; *AUTOMATIC CONTROL; *DAMPING; *FLIGHT CONTROL;
*FLIGHT PATHS; *HOVERING; *PILOT PERFORMANCE; *SYSTEMS ENGINEERING;
*TASKS; *VERTICAL TAKEOFF AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00189855
AN- <AEROSPACE> A67-24591
TI- An analysis of the divergent vertical helicopter oscillations resulting from the physical presence of the pilot in the collective control loop.
TI- <NOTATION OF CONTENT> Divergent vertical helicopter oscillations

resulting from physical presence of pilot in collective control loop
AU- LYTWYN, R. T. /BOEING CO., VERTOL DIV., MORTON, PA./.
SO- AMERICAN HELICOPTER SOCIETY, JOURNAL, VOL. 12, JAN. 1967, P. 45-52.
PY- 1967
PD- 196701
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6711
SF- AIAA
DE- <MAJOR> *FLIGHT CONTROL; *HELICOPTERS; *HOVERING STABILITY; *LOW SPEED;
*LOW SPEED STABILITY; *OSCILLATIONS; *PILOT PERFORMANCE; *VERTICAL MOTION
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00172289
AN- <AEROSPACE> A66-40250
TI- Helicopter trainee performance following synthetic flight training.
TI- <NOTATION OF CONTENT> Helicopter trainee performance following synthetic flight training, noting flyable aircraft attached to ground effects machine
AU- CARO, P. W., JR.; ISLEY, R. N. /U.S. ARMY, HUMAN RESOURCES RESEARCH OFFICE, DIV. NO. 6 /AVIATION/, FORT RUCKER, ALA./.
SO- /SOUTHEASTERN PSYCHOLOGICAL ASSN., MEETING, NEW ORLEANS, LA., 1966,
PAPER./ AMERICAN HELICOPTER SOCIETY, JOURNAL, VOL. 11, JUL. 1966, P. 38-44. ARMY-SUPPORTED RESEARCH.
PY- 1966
PD- 196607
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6622
SF- AIAA
DE- <MAJOR> *CONFERENCES; *FLIGHT TRAINING; *GROUND EFFECT MACHINES; *HELICOPTER PERFORMANCE; *PILOT PERFORMANCE; *STUDENTS; *TRAINING AIRCRAFT; *TRAINING DEVICES
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00168918
AN- <AEROSPACE> A66-36879
TI- Practical application of statistical methods for reducing flight test data.
TI- <NOTATION OF CONTENT> Handling in hovering mode of Dornier VTOL TRANSPORT aircraft with and without autostabilizer, obtaining moments about roll, pitch and yaw axis
AU- MESCH, F.; SCHWEIZER, G. /DORNIER-WERKE GMBH, CONTROL ENGINEERING DIV.,
FRIEDRICHSHAFEN, WEST GERMANY/.
SO- INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL, CONGRESS, 3RD, LONDON,
ENGLAND, JUN. 20-25, 1966, PAPER. 9 P. 5 REFS.
PY- 1966
PD- 196606
LA- English
GL- Germany
DT- PREPRINT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6620
SF- AIAA
DE- <MAJOR> *CONFERENCES; *CONTROLLABILITY; *DATA REDUCTION; *DORNIER
AIRCRAFT; *FLIGHT TESTS; *HOVERING; *HOVERING STABILITY; *PILOT PERFORMANCE; *ROLL; *STATISTICAL ANALYSIS; *TRANSPORT AIRCRAFT; *VERTICAL TAKEOFF AIRCRAFT; *YAW
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00165136
AN- <AEROSPACE> A66-33097
TI- Nuclear radiation - Tool for anti-collision guidance.
TI- <NOTATION OF CONTENT> Nuclear radiation anticollision instrumentation for guidance systems of helicopters and other vehicles, both air and surface
AU- WILCOX, G. E. /U.S. NAVAL AIR DEVELOPMENT CENTER, AERO ELECTRONICS TECHNOLOGY DEPT., WARMINSTER, PA./.
SO- /INSTRUMENT SOCIETY OF AMERICA, SYMPOSIUM ON RADIOISOTOPE APPLICATIONS
IN AEROSPACE, DAYTON, OHIO, FEB. 15-17, 1966, PAPER./ ISA JOURNAL, VOL. 13, JUN. 1966, P. 43-48.
PY- 1966
PD- 196606

LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE; CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6617
SF- AIAA
DE- <MAJOR> *COLLISION AVOIDANCE; *CONFERENCES; *GUIDANCE (MOTION); *HELICOPTER CONTROL; *HELICOPTERS; *NAVIGATION; *NUCLEAR RADIATION
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00164773
AN- <AEROSPACE> A66-32734
TI- An analytical study of helicopter handling qualities in hover.
TI- <NOTATION OF CONTENT> Helicopter handling qualities during hover noting pilot performance, position control tasks with and without gusts, effects of stability derivatives, etc
AU- STAPLEFORD, R. L. /SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF./.; WALTON, R. P.
SO- IN- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 22ND, WASHINGTON, D.C., MAY 11- 13, 1966, PROCEEDINGS. <A66-32723 17-02< NEW YORK, AMERICAN HELICOPTER SOCIETY, INC., 1966, P. 100-114. 13 REFS.
PY- 1966
PD- 196600
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6617
SF- AIAA
DE- <MAJOR> *CONFERENCES; *CONTROLLABILITY; *GUSTS; *HELICOPTER CONTROL; *HELICOPTER PERFORMANCE; *HOVERING; *HOVERING STABILITY; *PILOT PERFORMANCE; *STABILITY DERIVATIVES
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00164767
AN- <AEROSPACE> A66-32728
TI- To fly a helicopter to the terminal in bad weather.
TI- <NOTATION OF CONTENT> Helicopter landing in zero-zero weather, describing experiment in England involving landing in dense fog
AU- GOODSPEED, R. E. /U.S. NAVAL ORDNANCE LAB., SILVER SPRING, MD./.
SO- IN- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 22ND, WASHINGTON, D.C., MAY 11- 13, 1966, PROCEEDINGS. <A66-32723 17-02< NEW YORK, AMERICAN HELICOPTER SOCIETY, INC., 1966, P. 62-66.
PY- 1966
PD- 196600
LA- English
GL- United States
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6617
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *CONFERENCES; *ENGLAND; *FOG; *HELICOPTER PERFORMANCE; *HELICOPTERS; *INSTRUMENT APPROACH; *PILOT PERFORMANCE; *WEATHER
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00164202
AN- <AEROSPACE> A66-32163
TI- Evaluation of piloting performance in rotary wing aircraft.
TI- <NOTATION OF CONTENT> Helicopter pilot performance evaluation method based on ability to precisely control rotor rotational velocity
AU- BILLINGS, C. E.; EGGSPUEHLER, J. J.; GERKE, R. /OHIO STATE U., DEPT. OF AVIATION AND DEPT. OF PREVENTIVE MEDICINE, COLUMBUS, OHIO/.
SO- IN- AEROSPACE MEDICAL ASSN., ANNUAL SCIENTIFIC MEETING, 37TH, LAS VEGAS, NEV., APR. 18-21, 1966, PREPRINTS. <A66-32134 17-04< WASHINGTON, D.C., AEROSPACE MEDICAL ASSN., 1966, P. 90, 91. ABRIDGED.
PY- 1966
PD- 196600
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6617
SF- AIAA
DE- <MAJOR> *CONFERENCES; *EVALUATION; *HELICOPTER CONTROL; *HELICOPTER PERFORMANCE; *PERFORMANCE TESTS; *PILOT PERFORMANCE; *ROTARY WING AIRCRAFT; *ROTORS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00155969
AN- <AEROSPACE> A66-23930
TI- Studies of helicopter pilot performance. II - The analysis of task dimensions.
TI- <NOTATION OF CONTENT> Helicopter pilot proficiency based on performance of 151 tasks in primary and basic training phases
AU- FLEISHMAN, E. A. /AMERICAN INSTITUTES FOR RESEARCH, WASHINGTON, D.C./.; LOCKE, E. A.; ZAVALA, A.
SO- HUMAN FACTORS, VOL. 7, JUN. 1965, P. 285-302. 18 REFS.
PY- 1965
PD- 196506
CN- DA-49-193-MD-2632
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6612
SF- AIAA
DE- <MAJOR> *ABILITIES; *EDUCATION; *HELICOPTER PERFORMANCE; *HELICOPTERS; *PILOT PERFORMANCE; *TASKS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00155968
AN- <AEROSPACE> A66-23929
TI- Studies of helicopter pilot performance. I - The analysis of maneuver dimensions.
TI- <NOTATION OF CONTENT> Helicopter pilot proficiency based on performance of separate maneuvers in primary and basic training phases
AU- FLEISHMAN, E. A. /AMERICAN INSTITUTES FOR RESEARCH, WASHINGTON, D.C./.; LOCKE, E. A.; VAN COTT, H. P.; ZAVALA, A.
SO- HUMAN FACTORS, VOL. 7, JUN. 1965, P. 273-283. 19 REFS.
PY- 1965
PD- 196506
CN- DA-49-193-MD-2632
LA- English
GL- United States
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6612
SF- AIAA
DE- <MAJOR> *ABILITIES; *EDUCATION; *HELICOPTER PERFORMANCE; *HELICOPTERS; *PILOT PERFORMANCE; *PSYCHOMOTOR PERFORMANCE
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00148859
AN- <AEROSPACE> A66-16820
TI- The XC-142A flight test program.
TI- <NOTATION OF CONTENT> XC-142A Flight Test Program, program statistics, aircraft instrumentation and flying qualities in hover and transition flight regimes
AU- SHEPARD, T. W., JR. /LING-TEMCO-VOUGHT, INC., LTV VOUGHT AERONAUTICS DIV., DALLAS, TEX./.
SO- IN- NATIONAL V/STOL AIRCRAFT SYMPOSIUM, 1ST, WRIGHT-PATTERSON AFB, OHIO, NOV. 3, 4, 1965, PROCEEDINGS. <A66-16808 06-02< SYMPOSIUM SPONSORED BY THE AMERICAN HELICOPTER SOCIETY AND THE AERONAUTICAL SYSTEMS DIV. OF THE USAF. NEW YORK, AMERICAN HELICOPTER SOCIETY, INC., 1965, P. III-78 TO III-96.
PY- 1965
PD- 196500
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6606
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *CONFERENCES; *CONTROLLABILITY; *FLIGHT CHARACTERISTICS; *FLIGHT TESTS; *HOVERING; *PHILOSOPHY; *PROJECT MANAGEMENT; *TRANSITION FLIGHT; *XC-142 AIRCRAFT
SH- 6502 Aircraft (1965-74)

AN- <DIALOG> 00126838

AN- <AEROSPACE> N65-21056
TI- Contact analog simulator evaluations- vertical display with horizontal map display
TI- <NOTATION OF CONTENT> Pilot ability to navigate and perform simulated helicopter terminal area maneuvers using contact analog vertical display symbolization and horizontal map display
AU- DOUGHERTY, D. J.; EMERY, J. H.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- OCT. 1964 46 P REFS
PY- 1964
PD- 196410
CN- NONR-1670/00/
RN- D228-421-020; AD-612465
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6510
DE- <MAJOR> *DISPLAY DEVICES; *FLIGHT SIMULATION; *HELICOPTERS; *PILOT PERFORMANCE; *SIMULATORS
SH- 6514 Instrumentation (1965-74)

AN- <DIALOG> 00110912
AN- <AEROSPACE> N64-28636
TI- James j. gibson on visual perception- analysis of selected papers
TI- <NOTATION OF CONTENT> Gibson theory on visual perception and human factors - sensory cues and dynamic distortion in helicopter flight simulator
AU- HOROWITZ, M. W.
CS- Educational Research Corp., Cambridge, MA.
CS- <CODE> EG265161
SO- FEB. 1964 43 P REFS
PY- 1964
PD- 196402
CN- N61339-294
RN- NAVTRADEVCEN-294-5; AD-602283
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
AV- <OTHER> NTIS
JA- STAR6420
DE- <MAJOR> *CUES; *DISTORTION; *FLIGHT SIMULATORS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING; *HUMAN FACTORS ENGINEERING?; *VISUAL PERCEPTION
SH- 6314 Human Behavior (1963-64)

AN- <DIALOG> 00102651
AN- <AEROSPACE> N64-20178
TI- Joint army-report aircraft instrumentation research- television as an aid to helicopter flight
TI- <NOTATION OF CONTENT> Flight control of helicopter using television as aid for visual contact with ground
AU- ELAM, C. B.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- MAR. 1964 59 P REFS
PY- 1964
PD- 196403
CN- NONR-1670/00/
RN- D228-421-018; AD-437975
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6413
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *FLIGHT CONTROL; *HELICOPTER CONTROL; *HELICOPTERS; *TELEVISION SYSTEMS
SH- 6310 Facilities (1963-64)

AN- <DIALOG> 00101620
AN- <AEROSPACE> N64-19136
TI- Joint army-navy aircraft instrumentation research /janair/ technical progress report
TI- <NOTATION OF CONTENT> Navigation system and visual display in rh- 2 helicopter
AU- DOUGHERTY, D. J.; MC DOWELL, E. V.; ROSENQUIST, D. E.; UPTON, H. W.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951

SO- JUL. 1963 73 P REFS
PY- 1964
PD- 196407
CN- NONR-1670/00/
RN- D228-100-008; AD-435733
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6411
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *HELICOPTERS; *NAVIGATION; *NAVIGATION AIDS; *UH-1 HELICOPTER
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00096083
AN- <AEROSPACE> N64-13499
TI- Pilotage of helicopters with reaction propulsion
TI- <ORIGINAL> pilotierbarkeit des reaktiong- shubschraubers
TI- <NOTATION OF CONTENT> Pilotage of helicopters with reaction control
AU- LAUFER
CS- Dornier-Werke G.m.b.H., Friedrichshafen (Germany).
CS- <CODE> D0425275
SO- 24 SEP. 1963 17 P REFS IN GERMAN PRESENTED AT THE MEETING OF THE WISS. GES. LUFT- U. RAUMFAHRT, MUNICH, 1963
PY- 1963
PD- 196300
LA- German
GL- Germany
CP- Germany
DT- REPORT; CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6405
DE- <MAJOR> *HELICOPTER PERFORMANCE; *HELICOPTERS; *PILOT PERFORMANCE; *PROPULSION; *REACTION CONTROL
SH- 6314 Human Behavior (1963-64)

AN- <DIALOG> 00095429
AN- <AEROSPACE> N64-12830
TI- Contact analog simulator evaluations- hovering and air taxi maneuvers technical report
TI- <NOTATION OF CONTENT> Army-navy aircraft instrumentation research - vertical display-contact analog simulator for hovering and air taxi maneuvers
AU- DOUGHERTY, D. J.; SGRO, J. A.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- JUL. 1963 116 P REFS
PY- 1963
PD- 196307
CN- NONR-1670/00/
RN- D228-421-016; AD-424485
LA- English
GL- United States
CP- United States
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6404
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *DISPLAY DEVICES; *FLIGHT SIMULATORS; *HOVERING; *SIMULATORS
SH- 6315 Instrumentation (1963-64)

AN- <DIALOG> 00093588
AN- <AEROSPACE> N64-10971
TI- Instrument flight simulation studies of the effect of vanes on the flight control of hovering aircraft
TI- <ORIGINAL> regeltechnische unter- suchungen uber den einfluss des stellgliedes in schwebeflugsteuerungen
TI- <NOTATION OF CONTENT> Flight simulator study of velocity and attitude control systems with pilot performance consideration
AU- DOPNER, G.; FRANKE, H. M.
CS- Entwicklungsring Sud, Munich (Germany).
CS- <CODE> EZ955667
SO- SEP. 1963 38 P REFS IN GERMAN PRESENTED AT THE ANN. MEETING OF THE WISS. GES. FUR LUFT- UND RAUMFAHRT, MUNICH, 8-12 OCT. 1963
PY- 1963
PD- 196309
RN- EWR-101-63
LA- German
GL- Germany
CP- Germany

DT- REPORT; CONFERENCE PAPER
DT- TRANSLATION
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6402
DE- <MAJOR> *AIRCRAFT CONTROL; *ATTITUDE CONTROL; *FLIGHT CONTROL; *FLIGHT
SIMULATION; *FLIGHT SIMULATORS; *HOVERING; *PILOT PERFORMANCE; *VANES;
*VELOCITY
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00090684
AN- <AEROSPACE> N63-21843
TI- <NOTATION OF CONTENT> Human factor problems associated with low altitude high-speed flight
AU- RAWSON, H. E.; SCHOHAN, B.
CS- North American Aviation, Inc., Columbus, OH.
CS- <CODE> N2683895
SO- NORTH AMERICAN AVIATION, INC., COLUMBUS, OHIO HUMAN FACTOR PROBLEMS
ASSOCIATED WITH LOW ALTITUDE, HIGH-SPEED /LAHS/ FLIGHT H. E. RAWSON AND
B. SCHOHAN IN CORNELL AERONAUTICAL LAB., INC. PROC. OF THE CAL/TRECOM
SYMP. <ON< DYNAMIC LOAD PROBLEMS ASSOCIATED WITH HELICOPTERS AND
V/STOL AIRCRAFT, BUFFALO, N.Y., JUNE 26-28 <1963< VOL. II 15P /SEE
N63-21838 22-04/
PY- 1963
PD- 196300
LA- English
DT- REPORT
JA- STAR6322
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *DYNAMIC LOADS; *HELICOPTERS; *HIGH
SPEED; *HUMAN FACTORS ENGINEERING?; *LOW ALTITUDE; *V/STOL AIRCRAFT
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00090683
AN- <AEROSPACE> N63-21842
TI- <NOTATION OF CONTENT> Results of army low-altitude, high-speed flight
program /man-machine/
AU- YEATES, J. E.
CS- Army Transportation Research Command, Fort Eustis, VA.
CS- <CODE> A2958801
SO- ARMY TRANSPORTATION RESEARCH COMMAND, FORT EUSTIS, VA. SOME RESULTS
FROM THE ARMY LOW-ALTITUDE, HIGH-SPEED FLIGHT PROGRAM /MAN-MACHINE/
JOHN E. YEATES IN CORNELL AERONAUTICAL LAB., INC. PROC. OF THE
CAL/TRECOM SYMP. <ON< DYNAMIC LOAD PROBLEMS ASSOCIATED WITH
HELICOPTERS AND V/STOL AIRCRAFT, BUFFALO, N.Y., JUNE 26-28 <1963< VOL.
II 24P 4 REFS /SEE N63-21838 22-04/
PY- 1963
PD- 196300
LA- English
DT- REPORT
JA- STAR6322
DE- <MAJOR> *AIRCRAFT PERFORMANCE; *DYNAMIC LOADS; *HELICOPTERS; *HIGH
SPEED; *HUMAN FACTORS ENGINEERING?; *LOW ALTITUDE; *V/STOL AIRCRAFT
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00089046
AN- <AEROSPACE> N63-20161
TI- <NOTATION OF CONTENT> Helicopter flight instrumentation - instrumental control, measuring aerodynamics of rotating airfoils
AU- ANNA, O.
CS- Novotechnik K.G., Stuttgart (Germany).
CS- <CODE> N7946995
SO- NOVOTECHNIK KG. STUTTGART /W. GERMANY/ EVALUATION OF HELICOPTER FLIGHT
CHARACTERISTICS AND FLIGHT PERFORMANCE 'MESSUNGEN VON
FLUGEIGENSCHAFTEN UND FLUGLEISTUNGEN VON HUBSCHRAUBERN< O. ANNA IN
WISS. GES. LUFT- U. RAUMFAHRT, COLOGNE /W. GERMANY/ PROC. OF THE 5TH
MEETING OF THE WGLR COMM. ON FLIGHT MECHANICS, BRUNSWICK, FEB. 10, 1961
P 23-40 IN GERMAN /SEE N63- 20159 20-04/
PY- 1961
PD- 196102
LA- GERMAN

DT- REPORT; CONFERENCE PAPER
JA- STAR6320
DE- <MAJOR> *AERODYNAMICS; *AIRFOILS; *FLIGHT CONTROL; *FLIGHT INSTRUMENTS;
*FLIGHT MECHANICS; *HELICOPTERS; *ROTARY WINGS; *ROTATION; *ROTOR AERODYNAMICS
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00087801
AN- <AEROSPACE> N63-18879
TI- <NOTATION OF CONTENT> Pilot factors in army helicopter accidents based on 1467 accidents, 1957-1961
AU- SPEZIA, E.
CS- Army Board for Aviation Accident Research, Fort Rucker, AL.
CS- <CODE> AZ245473
SO- ARMY BOARD FOR AVIATION ACCIDENT RESEARCH, FORT RUCKER, ALA. ROLE OF
PILOT FACTORS IN ARMY HELICOPTER ACCIDENTS EMIL SPEZIA JAN. 1963 22P
5 REFS /HF 2-62/
PY- 1963
PD- 196301
RN- HF-2-62
LA- English
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6318
DE- <MAJOR> *AIRCRAFT ACCIDENTS; *AUTOROTATION; *HELICOPTERS; *JUDGMENTS;
*LEVELING; *PILOT PERFORMANCE; *STUDENTS
SH- 6314 Human Behavior (1963-64)

AN- <DIALOG> 00084599
AN- <AEROSPACE> N63-15600
TI- <NOTATION OF CONTENT> Army-navy instrumentation program - man-machine system rh-2 helicopter flight test
AU- PERRY, J.; ROBINSON, W. C.; ROSENQUIST, D.
CS- Bell Helicopter Co., Fort Worth, TX.
CS- <CODE> BI370951
SO- BELL HELICOPTER CO., FORT WORTH, TEX. ARMY-NAVY INSTRUMENTATION PROGRAM. STATUS REPORT THROUGH 30 JUNE 1962 DON ROSENQUIST, J. PERRY,
AND W. C. ROBINSON 1962 35P /CONTRACT NONR-1670/00// /ANIP 6-30-62/
PY- 1962
PD- 196200
CN- NONR-1670/00/
RN- ANIP-6-30-62
LA- English
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6312
DE- <MAJOR> *ARMY-NAVY INSTRUMENTATION PROGRAM; *FLIGHT TESTS; *MAN MACHINE
SYSTEMS; *UH-1 HELICOPTER
SH- 6315 Instrumentation (1963-64)

AN- <DIALOG> 00082115
AN- <AEROSPACE> N63-13083
TI- <NOTATION OF CONTENT> Helicopter pilot training, aerial reconnaissance, navigation, instrumentation, aerial gunnery
AU- LYONS, J. D.
CS- George Washington Univ., Washington, DC. HUMAN RESOURCES RESEARCH OFFICE
CS- <CODE> GV805122
SO- GEORGE WASHINGTON U. HUMAN RESOURCES RESEARCH OFFICE, WASHINGTON, D.C.
QUARTERLY RESEARCH REPORT, OCTOBER - DECEMBER 1962 J. DANIEL LYONS FT.
RUCKER, ALA., ARMY AVIATION HUMAN RESOURCES RES. UNIT, DEC. 31, 1962
18P REFS /CONTRACT DA 44-188-ARO-2/
PY- 1962
PD- 196212
CN- DA-44-188-ARO-2
LA- English
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6307
DE- <MAJOR> *AERIAL RECONNAISSANCE; *GUNS; *HELICOPTERS; *LOW ALTITUDE;
*NAVIGATION; *PILOT TRAINING
SH- 6314 Human Behavior (1963-64)

AN- <DIALOG> 00080508
AN- <AEROSPACE> N63-11445

TI- <NOTATION OF CONTENT> Effect of helicopter dynamics on pilot performance of steep descent instrument approaches in turbulence
AU- MILLER, G. E.; SECKEL, E.; TRAYBAR, J. J.
CS- Princeton Univ., NJ.
CS- <CODE> P3732113
SO- PRINCETON U., N.J. A NOTE ON THE EFFECT OF HELICOPTER DYNAMICS ON STEEP INSTRUMENT APPROACHES EDWARD SECKEL, J. J. TRAYBAR, G. E. MILLER FEB. 1962 34P 10 REFS /CONTRACT DA 44-117-TC-524/ /AERONAUTICAL ENG. REPT. 600/
PY- 1962
PD- 196202
CN- DA-44-177-TC-524
RN- AERONAUTICAL ENG. REPT.-600
LA- English
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6303
DE- <MAJOR> *ATMOSPHERIC TURBULENCE; *DESCENT; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *HELICOPTERS; *INSTRUMENT APPROACH; *PILOT PERFORMANCE; *TURBULENCE
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00077459
AN- <AEROSPACE> N62-16329
TI- <NOTATION OF CONTENT> Visual vertical judgments in flight under four levels of gravity
AU- HAMMER, L. R.
CS- Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, OH.
CS- <CODE> AG627259
SO- AEROSPACE MEDICAL RESEARCH LABS. /6570TH/, AEROSPACE MEDICAL DIV., WRIGHT-PATTERSON AFB, OHIO. PERCEPTION OF THE VISUAL VERTICAL UNDER REDUCED GRAVITY. <FINAL REPORT, APR. - AUG. 1961.<. LOIS REEL HAMMER. MAY 1962. 17P. 33 REFS. /MRL-TDR-62-55/ OTS- $0.50.
PY- 1962
PD- 196205
RN- MRL-TDR-62-55
LA- English
DT- REPORT
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- STAR6216
DE- <MAJOR> *AIRCRAFT; *GRAVIRECEPTORS; *GRAVITATION; *HUMAN FACTORS ENGINEERING; *JUDGMENTS; *REDUCED GRAVITY; *SPACE FLIGHT; *TRAJECTORIES ; *VERTICAL FLIGHT; *VISUAL FLIGHT; *VISUAL PERCEPTION; *WEIGHTLESSNESS
SH- 6216 Life Sciences & Life Support Systems (1962)

AN- <DIALOG> 00067727
AN- <AEROSPACE> A65-32984
TI- The effects of vibration on accuracy of a positioning task.
TI- <NOTATION OF CONTENT> Helicopter vibration effect on pilot accuracy in positioning task
AU- LARUE, M. A., JR. /MARTIN MARIETTA CORP., MARTIN CO., ORLANDO, FLA./.
SO- JOURNAL OF ENVIRONMENTAL SCIENCES, VOL. 8, AUG. 1965, P. 33-35. 5 REFS.
PY- 1965
PD- 196508
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6521
SF- AIAA
DE- <MAJOR> *ACCURACY; *HELICOPTERS; *HUMAN REACTIONS; *PILOT PERFORMANCE; *POSITIONING; *VIBRATION EFFECTS
SH- 6505 Biotechnology (1965-74)

AN- <DIALOG> 00030460
AN- <AEROSPACE> A64-14357
TI- Observed pilot-vehicle loop-closure characteristics for hovering aircraft control.
TI- <NOTATION OF CONTENT> Pilot describing function and pilot-vehicle loop-closure characteristics for pitch control of hovering aircraft
AU- LOLLAR, T. E.; MATOUS, J. /BOEING CO., MILITARY AIRCRAFT SYSTEMS DIV., WICHITA, KAN./.

SO- IEEE TRANSACTIONS ON HUMAN FACTORS IN ELECTRONICS, VOL. HFE-4, SEP.
1963, P. 60-63. 11 REFS.
PY- 1963
PD- 196309
LA- English
CP- United States
DT- JOURNAL ARTICLE
AV- <DOCUMENTS AVAILABLE FROM> AIAA Technical Library
JA- IAA6407
SF- AIAA
DE- <MAJOR> *AIRCRAFT CONTROL; *DESCRIPTIONS; *FLIGHT SIMULATION; *HOVERING
; *HUMAN PERFORMANCE; *PILOT PERFORMANCE
SH- 6304 Aircraft (1963-64)

AN- <DIALOG> 00018691
AN- <AEROSPACE> A63-18701
TI- <NOTATION OF CONTENT> Program to establish most efficient and practical combination of man, machine and electronic equipment to permit all-weather flying in military v/tol aircraft
AU- MITCHELL, H. W.
SO- THE JOINT ARMY NAVY AIRCRAFT INSTRUMENT RESEARCH PROGRAMSTATUS REPORT.
HARRY W. MITCHELL /BELL HELICOPTER CO., FORT WORTH, TEX./. INAMERICAN
HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 19TH, PROCEEDINGS. NEW
YORK, AMERICAN HELICOPTER SOCIETY, 1963. 11 P.
PY- 1963
PD- 196300
LA- English
CP- United States
DT- CONFERENCE PAPER
JA- IAA6317
SF- AIAA
DE- <MAJOR> *AIRCRAFT INSTRUMENTS; *ALL-WEATHER AIR NAVIGATION; *ARMY-NAVY
INSTRUMENTATION PROGRAM; *ELECTRONIC EQUIPMENT; *FLIGHT TESTS; *HELICOPTER PERFORMANCE; *MAN MACHINE SYSTEMS; *MILITARY AVIATION; *NAVY
SH- 6315 Instrumentation (1963-64)

AN- <DIALOG> 00018666
AN- <AEROSPACE> A63-18676
TI- <NOTATION OF CONTENT> Papers concerned with helicopter structural dynamics, aerodynamics, development and testing, instrumentation and applications
SO- AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 19TH, PROCEEDINGS.
WASHINGTON, D.C., MAY 1-3, 1963. NEW YORK, AMERICAN HELICOPTER SOCIETY,
1963. 182 P. MEMBERS, $9.00, NONMEMBERS, $12.00.
PY- 1963
PD- 196300
LA- English
CP- United States
DT- CONFERENCE PROCEEDINGS
JA- IAA6317
SF- AIAA
DE- <MAJOR> *AERODYNAMICS; *AIRCRAFT DESIGN; *CONFERENCES; *HELICOPTER
DESIGN; *HELICOPTERS; *ROTORCRAFT AIRCRAFT; *VERTICAL TAKEOFF AIRCRAFT
SH- 6301 General (1963-64)

AN- <DIALOG> 00015570
AN- <AEROSPACE> A63-15580
TI- <NOTATION OF CONTENT> Discussion of light flicker as a problem to helicopter pilots
AU- JOHNSON, L. C.
SO- FLICKER AS A HELICOPTER PILOT PROBLEM. LAVERNE C. JOHNSON /U.S. NAVY,
MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT, SAN DIEGO, CALIF./ AEROSPACE
MEDICINE, VOL. 34, APR. 1963, P. 306-310. 20 REFS. NAVY-SUPPORTED RESEARCH, RESEARCH TASK NO. MR 005.12-2304.
PY- 1963
PD- 196304
CN- MR 005-12-2304
LA- English
CP- United States
DT- JOURNAL ARTICLE
JA- IAA6311
SF- AIAA

DE- <MAJOR> *FLICKER; *FLIGHT CREWS; *HELICOPTERS; *HUMAN FACTORS ENGINEERING?
SH- 6314 Human Behavior (1963-64)

Ergonomics Abstracts On-line

Abstract Number: 107524
Title: The Role of Helicopter Noise-Induced Vibration and Rattle in Human Response
Author(s): SCHOMER, P.D.; NEATHAMMER, R.D.
Source: Journal of the Acoustical Society of America
Year: 1987
Volume: 81
Issue: 4
Pages: 966-976
Number of References:
Original Language: English
Classification Term(s): VIBRATION; Exposure to noise; FAMILY AND HOME LIFE; Noise levels
Classification Number(s): 31-00-00; 30-01-00; 30-03-00; 60-00-00
Application(s): Helicopters; Urban planning
Abstract:
Our understanding of community reaction to helicopter noise is incomplete and inadequate. While A-weighting appears to work outdoors and at modest noise levels, and the community response in terms of percentage of population highly annoyed can be correlated with respect to the day/night average sound level (DNL) descriptor, questions remain as to the role of perceived building vibrations and rattle in human response to helicopter noise. Does hearing windows, ceiling tiles, or objects in the room rattle or does the general perception of building vibration increase the public's adverse response to helicopter noise? To answer these questions, this study examined the role of vibration and rattle in human response to helicopter noise. Results showed that the A-frequency-weighting is generally adequate to assess community response to helicopter noise when no vibration or rattle is induced by the noise. When rattle or vibrations are induced by the helicopter noise, however, A-weighting does not assess the community response adequately. In this study, slant distance (distance of closest approach between the helicopter and the location on the ground) offers the best correlation with high levels of rattle. High levels of rattle usually would not be induced for slant distances in excess of 1000 ft, but high levels of rattle would nearly always be produced for slant distances shorter than 500 ft. The result suggests a decibel offset of the order of 10 dB or more is required to assess helicopter noise properly when little vibration or rattle is produced. When no rattles are induced by the noise, there is no offset. No housing or noise-sensitive land uses should be located in zones where high levels of vibration or rattle are induced by helicopter noise; the offset is at least of the order of 20 dB. This high vibration and rattle zone potentially can be delineated by helicopter type and slant distance. For the Army Huey aircraft in level flyover, this zone boundary is at a slant distance between 500 and 1000 ft. The slant distance zone boundary is expected to differ with type of aircraft and operation.

Abstract Number: 142190
Title: Neuro-Controllers for Adaptive Helicopter Hover Training
Author(s): KRISHNAKUMAR, K.; SAWHNEY, S.; WAI, R.
Source: IEEE Transactions on Systems, Man, and Cybernetics
Year: 1994
Volume: 24
Issue: 8
Pages: 1142-1152
Number of References: 7
Original Language: English
Classification Term(s): TRAINING; Learning, skill development, knowledge acquisition and concept attainment; System adaptability and flexibility; Use of simulators
Classification Number(s): 44-00-00; 02-09-09; 37-02-00; 63-02-00
Application(s): Trains
Abstract:
This paper presents an application of artificial neural networks in adaptive helicopter hover training of novice student pilots. The design of the adaptive trainer utilizes the hypothesis that novices can be trained to fly a helicopter system automatically (with no human interaction) if the helicopter system adapts to the learning curve of the student. Two different techniques based on the above approach are presented. In the first technique, the helicopter system actively enforces optimality by augmenting the novice's control inputs by amounts necessary to satisfy desired performance criteria. The second technique uses relaxed performance criteria that are not initially optimal, but approach optimality in a graded fashion, based on the learning curve of the student. Adaptive neuro-controllers, together with a critic model, are used to implement the adaptive helicopter system. The results using simulated student models verify the approach adopted, and show that the adaptive neuro-controllers allow the helicopter system to adapt to the novice's learning curve.

Abstract Number: 122914
Title: An Anthropometric Evaluation of the TH-57 Jetranger Helicopter
Author(s): CHAPLESKI, R.C.; ADRIAN, E.D.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1990
Volume: -

Issue: -
Pages: 710-714
Number of References: 13
Original Language: English
Classification Term(s): Workstation dimensions; GENERAL WORKPLACE DESIGN AND BUILDINGS; Opinions; Questionnaires and surveys; Ratings and preferences; Reach; Seating; Workstation visibility and audibility
Classification Number(s): 27-01-00; 26-00-00; 27-01-01; 27-02-01; 28-04-01; 64-05-00; 65-08-01; 65-08-02
Application(s): Aircrew; Helicopters
Abstract:
This paper summarizes results of a questionnaire and field study evaluating the TH-57 Bell Jetranger helicopter from anthropometric aspects. A questionnaire was prepared and distributed to the student pilots asking their opinions in regard to the problems associated with operating this helicopter. Over forty responses were received and analyzed which pointed toward the problem areas. The findings of the questionnaire were used in a field test to evaluate the helicopter objectively. The respondents indicated that they had problems with a cramped cockpit environment, obstructed visibility, difficulties in reaching and even seeing some instruments and gauges and several comfort factors. The field test indicated that this helicopter is deficient in accommodating individuals within the allowable anthropometric ranges for student pilots. Additionally, many design features to aid in pilot safety and proficiency were given insufficient attention or totally overlooked. Having identified these deficiencies, solutions were proposed to eliminate them. The results of this study can be used to study the helicopter further and improve its design for a safer and more user friendly workspace.

Abstract Number: 150180
Title: U.S. Naval Helicopter Mishaps: Cockpit Egress Problems
Author(s): BARKER, C.O.; BELLENKES, A.H.
Source: Aviation, Space, and Environmental Medicine
Year: 1996
Volume: 67
Issue: 5
Pages: 480-485
Number of References: 133
Original Language: English
Classification Term(s): Evacuation procedures; Doors, hatches and openings; Education, training and safety programmes; Equipment for altitude and depth; Surveys, statistics and analysis; Workplace and equipment design; Workplace and equipment design for health and safety; Workstation visibility and audibility
Classification Number(s): 51-11-03; 26-04-01; 27-02-01; 48-01-00; 49-04-00; 51-02-00; 51-07-00; 51-10-07
Application(s): Air safety; Aircrew; Helicopters
Abstract:
A number of potential problems are associated with egress from the helicopter cockpit in the post-crash phase of a mishap. The purpose of this study was to identify the egress problems experienced by pilots in U.S. Navy/Marine Corps helicopter cockpits, and to propose a priority of preventive interventions. Using Naval Safety Center data, the authors reviewed 1980-94 Class A helicopter mishap narratives. They identified and categorized cockpit egress problems reported by pilots. The data are described in terms of problem category, helicopter type, crash terrain, and time of day. Of the 210 survivable mishaps, 489 egress problems were reported in 128 mishaps, 61% involved aircrew factors, 16% environmental factors, 12% were related to helicopter factors, and 11% to cockpit factors. Of the 128 mishaps, 67.5% occurred during daytime, 32.5% at night, 64% in overwater crashes, 26% over land, and 10% over flight decks. The most significant, but uncommon, injuries involved the 'stroking seat'. Egress hazards can be minimized by the implementation of more intensive underwater egress training, crashworthy fuel systems, better design of cockpit exits and hatches, better restraint systems, better crashworthy seats, underwater visual aids, and more streamlined personal equipment. Engineering validation is needed before committing to suggested interventions.

Abstract Number: 162216
Title: Psycho-Social Safety Perceptions: Helicopters as a Case Study
Author(s): ADAMS, R.J.; HWOSCHINSKY, P.V.; BAILEY, T.E.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 945-950
Number of References: 6
Original Language: English
Classification Term(s): System reliability; Human reliability and system reliability; Surveys, statistics and analysis
Classification Number(s): 37-07-00; 48-01-00; 63-06-00
Application(s): Helicopters
Abstract:
Helicopter risk exposure has increased from about 500,000 to 2.9 million annual hours over the past quarter of a century; nearly a sixfold increase. During this same time period, helicopter accidents per 100,000 flight hours have decreased by an order of magnitude (from 60 to 6.2). In fact, over the past four years, the overall helicopter accident rate has been about equal to general aviation accident rate. During this same period the 'non-hazardous' helicopter operation accident rate has been about equal to the regional air carrier accident rate. Yet, the public perception of helicopter safety remains negative. People do not feel comfortable flying in helicopters, they resent helicopter overflights of their property, and do not want heliports built in their neighbourhoods. The discussion

addresses the safety issue first from an objective, quantitative perspective. The actual risks to neighbourhoods, businesses, and the population in areas where helicopters operate are quantified. Second, accident rates for various missions are examined so that citizens can intelligently differentiate between high and low risk types. Finally, the accident risk exposure near take-off and landing facilities is analyzed to determine the risks to residential and commercial buildings, vehicles and people on the ground.

Abstract Number: 106868
Title: Helicopter Pilot Suits for Offshore Application. A Survey of Thermal Comfort and Ergonomic Design
Author(s): GAUL, C.A.; MEKJAVIC, I.B.
Source: Applied Ergonomics
Year: 1987
Volume: 18
Issue: 2
Pages: 153-158
Number of References:
Original Language: English
Classification Term(s): Clothing ensembles; Equipment for altitude and depth; High temperature; Low temperature; Questionnaires and surveys; Thermal comfort; Thermal stress
Classification Number(s): 51-09-05; 33-01-01; 33-01-02; 33-04-00; 33-07-00; 51-10-07; 64-05-00
Application(s): Aircrew; Armed forces; Helicopters; Oil and petroleum industry
Abstract:
The objective of this study was to determine the existing problems associated with helicopter pilot survival suits currently in use. A survey was conducted of helicopter pilots from both Canadian commercial and military disciplines. Pilots commented on eight different types of survival suits. Reduced thermal comfort as well as lack of ventilation were the two most common criticisms of the pilot suits. The 'greenhouse' effect, common to helicopter cockpits, results in hot working ambients both in summer and winter. The air cooling mechanisms employed in summer may cause a 'chilling' effect following an on-ground stand-by where cockpit temperatures may reach 40^oC. Thermal stress may also be induced with high cockpit temperatures caused by the sun's radiation in winter and summer. Suit design was another area considered. 72% and 86% of military and commercial pilots respectively felt their freedom of movement was hindered by their survival suits. Certain designs were considered more hazardous than others with regard to clips and hooks catching switches on the control panel. Difficulty in donning suits appeared to be a universal problem irrespective of type of suit used. Lack of comfort and movement in addition to thermal stress may lead to reduced time to fatigue and, thus, occurrence of errors and accidents. The results of this survey reflect the inadequacies of the helicopter pilot survival suits presently in use. It is suggested that evaluation of these suits be made on the basis of their ventilation capabilities, ergonomic design and thermal properties in a variety of ambient environments.

Abstract Number: 112831
Title: Maximum Acceptable Inherent Buoyancy Limit for Aircrew/Passenger Helicopter Immersion Suit Systems
Author(s): BROOKS, C.J.
Source: Applied Ergonomics
Year: 1988
Volume: 19
Issue: 4
Pages: 266-270
Number of References: 16
Original Language: English
Classification Term(s): Clothing ensembles; Evacuation procedures; Instrument recording; Low temperature; Materials for clothing; Thermal comfort; Thermal equipment; Use of test rigs
Classification Number(s): 51-09-05; 33-01-01; 33-07-00; 51-09-06; 51-10-03; 51-11-03; 63-02-01; 63-09-03
Application(s): Air passengers; Aircrew; Helicopters
Abstract:
Helicopter crew and passengers flying over cold water wear immersion suits to provide hypothermic protection in case of ditching in cold water. The suits and linings have trapped air in the material to provide the necessary insulation and are thus very buoyant. By paradox, this buoyancy may be too much for a survivor to overcome in escaping from the cabin of a rapidly sinking inverted helicopter. The Canadian General Standard Board requested that research be conducted to investigate what should be the maximum inherent buoyancy in an immersion suit that would not inhibit escape, yet would provide adequate thermal insulation. This experiment reports on 12 subjects who safely escaped with 146N (33 lbf) of added buoyancy from a helicopter underwater escape trainer. It discusses the logic for and recommendation that the inherent buoyancy in a helicopter crew/passenger immersion suit system should not exceed this figure.

Abstract Number: 124248
Title: Frames of Reference for Helicopter Electronic Maps: The Relevance of Spatial Cognition and Componential Analysis
Author(s): HARWOOD, K.; WICKENS, C.D.
Source: International Journal of Aviation Psychology
Year: 1991
Volume: 1
Issue: 1
Pages: 5-23

Number of References: 25
Original Language: English
Classification Term(s): Charts and maps; Imagery; Knowledge representation; Mental ability; Modelling system characteristics; Rating and ranking; Ratings and preferences; User's model, mental models and cognitive maps
Classification Number(s): 08-02-03; 02-09-05; 02-09-06; 05-02-01; 05-10-00; 63-01-02; 64-06-00; 65-08-01
Application(s): Aircrew; Cartography; Helicopters
Abstract:
Maps are important for most forms of navigational flight, yet for helicopter flight they are critical. Computer-generated map displays for Nap-of-the-Earth (NOE) and low-level helicopter flight were configured according to previous research on maps, navigational problem solving and spatial cognition in large-scale environments. Interest centred on different frame-of-reference representations. The north-up map emphasized consistency of object location, characteristic of an earth-centred frame of reference. The track-up map emphasized map-terrain congruency, characteristic of an ego-centred frame of reference. Twenty skilled pilots used the maps to complete several navigational tasks that occurred within a realistic simulation program tailored for helicopter navigation. Findings revealed an interesting pattern of map-task dependencies. A componential analysis suggests that different cognitive components such as orienting and absolute object location are supported to varying degrees by properties of different frames of reference. These findings are important for designers of helicopter map displays.

Abstract Number: 139199
Title: Postural Control in Pilots and Candidates for Flight Training
Author(s): KOHEN-RAZ, R.; KOHEN-RAZ, A.; EREL, J.; DAVIDSON, B.; CAINE, Y.; FROOM, P.
Source: Aviation, Space & Environmental Medicine
Year: 1994
Volume: 65
Issue: 4
Pages: 323-326
Number of References: 15
Original Language: English
Classification Term(s): Posture; Application of test batteries; Instrument recording; Signal processing and spectral analysis
Classification Number(s): 03-04-04; 63-09-03; 63-10-02; 64-07-00
Application(s): Aircrew; Helicopters
Abstract:
Postural control may reflect the pilot's ability to deal successfully with the stresses of spatial orientation. In this study, the authors hypothesized that fighter pilots would have better performance on the 'tetra-axiametric posture test' than would helicopter pilots (less rigorously selected) and candidates for flight training. They tested 28 fighter pilots, 23 helicopter pilots and 43 candidates by tetra-axiametric posturography. Fighter pilots were found on the level position to have significantly more compensatory anterior-posterior sway (moving anterior-posterior rather than laterally, p=0.02) and required less movements to maintain balance (p=0.02) than did candidates. Helicopter pilots had intermediate values. In stressed positions, fighter pilots demonstrated relatively more slow movements (p=0.018) than control. In the stressed positions, helicopter pilots had postural profiles similar to the candidates. It is concluded that there are significant differences in postural control as tested by tetra-axiametric posturography between fighter pilots, helicopter pilots, and candidates for flight training. This could be due to either innate ability, which could be used in the selection process, or to training. A prospective study is planned in order to determine if posturography can predict a candidate's ability to complete flight training.

Abstract Number: 139480
Title: Heat Stress and Helicopter Pilot Errors
Author(s): FROOM, P.; CAINE, Y.; SHOCHAT, I.; RIBAK, J.
Source: Journal of Occupational Medicine
Year: 1993
Volume: 35
Issue: 7
Pages: 720-724
Number of References: 40
Original Language: English
Classification Term(s): High temperature; Errors, accuracy and reliability; Humidity; Thermal stress
Classification Number(s): 33-01-02; 02-11-02; 33-02-00; 33-04-00
Application(s): Aircrew; Helicopters
Abstract:
Helicopter pilots are subjected to degrees of heat stress that under laboratory conditions result in decreased performance. However, the effect of heat stress on the frequency of helicopter pilot errors is uncertain. The purpose of this study is to determine whether there is an association between ambient heat stress and pilot error. The records of 500 helicopter accidents and incidents due to pilot error during the months May through October were selected at random. On the day of the event, ambient dry bulb and wet bulb temperatures were recorded and compared to temperature and humidity readings on 1000 days chosen at random over the same time period, after eliminating days where events occurred. There was significant difference between the dry temperature distributions of the days with pilot error compared with the control group (chi² = 47.54, p<0.0001). A dose-response relationship was found, with a significant lower risk when ambient dry bulb temperatures were 25 to 29^oC (odds ratio, 0.6; 95% confidence interval, 0.5 to 0.8, p<0.0001), an increased risk of 1.6 (1.3 to 2.0, p<0.0001) at 30 to 34^oC, and the highest risk at 35^oC or more (6.2, 95% confidence interval, 2.1 to 21.8,

p<0.0002). There is a dose-response relationship between ambient heat stress and pilot error in Israeli military helicopter pilots. This is the first study outside the laboratory showing a connection between heat stress and accidents due to human error. Further studies are required to substantiate the findings and to determine whether extrapolation to other settings is warranted.

Abstract Number: 140356
Title: Heat Stress and Helicopter Pilot Errors
Author(s): FROOM, P.; CAINE, Y.; SHOCHAT, I.; RIBAK, J.
Source: Journal of Occupational Medicine
Year: 1993
Volume: 35
Issue: 7
Pages: 720-724
Number of References: 40
Original Language: English
Classification Term(s): Thermal stress; Errors, accuracy and reliability; High temperature; Surveys, statistics and analysis
Classification Number(s): 33-04-00; 02-11-02; 33-01-02; 48-01-00
Application(s): Aircrew; Helicopters
Abstract:
Helicopter pilots are subjected to degrees of heat stress that under laboratory conditions result in decreased performance. However, the effect of heat stress on the frequency of helicopter pilot errors is uncertain. The purpose of this study is to determine whether there is an association between ambient heat stress and pilot error. The records of 500 helicopter accidents and incidents due to pilot error during the months May through October were selected at random. On the day of the event, ambient dry bulb and wet bulb temperatures were recorded and compared to temperature and humidity readings on 1000 days chosen at random over the same time period, after eliminating days where events occurred. There was a significant difference between the dry temperature distributions of the days with pilot error compared with the control group (x² = 47.54, p<0.0001). A dose-response relationship was found, with a significantly lower risk when ambient dry bulb temperatures were 25 to 29^oC (odds ratio, 0.6; 95% confidence interval, 0.5 to 0.8, p<0.0001), an increased risk of 1.6 (1.3 to 2.0, p<0.0001) at 30 to 34^oC, and the highest risk at 35^oC or more (6.2, 95% confidence interval, 2.1 to 21.8, p<0.0002). There is a dose-response relationship between ambient heat stress and pilot error in Israeli military helicopter pilots. This is the first study outside the laboratory showing a connection between heat stress and accidents due to human error. Further studies are required to substantiate the findings and to determine whether extrapolation to other settings is warranted.

Abstract Number: 146761
Title: The Feasibility of Collecting In-Flight EEG Data from Helicopter Pilots
Author(s): CALDWELL, J.A.; LEWIS, J.A.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 9 Section I
Pages: 883-889
Number of References: 9
Original Language: English
Classification Term(s): Instrument recording; Brain function; Experimental equipment design; Physiological and psychophysiological recording; Signal processing and spectral analysis; Whole body acceleration and deceleration
Classification Number(s): 63-09-03; 03-01-05; 32-02-00; 63-07-00; 63-10-02; 64-08-00
Application(s): Aircrew; Helicopters
Abstract:
An assessment of whether valid EEG data could be collected on helicopter pilots in flight was conducted. Each subject provided eyes-open/eyes-closed EEG in the laboratory and in a helicopter. During flights, EEGs were monitored on the ground in real-time via radio telemetry. Analyses were conducted on the data recorded from Fz, Cz, Pz, P3, P4, O1, and O2 from eight subjects. Delta activity at one recording site was higher in the aircraft than in the laboratory probably because of increased eye movements. Both theta and alpha activity at several sites also were increased in the aircraft, and alpha activity at all electrodes showed the expected augmentation from eyes-opened to eyes-closed; however, there were no interactions indicative of problems detecting normal alpha changes due to eye closure in the aircraft. Beta activity recorded from Cz and O1 was elevated during flight testing, but it was concluded that at least the O1 effect was due to muscle artifact in the more active environment. While there were more recording artifacts in the helicopter than in the laboratory, the overall results show it is possible to telemeter EEG from helicopter pilots in flight. Follow-on studies are needed to assess whether recordings can be obtained while pilots are performing flight-related tasks.

Abstract Number: 166748
Title: Can 3-D Auditory Warnings Enhance Helicopter Cockpit Safety?
Author(s): HAAS, E.C.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1998
Volume: -
Issue: -

Pages: 1117-1121
Number of References: 5
Original Language: English
Classification Term(s): Emergency and warning devices; Auditory coding; AUDITORY DISPLAYS; CHOICE OF COMMUNICATION MEDIA; Information and communication design for health and safety; Mixed modality displays; Time and speed
Classification Number(s): 51-06-01; 09-01-03; 10-00-00; 23-00-00; 24-02-00; 51-05-00; 65-02-00
Application(s): Aircrew; Helicopters
Abstract:
The design and use of 3-D auditory warning signals can potentially enhance helicopter cockpit safety. A study was conducted to determine how quickly helicopter pilots could respond to helicopter malfunction warning signals in a simulated cockpit environment when four different signal functions (fire in left engine, fire in right engine, chips in transmission, shaft-driven compressor failure) were presented in three different presentation modes (visual only, visual plus 3-D auditory speech signals, visual plus 3-D auditory icons). The dependent variable was pilot response time to the warning signal, from the time of signal onset to the time that the pilot manipulated the collective control in the correct manner. Subjects were 12 U.S. Army pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the U.S. Army. Results indicated that signal presentation was the only significant effect. Signal function and the signal presentation x signal function interaction were not significant. Post hoc test results indicated that pilot response time to the visual signals supplemented with 3-D audio speech or auditory icon signals was significantly shorter than that to visual signals only. The data imply that 3-D audio speech and auditory icon signals provide a safe and effective mode of warning presentation in the helicopter cockpit.

Abstract Number: 170477
Title: A Preliminary Descriptive Critical Incident Analysis of Night Vision Goggle Helicopter Operations
Author(s): RENSHAW, P.F.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 221-228
Number of References: 27
Original Language: English
Classification Term(s): Night vision devices; Critical incident technique; Surveys, statistics and analysis
Classification Number(s): 22-01-06; 48-01-00; 64-09-00
Application(s): Aircrew; Helicopters
Abstract:
Night vision goggles (NVGs) and, in particular, the helmet mounted Aviators Night-Vision-Imaging-System (ANVIS), have gained increasing importance in night time military helicopter operations. Moreover, NVG accident data have demonstrated that there is a need to address the multi-faceted human factors aspects associated with low-level tactical NVG helicopter operations including the impact of cognitive factors such as situational awareness and decision-making. The aim of the current research was to examine the perceptions of Australian Army helicopter pilots towards NVG operations. The study utilises a four dimensional theoretical model of complexity proposed by Woods (1988), to examine the cognitive impact of NVGs on pilot performance. This model forms the basis of a critical incident questionnaire which is used to extract and qualify the characteristics of errors that pilots believe adversely impact upon NVG helicopter operations. The Night Vision Goggles Critical Incident Questionnaire (NVGCIQ) is designed to anticipate accident-producing situations and provide a theoretical basis for examining the origins of human error in complex task performance.

Abstract Number: 101123
Title: Helicopter Crew Evaluations on the Effects of Vibration on Performance
Author(s): BATEMAN, R.P.; WHITE, R.P.
Source: Progress for People. Proceedings of the Human Factors Society 29th Annual Meeting, Baltimore, Maryland, September 29-October 3, 1985, Edited by R.W. Swezey. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1985
Volume: -
Issue: -
Pages: 550-553
Number of References:
Original Language: English
Classification Term(s): Vibration levels; Fatigue; Standards, codes of practice, guidelines and recommendations; Subjective measures
Classification Number(s): 31-01-00; 01-05-00; 06-04-00; 65-08-00
Application(s): Helicopters
Abstract:
The objectives of this research were to determine the subjectively experienced differences in vibration levels between helicopter models and to determine the conditions of maximum subjective fatigue experienced during actual helicopter operations. Subjective data were obtained from 12 experienced helicopter crewmembers assigned to flight test duties. Evaluated concurrently, it was hypothesized that these independent evaluations would provide preliminary data on the effects of vibration on performance. Analysis of the data indicated that the subjectively observed effects of vibration could be divided into two categories: (1) direct mechanical interference which imposed immediate performance

decrements, and (2) fatigue effects which were not apparent until after at least six hours of continuous operation. The experienced differences would not be predicted by the current ISO Standard 2631.

Abstract Number: 103606
Title: Levels of Helicopter Control Force Inputs during In-Flight Emergency Conditions as a Function of Aviator Experience
Author(s): SCHOPPER, A.W.; WELLS, J.H.
Source: Ergonomics
Year: 1986
Volume: 29
Issue: 11
Pages: 1329-1341
Number of References:
Original Language: English
Classification Term(s): Control dynamics; Experience and practice; Joysticks; Multifunction controls ; Muscular strength and endurance; Pedals
Classification Number(s): 25-04-00; 03-04-03; 04-04-00; 21-09-00; 21-10-00; 21-17-00
Application(s): Aircrew; Helicopters
Abstract:
In response to the dearth of information available regarding the magnitude of force inputs required to operate helicopter controls under emergency conditions, 12 male US Army aviators each flew six normal and six simulated emergency ('hydraulics-off') approaches and landings in an army utility helicopter. Cyclic, collective and pedal outputs recorded during the last 60s of flight prior to each touchdown revealed significant differences in the magnitude of the forces applied as a function of hydraulics condition and time to touchdown, i.e. forces differentially increased as touchdown neared during hydraulics-off approaches. Significant interactions involving level of experience were encountered; the nature of the effects differed among the various controls and directions of input. The descriptive statistics show the overall mean and median forces for both groups of aviators to be below the helicopter control-referenced maximal 4s strength capabilities of small Army males and females for all inputs except those in the downward direction on the collective.

Abstract Number: 107515
Title: Community Reactions to Helicopter Noise: Results from an Experimental Study
Author(s): FIELDS, J.M.; POWELL, C.A.
Source: Journal of the Acoustical Society of America
Year: 1987
Volume: 82
Issue: 2
Pages: 479-492
Number of References:
Original Language: English
Classification Term(s): Noise levels; Combined measures and indices; Intermittent noise; Interviews; Questionnaires and surveys; Rating and ranking
Classification Number(s): 30-01-00; 30-02-01; 64-04-00; 64-05-00; 64-06-00; 65-07-00
Application(s): Aircraft; Helicopters
Abstract:
Reactions to low numbers of helicopter noise events (less than 50 per day) have been studied in a community setting utilizing a new type of study design. Community residents were repeatedly interviewed about daily noise annoyance reactions on days when helicopter noise exposures had, without the residents' knowledge, been controlled for study design purposes. The effects of maximum noise level and number of noise events on helicopter noise annoyance were found to be consistent with the principles contained in L_{eq}-based noise indices. Although the best estimate of the effect of number of noise events is very nearly the same as that represented by the energy summation principle contained in L_{eq}-based indices, the possibility that the number of noise events has only a small effect on annoyance cannot be rejected at the conventional p<0.05 level. The effect of the duration of noise events was also found to be consistent with L_{eq}-based indices. After removing the effect of differences in duration and noise levels, there is not an important difference between reactions to impulsive and nonimpulsive types of helicopters.

Abstract Number: 113301
Title: Mental Effect and Fatigue of JNR Employees Caused by Inspection Work of Rails and Bridges by Helicopter
Author(s): MUROYA, H.; TADA, M.; SATO, K.; IKEDA, M.
Source: Bulletin of the Railway Labour Science Research Institute
Year: 1985
Volume: -
Issue: No.39
Pages: 37-50
Number of References: 8
Original Language: Japanese
Classification Term(s): Mental fatigue; Questionnaires and surveys; Workload demands; Young adults
Classification Number(s): 06-04-04; 04-01-02; 41-03-05; 64-05-00
Application(s): Helicopters; Railways
Secondary Source: CIS Abstracts (CIS 86-2046)
Abstract:
To prevent railway accidents on the Japanese National Railways, employees inspect the rails and bridges by helicopter. To learn about the psychological impact of this work, 148 questionnaires were delivered and collected. In addition, 15 of these employees were

checked for normal heart rates. 22% of the respondents reported no fatigue after getting out of the helicopter; 78% registered fatigue. Mental effects were reported for the evenings before the employees' scheduled flights. The mental effects were most marked in employees in their twenties. Mental effects were not due to the helicopter itself, but to the type of work involved. The reason why most of the employees in their twenties and thirties registered fatigue after work is because of the filming and changing of films that is necessary.

Abstract Number: 117469
Title: Cognitive Perspectives on Map Displays for Helicopter Flight
Author(s): HARWOOD, K.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 13-17
Number of References: 14
Original Language: English
Classification Term(s): Charts and maps; Ratings and preferences; Stimulus-response compatibility; Task complexity; Time and speed; Visual perception of form, shape, angle, size and distance
Classification Number(s): 08-02-03; 02-01-06; 07-09-00; 25-06-01; 65-02-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Currently accessible technologies are providing entirely new display concepts for enhancing helicopter navigation. Yet the effectiveness of such displays depends on the extent to which they are configured according to principles from research on human performance. Computer generated map displays in the present study were configured according to previous research on maps, navigational problem solving, and spatial cognition in large scale environments. Interest centered on the representation of different spatial relationships that would best support helicopter navigational problem solving. One map display emphasized the global relationships between objects in the environment. The other map showed the pilot's relationship to objects as he travelled through the environment. Twenty skilled pilots used the maps to complete several navigational tasks that occurred within a realistic simulation program tailored for helicopter navigation. Findings indicate that the type of task and mode of flight (low level or Nap of the Earth (NOE) are important determinants of map display effectiveness.

Abstract Number: 121600
Title: Back Pain in Helicopter Pilots
Author(s): GROENHOUT, H.J.M.; VALKEN, E.; BONGERS, P.M.; HULSHOF, C.T.J.; DIJKSTRA, L.
Source: Tijdschrift voor Sociale Gezondheidszorg
Year: 1989
Volume: 67
Issue: 6
Pages: 193-198
Number of References: 32
Original Language: Dutch
Original Title: Rugklachten bij Helikoptervliegers
Classification Term(s): Effects on the musculo-skeletal system; Experience and practice; Posture; Questionnaires and surveys; Vibration levels; Workplace and equipment design
Classification Number(s): 50-12-00; 03-04-04; 04-04-00; 31-01-00; 49-04-00; 64-05-00
Application(s): Aircrew; Helicopters
Abstract:
The prevalence of back pain in helicopter pilots and the relationship between back pain and long-term exposure to whole-body vibration in the straining posture during flight was examined by means of a questionnaire, in 163 helicopter aircrew members and a control group of 297 non-flying Air Force officers. Vibration levels corresponding to different flight conditions have been measured in four types of helicopters. The relationship between exposure (flying hours and calculated vibration dose levels) and effect (back pain prevalence and nature of back complaints) has been analyzed. The prevalence of back pain in helicopter pilots (68%) is four times higher than in the control group. Back pain is found to be related to the number of hours flown daily and the total number of hours flown. Flying hours represent the exposure time to back straining factors related to flying helicopters. The relationship between back pain and the overall vibration exposure dose is similar to the relationship between back pain and total flying hours. The prevalence of back pain, particularly back pain of a transient nature, shows a strong tendency to rise with an increase in the total number of flying hours per day. More 'chronic' back pain, with persistent symptoms, appears to increase with total number of flying hours and the vibration dose and is significantly higher than in the control group after more than 2000 flying hours. The dose/response relationship could be considered a result of vibration exposure, while sitting in a strained working posture.

Abstract Number: 129757
Title: Should Helicopter Frequent Flyers Wear Head Protection? A Study of Helmet Effectiveness
Author(s): CROWLEY, J.S.
Source: Journal of Occupational Medicine
Year: 1991
Volume: 33
Issue: 7
Pages: 766-769

Number of References: 21
Original Language: English
Classification Term(s): Headgear; Injuries resulting from accidents
Classification Number(s): 51-09-01; 50-01-00
Application(s): Aircrew; Helicopters
Abstract:
Flight helmets have been recommended as aircrew head protection since 1908, yet debate continues regarding their effectiveness. Estimates of helmet use in civilian helicopter aeromedical programmes range from 6.5% to 13%. The effectiveness of the Army's SPH-4 flight helmet in reducing severe head injuries sustained during helicopter accidents was evaluated using the accident data base at the US Army Safety Center, Fort Rucker, Alabama. Analysis was restricted to severe (Class A) accidents that were at least partially survivable, using US Army Safety Center criteria. Occupants not wearing a protective helmet were significantly more likely to sustain severe and fatal head injuries than were occupants wearing the SPH-4 (RR = 3.8 and 6.3, respectively; p<0.01). Unhelmeted noncockpit occupants were at higher risk of head injuries (RR = 5.3 and 7.5; p<0.01). All personnel regularly participating in helicopter flight, civilian or military, should be equipped with protective headgear.

Abstract Number: 140330
Title: Assessment of Helicopter Noise Annoyance: A Comparison between Noise from Helicopters and from Jet Aircraft
Author(s): GJESTLAND, T.
Source: Journal of Sound and Vibration
Year: 1994
Volume: 171
Issue: 4
Pages: 453-458
Number of References: 9
Original Language: English
Classification Term(s): Annoyance from noise; Noise levels; Rating and ranking
Classification Number(s): 30-03-02; 30-01-00; 64-06-00
Application(s): Aircraft; Helicopters
Abstract:
A laboratory study has been conducted to validate the special procedure recommended by Norwegian authorities for assessing helicopter noise annoyance. Noise from helicopters has been subjectively compared with noise from a modern commercial fixed wing jet aircraft. At equal noise levels, LEQ, the noise from a helicopter is judged more or less annoying than the noise from the reference aircraft, depending on the type of helicopter. Norwegian procedures call for a 5 dB 'penalty' when judging the annoyance of noise from helicopters. Based on the conclusion of the present study, it is recommended that the same procedures for assessing conventional aircraft noise annoyance be used for both fixed wing and rotary wing aircraft without any correction factors.

Abstract Number: 142920
Title: Factors Related to Pilot Survival in Helicopter Commuter and Air Taxi Crashes
Author(s): KREBS, M.B.; LI, G.; BAKER, S.P.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 2
Pages: 99-103
Number of References: 14
Original Language: English
Classification Term(s): Surveys, statistics and analysis
Classification Number(s): 48-01-00
Application(s): Aircraft; Helicopters
Abstract:
The authors examined factors related to pilot survival in 167 consecutive helicopter commuter and air taxi crashes that occurred during 1983-88. Case fatality rates and adjusted odds ratios from multivariate logistic regression models were determined using data from the National Transportation Safety Board (NTSB). During this 6-year period, 29 pilots-in-command died in 167 helicopter commuter and air taxi crashes, a case fatality rate of 17.4%. Factors significantly associated with increased risk of pilot fatality were aircraft fire [odds ratio (OR) 20.0, 95% confidence interval (CI) 4.6-86.8], not using shoulder harnesses (OR 9.2, 95% CI 2.2-37.3), and aircraft with two engines (OR 4.8, 95% CI 1.3 - 17.4). In addition, the authors present data regarding success and failure of emergency flotation devices. The results suggest that the likelihood of pilot survival in helicopter crashes could be greatly improved by preventing crash associated fires and promoting the usage of shoulder restraints.

Abstract Number: 146298
Title: Sustaining Helicopter Pilot Performance with Dexedrine during Periods of Sleep Deprivation
Author(s): CALDWELL, J.A.; CALDWELL, J.L.; CROWLEY, J.S.; JONES, H.D.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 10
Pages: 930-937
Number of References: 15
Original Language: English

Classification Term(s): Sleep loss; Brain function; Drugs; Fear, anxiety, mood and emotion; Physiological and psychophysiological recording ; Rating and ranking; Ratings and preferences; Use of simulators
Classification Number(s): 06-01-01; 03-01-05; 06-05-00; 06-07-00; 63-02-00; 63-07-00; 64-06-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Around-the-clock operations often are mandated in combat, but while aircraft can function effectively throughout continuous 24-hour periods, aviators often cannot because of sleep loss. An efficacious countermeasure in sustained operations may be the administration of dextroamphetamine (Dexedrine). Dexedrine will effectively prevent many of the performance problems associated with sleep deprivation in helicopter pilots. A placebo-controlled, double blind study was conducted. Six U.S. Army helicopter pilots completed five flights in a UH-60 simulator while their performance was evaluated. Immediately following each flight, data were collected on electroencephalographic (EEG) activity and subjective mood ratings. Testing sessions occurred at 0100, 0500, 0900, 1300, and 1700. One hour prior to each of the first three flights on drug-administration days, the aviators were given 10 mg of Dexedrine or placebo. Dexedrine, in comparison to placebo, improved aviator simulator control on descents, straight-and-levels, standard-rate turns, and a left-descending turn. Performance was facilitated most noticeably at 0500, 0900, and 1700 (after 22, 26, and 34 hours of continuous wakefulness). EEG and mood data showed that alertness was sustained significantly by Dexedrine - there was reduced slow-wave EEG activity and improved ratings of vigour and fatigue. No adverse behavioural or physiological effects were observed. Dexedrine appears to be effective for sustaining helicopter pilot performance during short periods of sleep loss without producing adverse side effects.

Abstract Number: 148060
Title: Inadequacy of Visual Alarms in Helicopter Air Medical Transport
Author(s): FROMM, R.E.; CAMPBELL, E.; SCHLIETER, P.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 8
Pages: 784-786
Number of References: 13
Original Language: English
Classification Term(s): Emergency and warning devices; CHOICE OF COMMUNICATION MEDIA; Light emitting diodes; Noise levels; Reaction time and speed of performance
Classification Number(s): 51-06-01; 02-11-01; 10-00-00; 22-04-04; 30-01-00
Application(s): Helicopters; Medicine; Nursing
Abstract:
Air medical programmes use medical equipment primarily designed for hospital and/or ground transport settings. Many of these medical devices are equipped with auditory alarms of malfunction or deteriorating clinical status. The high ambient noise requires visual scanning of medical devices to detect alarm conditions in the helicopter cabin. This study aimed to evaluate the adequacy of visual scanning for alarm conditions in the helicopter air medical environment. The helicopter transport programme used in this study is staffed with two medical crewmembers. Flight nurse response time (RT) to a visual alarm was assessed during 25 air medical patient flights. RT was measured using a battery powered dual timer device with a red LED visual alarm placed in a fixed position among the medical instruments. The device was activated at a random time point unknown to the medical crew during each patient flight. RT was defined as the elapsed time from activation of the alarm until it was physically switched off by the flight nurse. RT was surprisingly lengthy for the study population with a mean RT of 81.2 78.4 s (95% CI 48.8-113.5 s). The variability of RT was also surprising ranging from 3 s to more than 5 min. RT to visual alarms in the air medical environment is lengthy and quite variable. Recognition of malfunction of medical equipment or early signs of clinical instability prior to clinical deterioration cannot be assured by visual scanning for alarm conditions. Alternative alarming systems should be considered and investigated for air medical transport.

Abstract Number: 128377
Title: Implementation Issues for Telerobotic Handcontrollers: Human-Robot Ergonomics
Author(s): JACOBUS, H.N.; RIGGS, A.J.; JACOBUS, C.J.; WEINSTEIN, Y.
Source: Human-Robot Interaction, Edited by M. Rahimi and W. Karwowski. Taylor & Francis, London
Year: 1992
Volume: -
Issue: -
Pages: 284-314
Number of References: 114
Original Language: English
Classification Term(s): Manual control; Comparison between input devices; Joysticks; Knowledge of results, feedback and feedforward; Task analysis; Triggers
Classification Number(s): 02-11-05; 07-06-00; 21-01-00; 21-09-00; 21-23-00; 63-05-01
Application(s): Robotics; Teleoperation systems
Abstract:
Teleoperated control requires a master human interface device that can provide haptic input and output which reflects the responses of a slave robotic system. This paper addresses the design of six degree-of-freedom (DOF) cartesian coordinate force-reflecting hand controllers for this purpose. Force-reflecting hand controllers have advantages in space-based applications where an operator must control several robot arms in a simultaneous and coordinated fashion. They also have implications in intravehicular activities (within the Space Station) such as microgravity experiments in metallurgy and

biological experiments that require isolation from the astronauts' environment. For ground applications, universal, or computer-controlled hand controllers are useful in underwater activities where the generality of the hand controller becomes an asset for operation of many different manipulator types. Also applications will emerge in the military, construction and maintenance/manufacturing areas including ordnance handling, mine removal, NBC (Nuclear, Chemical, Biological) operations, control of vehicles and operating-strength and agility-enhanced machines. Future avionics applications including advanced helicopter and aircraft control may also become important.

Abstract Number: 128662
Title: Noise Exposure in Transport Incubators
Author(s): LANDSTROM, U.; LINDBERG, L.; LEDING, L.
Source: Zeitschrift fur Arbeitswissenschaft
Year: 1991
Volume: 45
Issue: 4
Pages: 235-238
Number of References: 7
Original Language: German
Original Title: Larmexposition in Transportbrutkasten
Classification Term(s): Noise levels; Effects on the auditory system; Exposure to noise; Vehicles
Classification Number(s): 30-01-00; 28-05-00; 30-03-00; 50-03-00
Application(s): Aircraft; Ambulance service; Helicopters; Medicine
Abstract:
Measurements and analyses were made of noise in transport incubators to carry babies in ambulances, helicopters, and aircraft. Measurements in road vehicles were made while driving on gravel and asphalt roads at three speeds. The analyses show, as expected, a speed-dependent noise level. At the highest test speed the level for hearing damage risk, 85 dB(A), was reached and in some cases exceeded. The level at low frequencies was consistently high, resulting in a danger of tiredness and disturbed behaviour. Exposure to noise in an incubator during transport in helicopters and aircraft for longer than 1-2 hours a day represents a danger of hearing damage in most cases. The exposure level in the low frequency range is relatively high, especially during helicopter travel. The level inside the incubator is comparable to that outside, indicating insufficient insulation of the walls, floor, and lid. In the 80-140 Hz range the noise inside is even amplified compared with outside.

Abstract Number: 128706
Title: Spatial Disorientation in Naval Aviation Mishaps: A Review of Class A Incidents from 1980 through 1989
Author(s): BELLENKES, A.; BASON, R.; YACAVONE, D.W.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 2
Pages: 128-131
Number of References: 12
Original Language: English
Classification Term(s): Disorientation; Surveys, statistics and analysis
Classification Number(s): 35-05-00; 48-01-00
Application(s): Air safety; Aircraft; Aircrew; Helicopters
Abstract:
Spatial Disorientation (SD) has long been a major aeromedical factor contributing to naval aviation mishaps. In the past, it has been viewed as a generalized phenomenon, described by its vertigo-related symptoms. More recently, however, three distinct types of SD have been identified, each based on whether the aviator recognizes and responds to its onset. In the current retrospective study, Flight Surgeon and Mishap Investigation Report narratives from 33 Class A mishaps occurring from 1980 through 1989 were reviewed. SD was determined to have been a causal factor in all cases. The mishaps were examined to categorize SD into the three descriptive types and to describe the relationship (if any) between SD and various mission-related factors. Aircraft type, phase of flight, time of day, pilot experience, and flight topography were all considered. The results indicate that Types I and II SD could be identified as causal factors in all 33 Class A mishaps. Further, most Types I SD was experienced primarily by helicopter pilots at night while most Type II SD incidents affected jet pilots during day missions.

Abstract Number: 128899
Title: Temperature and Humidity within the Clothing Microenvironment
Author(s): SULLIVAN, P.J.; MEKJAVIC, I.B.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 3
Pages: 186-192
Number of References: 23
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; High temperature; Humidity; Materials for clothing
Classification Number(s): 51-09-05; 03-02-04; 33-01-02; 33-02-00; 51-09-06
Application(s): Helicopters
Abstract:
This study investigates clothing microenvironment conditions that may develop during prolonged exposure of workers to a hot environment. Five subjects were exposed to a linear increase in ambient temperature from 20-40^oC over a 90-min period,

and then remained at 40^oC for an additional 90 min. During the exposures, subjects were clad in four types of helicopter personnel suits (Gore-Tex, Cotton Ventile, Nomex/Insulite, and Nomex/Neoprene), incorporating both dry-suit and wet-suit designs. Continuous assessment was made of skin temperature, rectal temperature, and of microenvironment temperature, relative humidity, and vapour pressure (Tmu, RHmu, and VPmu) 8mm from the surface of the skin. Results indicate that although microenvironment temperatures were similar among suits and slightly lower than that of the environment, the RHmu and VPmu were much greater than those of the ambient air. The Nomex/Insulite and Nomex/Neoprene suits showed the highest VPmu, of which only the Nomex/Insulite resulted in significantly greater increases in rectal temperature, likely due to complete covering of the body with the impermeable insulite component. The present study demonstrates the need to discern between the ambient conditions and the conditions encountered next to the skin when protective clothing is worn.

Abstract Number: 129766
Title: US Navy and Marine Corps Programs for Aircrew Chemical-Biological (CB) Protection
Author(s): HARDY, J.C.
Source: Proceedings of the Twenty-Ninth Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 11-13, 1991. SAFE Association, Yoncalla, Oregon, USA
Year: 1991
Volume: -
Issue: -
Pages: 156-161
Number of References:
Original Language: English
Classification Term(s): Respiratory equipment; Chemical hazards; Clothing ensembles; Visual equipment
Classification Number(s): 51-10-05; 49-06-00; 51-09-05; 51-10-01
Application(s): Aircrew; Helicopters
Abstract:
The A/P22P-9(V) Protective Assembly has been placed in-service for Marine Corps helicopter aircrews, and is being upgraded through the implementation of a Service Life Extension Program (SLEP), and various Engineering Change Proposals. The assembly respirator is a variant of the United Kingdom's AR-5 respirator. For Desert Storm, Canadian Forces AR-5 respirators were loaned to the Navy and modified, tested and issued for use in AV-8B, F/A-18 and OV-10D aircraft. Based on the Desert Storm configurations, a new respirator configuration, designated A/P23P-X(V)N, has been developed and is a candidate configuration for the Naval Aircrew Eye/Respiratory Protection (NAERP) programme.

Abstract Number: 130007
Title: Overtaking Behaviour on Two-Lane Rural Roads
Author(s): CARLSSON, A.
Source: Proceedings of the Conference on the Strategic Highway Research Program and Traffic Safety on Two Continents, Gothenburg, Sweden, September 18-20, 1991, Part 3. Swedish Road and Traffic Research Institute (Statens Vag- och Trafikinstitut - VTI), Linkoping, Sweden
Year: 1991
Volume: -
Issue: -
Pages: 19-36
Number of References:
Original Language: English
Classification Term(s): Decision making and risk assessment; Human performance; Size, magnification and viewing distance
Classification Number(s): 02-09-07; 02-11-00; 25-01-01
Application(s): Driving; Roads and highways
Abstract:
As part of a review of the National Road Administration's rules for alignment standards, the VTI has been commissioned to investigate the overtaking behaviour of road users. The aim of the investigation is to determine how overtaking and passing behaviour depends on road width, sight distance, speed of obstructing vehicles and vehicle type. Data have mainly been collected by videofilming from a helicopter. Using the videofilms, analyses were made of road user behaviour in regard to overtaking and utilisation of a paved shoulder. The investigation consists of two parts. In the first part, a study was made of overtaking behaviour on 13-metre roads with a paved shoulder and a large variation in traffic flows. In this part, the study covers both behaviour in overtaking with the aid of the paved shoulder, i.e. 'passing', and normal overtaking. In the first case, overtaking takes place without a change of lane, while the vehicle being overtaken is on the paved shoulder, overtaking is thus performed without the driver having to interfere with oncoming traffic. This behaviour is characteristic in about 85% of all catching up situations. The remaining 15% consists of normal overtaking, where the lane for oncoming traffic is used. The second part of the investigation concerned overtaking behaviour on 9-metre roads, where only normal overtaking occurs. Data were collected for a large range of traffic flows, from 470 to 1,200 vehicles/hour, counting both directions. The material has been divided into vehicle groups. For overtaking cars, a division has been made according to the speed of the obstructing vehicle, above or below 90 km/h. Heavy vehicles have been divided into a group without trailers and a group with trailers.

Abstract Number: 130718
Title: A Simulator-Based Automated Helicopter Hover Trainer-Synthesis and Verification
Author(s): KRISHNAKUMAR, K.S.; SAWAL, D.; BAILEY, J.E.; DOHME, J.A.

Source: IEEE Transactions on Systems, Man, and Cybernetics
Year: 1991
Volume: 21
Issue: 5
Pages: 961-970
Number of References: 11
Original Language: English
Classification Term(s): Use of simulators; Manual control; Modelling human characteristics ; Modelling system characteristics; System adaptability and flexibility; TRAINING
Classification Number(s): 63-02-00; 02-11-05; 37-02-00; 44-00-00; 63-01-01; 63-01-02
Application(s): Helicopters
Abstract:
An approach to the application of flight simulators for automated training of novice student pilots, with limited human interaction, is presented. A hypothesis for automated human training is presented; and based on this hypothesis, a synthesis procedure for a simulator-based automated hover trainer is developed. The synthesis uses the theory of optimal control pilot modelling for designing varying levels of stability augmentation, which mimics certain aspects of an instructor pilot. Simulator implementation of the hover trainer utilizes an adaptive loop to provide continuous augmentation level changes based on the students' learning curve. Experimental verification of the hypothesis, using a group of neophytes, showed that neophytes could be successfully trained using the automated hover trainer.

Abstract Number: 131300
Title: Moderate Thermal Strain - Physiological Cost and Mental and Psychomotor Performance
Author(s): TERELAK, J.; KOWALSKI, W.
Source: Ergonomia (Poland)
Year: 1991
Volume: 14
Issue: 2
Pages: 181-192
Number of References: 19
Original Language: Polish
Original Title: Wplyw Umiarkowanego Stresu Termicznego na Koszt Fizjologiczny Oraz Sprawnosc Umyslowa i Psychomotoryczna
Classification Term(s): Thermal stress; Application of test batteries; Body temperature regulation; Cardiac processes; Clothing ensembles; Error, accuracy, reliability and frequency; High temperature; Thermal comfort; Time and speed
Classification Number(s): 33-04-00; 03-02-01; 03-02-04; 33-01-02; 33-07-00; 51-09-05; 64-07-00; 65-02-00; 65-03-00
Application(s): Aircrew; Helicopters
Abstract:
Marine helicopter crews use spatial immersion protective clothing when flying over the sea. The waterproof suit protects against cold sea water but it causes thermal strain during the flight and the regular procedures at the airport. The strain influences the crew's physiological cost and mental and psychomotor performance. Experiments were carried out on 10 male volunteers wearing a 'dry' MSK-5 protection suit. Weighted mean skin temperature (MST), rectal temperature (T_r), mean body temperature (MBT), sweat rate (SR), and heart rate (HR) were measured during a two hour period of work at 24^oC air temperature and at a low air movement (below 0.3 m/s). The decisive processes were measured: choice reaction time, psychomotor performance (on a flight simulator), mental performance (arithmetic test) and selective attention. Heat strain during a 2-hour working period in a 'dry' MSK-5 suit without undergarment ventilation exceeded the limits of thermal comfort. However, moderate thermal strain does not have a negative influence on the mental and psychomotor performance of the crew. The authors suggest limiting the time of wearing the MSK-5 suits without ventilation.

Abstract Number: 131459
Title: Back Disorders and Whole-Body Vibration at Work
Author(s): BONGERS, P.; BOSHUIZEN, H.
Source: Universiteit van Amsterdam, Coronel Laboratorium - Academisch Medisch Centrum, Amsterdam, The Netherlands
Year: 1990
Volume: -
Issue: -
Pages: 318pp
Number of References:
Original Language: English
Classification Term(s): Effects on the musculo-skeletal system; Absenteeism; Motor and postural fatigue; Reviews; VIBRATION
Classification Number(s): 50-12-00; 01-04-00; 06-04-06; 31-00-00; 54-01-00
Application(s): Agricultural vehicles; Aircrew; Cranes; Driving; Helicopters; Mechanical materials handling; Physically handicapped; Public road transport
Secondary Source: Safety and Health at Work. ILO-CIS Bulletin (CIS 91-1175)
Abstract:
The authors review the published literature and research projects conducted in The Netherlands concerning occupations with exposure to whole-body vibration (WBV), in order to investigate the relationship of WBV and the incidence and prevalence of disorders of the spine and of back pain. The contents include: the pathological mechanisms of low back pain; evaluation of the present standards for WBV with respect to long-term health effects; permanent work disability due to back disorders in public transport drivers; disability pensioning, long-term sickness absence and sick leave due to back disorders in crane operators exposed to WBV; self-reported back pain in relation to exposure to WBV in tractor drivers, helicopter pilots, fork-lift and freight-container tractor

drivers, and in drivers of wheel-loaders; WBV and back disorders - a meta-analysis and an outline of the dose-response relation; conclusions; recommendations. Statistical methods and data on other diseases in relation to WBV are given in appendices. There are detailed summaries in Dutch and English.

Abstract Number: 131492
Title: Measures for Reducing Noise in Transport Incubators
Author(s): LANDSTROM, U.; LINDBERG, L.
Source: Zeitschrift fur Arbeitswissenschaft
Year: 1992
Volume: 46
Issue: 2
Pages: 65-69
Number of References: 3
Original Language: German
Original Title: Massnahmen fur Reduzierte Larmexponierung in Transportbrutkasten
Classification Term(s): Workplace and equipment design for health and safety; Effects on the auditory system; EQUIPMENT DESIGN; Exposure to noise; Noise levels; Standards, codes of practice, guidelines and recommendations
Classification Number(s): 51-07-00; 01-05-00; 28-00-00; 30-01-00; 30-03-00; 50-03-00
Application(s): Ambulance service; Helicopters; Medicine
Abstract:
This study presents a number of suggestions for measures to reduce noise in transport incubators used today. The study includes evaluations of insulation materials, sealing of openings, alternative lid and wall material, double walls, and curved surfaces. The greatest reduction was obtained using curved surfaces or stiffening of the walls and lids and walls in conjunction with sealing of the incubator openings. In-service improvements of about 8 db(A) were achieved in these cases. The linear sound pressure level was reduced by 6 db(lin). Thanks to the materials suggested the noise level was reduced so much that during transport by helicopter, the transport vehicle with the highest noise exposure values, it was below the limit for hearing damage.

Abstract Number: 132476
Title: Flying with Dichoptic Displays: The Interplay between Display Characteristics and Attention Control
Author(s): GOPHER, D.; KIMCHI, R.; SEAGULL, F.J.; CATZ, I.; TRAININ, O.
Source: Innovations for Interactions. Proceedings of the Human Factors Society 36th Annual Meeting, Atlanta, Georgia, October 12-16, 1992. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1992
Volume: -
Issue: -
Pages: 1469-1473
Number of References: 7
Original Language: English
Classification Term(s): Monocular versus binocular vision; Attention, time sharing and resource allocation; Error, accuracy, reliability and frequency; Headup and projected displays; Manual control; Three-dimensional graphics
Classification Number(s): 02-01-10; 02-11-03; 02-11-05; 08-02-05; 22-05-00; 65-03-00
Application(s): Aircraft; Helicopters
Abstract:
Interest in the study of attention control under dichoptic conditions is instigated by the contemporary development of night-vision systems based on single-eye helmet-mounted displays. Two experiments were conducted to investigate the concurrent performance of a tracking task and letter classification under dichoptic display conditions. Subjects were required to fly a simulated helicopter path while classifying letter pairs presented intermittently. Experimental instructions in Experiment A specially emphasized a two-dimensional interpretation of the visual field. Under these instructions, the presentation of a common visual axis to the two eyes provided by the flight-tunnel did not aid subjects, and their performance deteriorated in dichoptic conditions. In Experiment B, the instructions to subjects changed to advocate a three-dimensional interpretation of the display. Under these instructions, dichoptic performance-levels were substantially improved when the tunnel was present. These results imply that the presence of a common visual axis is not automatically beneficial. In order to improve performance, attention should be intentionally directed to utilize information supporting a three-dimensional frame of mind. These findings have important implications for understanding the dynamics of performance with single-eye helmet-mounted displays, and the training of pilots in their use.

Abstract Number: 132693
Title: Application of the Subjective Workload Assessment Technique to Aviation Test and Evaluation
Author(s): HALE, S.; PICCIONE, D.
Source: Innovations for Interactions. Proceedings of the Human Factors Society 36th Annual Meeting, Atlanta, Georgia, October 12-16, 1992. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1992
Volume: -
Issue: -
Pages: 1185-1189
Number of References: 6
Original Language: English
Classification Term(s): Mental workload; Circadian rhythms; Rating and ranking; Ratings and preferences; Self recording; Team work; Workload demands

Classification Number(s): 07-01-00; 06-02-01; 41-02-03; 41-03-05; 63-09-02; 64-06-00; 65-08-01
Application(s): Aircrew; Armed forces
Abstract:
A study was performed to assess pilot workload assocated with the employment of an air-to-air weapon system integrated onto an attack helicopter. Mental workload was assessed using the Subjective Workload Assessment Technique (SWAT). Pilots performed simulated engagements against an airborne target under varying conditions of engagement type, time of day, target background, and target range. The results indicated significant differences in SWAT ratings as a function of time of day and engagement type. To a lesser degree, SWAT ratings were also sensitive to changes in target background and range. These results are consistent with laboratory and simulation studies which have shown SWAT to be sensitive to changes in task demand and further demonstrate the utility of SWAT for assessing operator workload in the less structured test and evaluation environment.

Abstract Number: 133868
Title: A New Generation of U.S. Army Flight Helmets
Author(s): CARTER, R.M.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 7
Pages: 629-633
Number of References: 7
Original Language: English
Classification Term(s): Headgear; Equipment for altitude and depth; Night vision devices; Personal equipment; Visual equipment
Classification Number(s): 51-09-01; 22-01-06; 51-10-00; 51-10-01; 51-10-07
Application(s): Aircrew
Abstract:
Head injuries are the most common cause of fatal injury in helicopter crashes. For over 80 years, the U.S. Army has used crash investigation studies to redesign flight helmets. This paper describes the evolution of the newly fielded U.S. Army helmet, the Sound Protection Helmet No. 4B (SPH-4B), and compares its protective features to its predecessors, especially the SPH-4. A major contribution to the helmet design process was made by the Aviation Life Support Equipment Retrieval Program (ALSERP), a functional program at the U.S. Army Aeromedical Research Laboratory (USAARL). ALSERP has analyzed more than 500 helmets involved in crash events since 1972. Based on these studies of critical safety factors, the Army has developed and deployed the SPH-4B, a new helmet with improved energy absorption, retention, and stability.

Abstract Number: 133879
Title: The Physiological Consequences of Simulated Helicopter Flight in NBC Protective Equipment
Author(s): THORNTON, R.; CALDWELL, J.L.
Source: Aviation, Space, and Environmental Medicine
Year: 1993
Volume: 64
Issue: 1
Pages: 69-73
Number of References: 8
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; Cardiac processes; High temperature; Personal equipment; Physiological and psychophysiological recording ; Thermal stress; Use of simulators
Classification Number(s): 51-09-05; 03-02-01; 03-02-04; 33-01-02; 33-04-00; 51-10-00; 63-02-00; 63-07-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The physiological effects of wearing U.S. Army aviator nuclear-biological-chemical (NBC) individual protective equipment (IPE) were evaluated in the USAARL UH-60 research flight simulator. There were 16 male aviators who flew the simulator in 4 test conditions: standard flight suit and cool cockpit, standard flight suit and hot cockpit, NBC IPE and cool cockpit, NBC IPE and hot cockpit. The cool condition was a WBGT of 17.9^oC, the hot 30.6^oC. Rectal temperature, mean skin temperature, and heart rate were monitored and showed significant increases for the NBC hot condition compared with the other three. Seven subjects failed to complete the sortie in the NBC hot condition with a mean survival time of 298 min. All subjects flew for the target 6 h in the other conditions.

Abstract Number: 134124
Title: A Comparison of a Linear and Non-Linear Control Law
Author(s): KNOWLES, D.J.
Source: Contemporary Ergonomics 1993. Proceedings of the Ergonomics Society's 1993 Annual Conference, Edinburgh, Scotland, 13-16 April 1993, Edited by E.J. Lovesey. Taylor & Francis, London
Year: 1993
Volume: -
Issue: -
Pages: 17-21
Number of References: 3
Original Language: English
Classification Term(s): Manual control; Control dynamics; Error, accuracy, reliability and frequency; System dynamics

Classification Number(s): 02-11-05; 25-04-00; 37-04-00; 65-03-00
Application(s): Armed forces
Abstract:
Future long range anti-tank guided weapon systems will be required to engage targets from 500m to 5km. The primary long range tank targets have angular velocities. Two control laws (for the relationship between joystick output and sight velocity) were compared using a simulator and 13 military subjects. A multi-linear control law, with the maximum output linked to the track box used to mark the target was compared with a shaped control law, and performance when engaging a variety of targets at different ranges was measured. Results showed that the multi-linear control law method produced significantly lower tracking errors when engaging both the primary long range tank targets and the secondary close range helicopter targets.

Abstract Number: 134469
Title: The Effect of Warming upon Core Temperature Responses to a Subsequent Cold Water Immersion
Author(s): WINDLE, C.M.; TIPTON, M.J.
Source: Proceedings of the Fifth International Conference on Environmental Ergonomics, Maastricht, The Netherlands, Edited by W.A. Lotens and G. Havenith, TNO-Institute for Perception, Soesterberg, The Netherlands
Year: 1992
Volume: -
Issue: -
Pages: 58-59
Number of References: 3
Original Language: English
Classification Term(s): Low temperature; Body temperature regulation
Classification Number(s): 33-01-01; 03-02-04
Application(s):
Abstract:
Estimations of survival time in cold water are important because they influence policies associated with survival including the protective clothing recommended for those at risk of accidental immersion and suggested search and rescue times. Previously, estimations have largely ignored the thermal state of the indiviudal on immersion. Body temperature may increase as a result of activity, exposure to an external heat source, or from a combination of both these; helicopter pilots and passengers, fire-fighters and sportsmen could quite feasibly enter cold water with an elevated core temperature. These experiments were undertaken to determine the effect of warming by active and warming by passive means on the long term survival prospects of individuals subsequently immersed in cold water.

Abstract Number: 135426
Title: A Literature Survey for Virtual Environments: Military Flight Simulator Visual Systems and Simulator Sickness
Author(s): PAUSCH, R.; CREA, T.; CONWAY, M.
Source: Presence
Year: 1992
Volume: 1
Issue: 3
Pages: 344-363
Number of References: 114
Original Language: English
Classification Term(s): Motion sickness; Age; CRTs; Display dynamics; Display stability; Experience and practice; Fatigue; Gender; Reviews; Size, magnification and viewing distance; System response time; Use of simulators; Visual adaptation and pupil control; Visual perception of form, shape, angle, size and distance
Classification Number(s): 32-03-00; 01-04-00; 02-01-02; 02-01-06; 04-01-00; 04-02-00; 04-04-00; 06-04-00; 22-04-01; 25-01-00; 25-01-01; 25-02-04; 37-05-00; 63-02-00
Application(s): Aircraft; Armed forces; Virtual reality
Abstract:
Researchers in the field of virtual environments (VE), or virtual reality, surround a participant with synthetic stimuli. The flight simulator community, primarily in the U.S. military, has a great deal of experience with aircraft simulations, and VE researchers should be aware of the major results in this field. In this survey of the literature, the authors have especially focused on military literature that may be hard for traditional academics to locate via the standard journals. One of the authors of this paper is a military helicopter pilot himself, which was quite useful in obtaining access to many of the references. The authors concentrate on research that produces specific, measured results that apply to VE research. They assume no background other than basic knowledge of computer graphics, and explain simulator terms and concepts as necessary. This paper ends with an annotated bibliography of some harder to find research results in the field of flight simulators: The effects of display parameters, including field-of-view and scene complexity; the effect of lag in system response; the effect of refresh rate in graphics update; the existing theories on causes of simulator sickness; and the after-effects of simulator use. Many of the results cited are contradictory. The global observation is that with flight simulator research, like most human-computer interaction research, there are very few `correct' answers. Almost always, the answer to a specific question depends on the task the user was attempting to perform with the simulator.

Abstract Number: 135524
Title: Assessment of Coordination Demand for Aircrew Coordination Training
Author(s): BOWERS, C.A.; MORGAN, B.B.; SALAS, E.; PRINCE, C.
Source: Military Psychology
Year: 1993

Volume: 5
Issue: 2
Pages: 95-112
Number of References: 22
Original Language: English
Classification Term(s): Team work; Information systems and communication; Job analysis and skills analysis; Questionnaires and surveys; TRAINING
Classification Number(s): 41-02-03; 44-00-00; 56-05-00; 63-05-02; 64-05-00
Application(s): Aircrew; Situational awareness
Abstract:
This investigation attempted to augment current aircrew coordination training approaches by developing an assessment tool to meausre coordination demand associated with specific flight tasks. Using training and operations manuals, a questionnaire was developed to assess the coordination requirements of 38 routine and nonroutine tasks associated with military cargo helicopter operations. A sample of active-duty pilots was requested to estimate the amount of coordination demand imposed by each task. The findings indicated that pilots employed a reasonable range in responding to task items. The overall pattern of results was consistent with expert opinions and earlier research. In addition, a cluster analysis based on the coordination demand ratings indicated the presence of three distinct clusters of flight tasks. These findings are discussed in terms of their utility in creating scenarios for aircrew coordination training as well as providing guidelines for instructor feedback.

Abstract Number: 136675
Title: Subjective Estimates of Velocity, Distance and Time: Implications in Helicopter Navigation
Author(s): SEBALD, C.A.; WICKENS, C.D.
Source: Designing for Diversity. Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, Seattle, Washington, October 11-15, 1993. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1993
Volume: -
Issue: -
Pages: 152-156
Number of References: 10
Original Language: English
Classification Term(s): Time perception; Attention, time sharing and resource allocation; User's model, mental models and cognitive maps; Visual perception of texture and movement
Classification Number(s): 02-08-00; 02-01-07; 02-11-03; 05-10-00
Application(s): Aircrew; Helicopters
Abstract:
This study assessed the sorts of bias induced in a pilot's estimates of velocity, elapsed time, and distance travelled in a flight simulation environment. The validity of an `internal equation' relating the concepts of subjective distance, velocity, and time was assessed. Pilots flew a series of flight legs which varied in their distance, time and velocity, during which they were asked to make judgements of time passage (group 1), speed (group 2), and distance travelled (group 3). These judgements were made under both single and dual task conditions. There was little consistent effect of task loading on any of the subjective estimates, but variations in interval duration, speed, and distance affected the subjective estimates of these quantities in different ways. There was no evidence found for support of an internal equation.

Abstract Number: 137869
Title: Methods for Correlating Visual Scene Elements with Simulator Sickness Incidence
Author(s): KENNEDY, R.S.; BERBAUM, K.S.; SMITH, M.G.
Source: Designing for Diversity. Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, Seattle, Washington, October 11-15, 1993. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 1252-1256
Number of References: 21
Original Language: English
Classification Term(s): Motion sickness; Laboratory versus field; Statistical analysis and psychometrics; Use of simulators
Classification Number(s): 32-03-00; 63-02-00; 63-09-05; 63-10-01
Application(s): Helicopters
Abstract:
Simulator sickness occurs in a large number of Army, Navy, and Marine Corps simulators, and is most prevalent in moving-base, rotary-wing devices which employ cathode ray tube (CRT) video displays as opposed to fixed-wing, dome-display trainers with no motion base. Based on data from a factor analysis of over 1000 Navy and Marine Corps pilot simulation exposures, a new scoring procedure was applied to two helicopter simulators with similar rates of simulator sickness incidence. Based on the factor analytic scoring key, the two simulators showed slightly different sickness profiles. Preliminary work was begun to record the visual scene by video frame-by-frame decomposition and automated scoring algorithms were developed. The findings are discussed from the standpoints of (1) recommendations for future design and use of simulators, and (2) the metric advantages and other merits of the `field experiment' methodology to address human factors problems with simulator sickness.

Abstract Number: 138850
Title: Compromises in the Visual Field with the M43 Aviation Mask
Author(s): WINGERT, T.A.; MCALISTER, W.H.; BACHMAN, W.G.
Source: Aviation, Space & Environmental Medicine
Year: 1994
Volume: 65
Issue: 2
Pages: 157-160
Number of References: 11
Original Language: English
Classification Term(s): Respiratory equipment; Equipment for altitude and depth; Headgear; Size, magnification and viewing distance; Visual detection and acuity, contrast sensitivity and visual field; Visual equipment
Classification Number(s): 51-10-05; 02-01-01; 25-01-01; 51-09-01; 51-10-01; 51-10-07
Application(s): Aircrew; Helicopters
Abstract:
This study evaluated peripheral vision through the M43 protective mask currently worn by aviators in the AH-64 Apache helicopter. A Humphrey Visual Field Analyzer was used to measure the sensitivity of a subject's visual field with and without the mask. The results were analyzed using Dicon's Fieldview^{TM} software. The monocular visual field was reduced for each eye when wearing the mask, especially superiorly and nasally. The overall size of the visual field was not reduced when both eyes were open; however, the quality of the visual field was reduced. The area of binocular vision (central binocular vision fusion field subserving stereopsis) was restricted to the central 30°.

Abstract Number: 139150
Title: Supervisory Control in a Dynamic and Uncertain Environment: Laboratory Task and Crew Performance
Author(s): KIRLIK, A.; PLAMONDON, B.D.; LYTTON, L.; JAGACINSKI, R.J.; MILLER, R.A.
Source: IEEE Transactions on Systems, Man, and Cybernetics
Year: 1993
Volume: 23
Issue: 4
Pages: 1130-1138
Number of References: 18
Original Language: English
Classification Term(s): Supervisory control; Experience and practice; Learning, skill development, knowledge acquisition and concept attainment; Performance strategies; Team work; Use of simulators
Classification Number(s): 02-11-06; 02-09-09; 02-11-04; 04-04-00; 41-02-03; 63-02-00
Application(s): Aircrew; Armed forces
Abstract:
A research programme using a microworld methodology for investigating human performance in a dynamic uncertain environment is described. One- and two-person crews performed a supervisory control task that involved piloting a low-fidelity scout helicopter and supervising four additional helicopters. The simulated environment contained cargo and enemy craft that had to be discovered by searching a 100 mi² forested region. The task required planning, intervention, and several types of resource management. An expert one-person crew performed comparably to novice two-person crews, and both of these were superior to novice one-person crews. More detailed analyses of performance revealed several types of limited adaptivity in the behaviour of the novice crews.

Abstract Number: 139396
Title: Visual Field Information in Low-Altitude Visual Flight by Line-of-Sight Slaved Helmet-Mounted Displays
Author(s): GRUNWALD, A.J.; KOHN, S.
Source: IEEE Transactions on Systems, Man, and Cybernetics
Year: 1994
Volume: 24
Issue: 1
Pages: 120-134
Number of References: 17
Original Language: English
Classification Term(s): Headup and projected displays; Night vision devices; Size, magnification and viewing distance; Visual perception of texture and movement
Classification Number(s): 22-05-00; 02-01-07; 22-01-06; 25-01-01
Application(s): Aircrew; Helicopters
Abstract:
The pilot's ability to derive control-oriented visual field information from teleoperated helmet-mounted displays in nap-of-the-earth flight is investigated in this paper. The visual field with these types of display, commonly used in Apache and Cobra helicopter night operations, originates from a relatively narrow field-of-view forward looking infrared radiation (FLIR) camera, gimbal-mounted at the nose of the aircraft and slaved to the pilot's line of sight, providing a wide-angle field of regard. Pilots have encountered considerable difficulties in controlling the aircraft by these devices. The experimental simulator results presented here indicate that part of these difficulties can be attributed both to the narrow camera field of view and to head/camera slaving system phase lags and errors. In the presence of voluntary head rotation, these shortcomings are shown to impair the control-oriented visual field information vital in vehicular control, such as the perception of the anticipated flight path or the vehicle yaw rate. Since the pilot will tend to minimize head rotation in the presence of slaving system imperfections, the full wide-angle field of regard of the line-of-sight slaved helmet-mounted display is not always fully utilized. The findings in this paper are valid for a general class of head-slaved displays

which are used in teleoperation and virtual environments and in which correct self-motion estimation is an essential part of the operator task.

Abstract Number: 140304
Title: Helicopter Troop Seats: The Present and the Future
Author(s): DOCKSTADER, C.N.; TILLMANN, N.H.
Source: Proceedings of the 31st Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 8-10, 1993, SAFE Association, Yoncalla, Oregon
Year: 1994
Volume: -
Issue: -
Pages: 356-365
Number of References: 4
Original Language: English
Classification Term(s): Seating; Approaches to equipment testing; Body equipment; Human recording; Manikins and fitting trials; Use of test rigs; Whole body acceleration and deceleration
Classification Number(s): 28-04-01; 32-02-00; 51-10-06; 63-02-01; 63-04-00; 63-09-01; 63-14-00
Application(s): Armed forces; Helicopters
Abstract:
Troop seats currently operational in Navy helicopters are designed to outdated and obsolete performance requirements. These older generation seats provide extremely inadequate protection in potentially survivable crashes. The U.S. Navy is currently investigating replacing these seats with crash-resistant energy-attenuating troop seats. This report discusses a series of 11 dynamic tests performed on the UH-1N two-occupant, forward-facing troop seat, and the SH-3H three-occupant, side-facing troop seat. These tests clearly show the catastrophic failure of the seat at relatively low crash severities. This report also discusses the current U.S. Navy Non-Development Item (NDI) approach to replace these seats. The NDI troop seat programme intends to replace the older generation troop seats with state-of-the-art, commercially-available troop seats in a time-effective manner.

Abstract Number: 140606
Title: Evaluating the Potential for Rotation and Loss of Flight Helmets from Inertia and Impact Loads
Author(s): BRUCKART, J.E.; HALEY, J.L.
Source: Proceedings of the 31st Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 8-10, 1993, SAFE Association, Yoncalla, Oregon
Year: 1994
Volume: -
Issue: -
Pages: 107-110
Number of References: 6
Original Language: English
Classification Term(s): Headgear; Approaches to equipment testing; Manikins and fitting trials; Whole body acceleration and deceleration
Classification Number(s): 51-09-01; 32-02-00; 63-04-00; 63-14-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:
In severe helicopter accidents, flight helmets rotate or sometimes come off the head, triggering wearer injury. This study evaluates rotation potential for new flight helmets. The test series resulted in the selection of an improved HGU-56 design by the helmet developer. These tests may be improved by the use of more severe dynamic tests in the future to better reproduce severe impact conditions.

Abstract Number: 111199
Title: Anthropometry of North Sea Helicopter Pilots
Author(s): LIGHT, I.M.; MASSON, J.; ROSS, H.
Source: Ergonomics
Year: 1988
Volume: 31
Issue: 6
Pages: 905-913
Number of References:
Original Language: English
Classification Term(s): Static body measurements; Age; Combined measures and indices; Low temperature; Male
Classification Number(s): 03-04-01; 04-01-00; 04-02-01; 33-01-01; 65-07-00
Application(s): Aircrew; Diving; Helicopters; Oil and petroleum industry
Abstract:
This paper describes weight (W), height (H) and percentage body fat (%BF) of a sample of 244 North Sea civilian helicopter aircrew. W and H were measured and %BF estimated from four skinfold sites. The Quetelet index (W/H²) was calculated and satisfied the criteria of poor correlation with H(-0.007) and strong correlation with W and adiposity (0.828 and 0.746, respectively). The measured sample was heavier and fatter than an RAF aircrew population but exhibited close similarities to a USAF survey. According to the Quetelet index classifications, 39.7% of the study population may be classified as being overweight and a further 3.7% as obese. The increase in %BF with age was significant. Since %BF is an important factor in cold-water survival, it was suggested that %BF would be better estimated from skinfold thickness than from the regression equation utilizing the Quetelet index. Such a measure could be implemented in the routine aircrew medical and advice regarding survival clothing requirements could then be given.

Abstract Number: 113683
Title: Field Study of Communication and Workload in Police Helicopters: Implications for AI Cockpit Design
Author(s): LINDE, C.; SHIVELY, R.J.
Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1988
Volume: -
Issue: -
Pages: 237-241
Number of References: 11
Original Language: English
Classification Term(s): Workload demands; Allocation of function; Event frequency; Fatigue; Mental workload; Person-to-person communication; Ratings and preferences; Team work
Classification Number(s): 41-03-05; 06-04-00; 07-01-00; 09-01-01; 38-01-00; 41-02-03; 65-04-00; 65-08-01
Application(s): Aircrew; Helicopters; Police
Abstract:
This paper reports on the work performed by civilian helicopter crews, using audio and video recordings and a variety of workload measures (heart rate and subjective ratings) obtained in a field study of public service helicopter missions. The number and frequency of communications provided a significant source of workload. This is relevant to the design of automated cockpit systems, since many designs presuppose the use of voice I/O systems. Fluency of communications (including pauses, hesitation markers, repetitions, and false starts) furnished an early indication of the effects of fatigue. Three workload measures were correlated to identify high workload segments of flight, and to suggest alternate task allocations between crew members.

Abstract Number: 113792
Title: Helicopter Accident Survivability
Author(s): VYRNWY-JONES, P.; THORNTON, R.
Source: Journal of the Royal Army Medical Corps
Year: 1984
Volume: 130
Issue: 3
Pages: 150-156
Number of References: 8
Original Language: English
Classification Term(s): Surveys, statistics and analysis; Education, training and safety programmes; Equipment for altitude and depth; Errors, accuracy and reliability; Evacuation procedures; Individual differences; Injuries resulting from accidents; Vehicles; Whole body acceleration and deceleration; Workplace and equipment design for health and safety
Classification Number(s): 48-01-00; 02-11-02; 28-05-00; 32-02-00; 49-01-00; 50-01-00; 51-02-00; 51-07-00; 51-10-07; 51-11-03
Application(s): Air passengers; Aircrew; Armed forces; Helicopters
Abstract:
Army Air Corps accident and fatality rates have now reached levels which compare favourably with data from other civilian and military sources. This improvement is the result of enhanced helicopter design and parallel progress in aircrew training. The introduction of new generations of turbine powered rotor craft has largely eliminated mechanical failure as the cause of accident. As a result 75% of Army Air Corps accidents are due to pilot error. This contribution is likely to increase in the future as the pilot's task is made more difficult by the incumberance of personal equipment. Methods whereby occupant protection and aircraft crashworthiness can be improved are reviewed and it is concluded that it would make sound economic sense to implement some of these well proven design features.

Abstract Number: 113800
Title: Environmental Factors in Helicopter Operations
Author(s): THORNTON, R.; VYRNWY-JONES, P.
Source: Journal of the Royal Army Medical Corps
Year: 1984
Volume: 130
Issue: 3
Pages: 157-161
Number of References: 10
Original Language: English
Classification Term(s): Environmental design; Barometric pressure; Communication and masking in noise; Disorientation; Effects on brain function; Motion sickness; Temperature; Vestibular processes; VIBRATION; Visual illusions and after-effects; Workplace and equipment design
Classification Number(s): 49-05-00; 02-01-09; 02-06-00; 30-03-03; 31-00-00; 32-03-00; 33-01-00; 35-01-00; 35-05-00; 49-04-00; 50-05-00
Application(s): Armed forces; Helicopters
Abstract:
The environmental problems affecting aircrew are partly those which all soldiers face, such as noise, heat and cold, and partly peculiar to the medium and the vehicle in which aircrew train and fight, such as disorientation and decompression. The cockpit environment of the modern helicopter is luxurious in comparison with many of its predecessors, yet most of the adverse effects of flight on the man still pertain. The result can, predictably, be acute and disastrous, resulting in an accident produced by severe disorientation, or chronic, producing insidious fatigue and performance decrement, which

may also result in an accident. One particular stressor may be dominant in a given situation, but generally, many separate factors act simultaneously to produce their results.

Abstract Number: 115034
Title: Depth Perception after Prolonged Usage of Night Vision Goggles
Author(s): SHEEHY, J.B.; WILKINSON, M.
Source: Aviation, Space, and Environmental Medicine
Year: 1989
Volume: 60
Issue: 6
Pages: 573-579
Number of References: 18
Original Language: English
Classification Term(s): Visual accommodation and convergence; Night vision devices; Visual detection and acuity, contrast sensitivity and visual field; Visual perception of form, shape, angle, size and distance
Classification Number(s): 02-01-03; 02-01-01; 02-01-06; 22-01-06
Application(s): Aircrew; Helicopters
Abstract:
The present study was initiated following a report that a few helicopter pilots had failed a test of stereoscopic depth perception after a prolonged training flight employing night vision goggles (NVGs). In order to determine the cause of the loss, 12 helicopter pilots/copilots were assessed for depth perception, lateral and vertical phoria, and contrast sensitivity before and after training flights requiring the pilots to wear night vision goggles for the duration of the flight. Pilots flew one to three missions while wearing either PVS-5A or AN/AVS-6 goggles. Mission duration ranged from 1 to 4 h. The results indicate that contrast sensitivity and depth perception when monocular cues are present did not degrade over the course of the mission. Lateral phoria, however, did demonstrate an average exophoric shift of 1.5 prism diopters for 12 out of the 24 missions. The results indicate that the original report of a loss of depth perception based on a test of depth requiring stereopsis might have been caused by a shift in lateral phoria. It would be expected that as additional fusional effort is required, the minimum resolvable disparity degrades due to the increase in accommodation brought about through vergence accommodation. Possible causes for the phoria shift and future testing are discussed.

Abstract Number: 115379
Title: The Effects of Modifications to a Helicopter Seat on the Transmission of Vertical Vibration through Seat and Occupant
Author(s): MESSENGER, A.J.
Source: Proceedings of the Joint French-British Meeting on the Effects of Vibration on Man, Vandoeuvre-Les-Nancy, France, 26-28 September 1988. Institut National de Recherche et de Securite, Vandoeuvre, France
Year: 1988
Volume: -
Issue: -
Pages: 11pp
Number of References: 6
Original Language: English
Classification Term(s): Seating; Instrument recording; Posture; Vibration levels; Vibration quality
Classification Number(s): 28-04-01; 03-04-04; 31-01-00; 31-02-00; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
A helicopter pilot's seat was modified, altering both the seat transmissibility and the spinal posture of the occupant. To achieve this the foam cushions in the seat pan and backrest were changed and a foam lumbar support added. The transmission of vertical vibration, in the frequency range 0.5 Hz to 30 Hz, through the modified seat and occupant was compared with that through an original seat. Twenty male subjects participated, all sitting in both seats. The results indicated that the provision of a 'better' sitting posture for the occupant, by increasing lumbar lordosis, also increased the magnitude of vertical vibration transmitted from seat to head, at frequencies above approximately 12.5 Hz. However, the replacement foam reduced seat transmissibility at frequencies above 5.75 Hz. If seat and occupant are considered as a whole, the combination of 'better' sitting posture and replacement foam reduced the amount of vertical vibration transmitted from the base of the seat to the head at frequencies between about 5 Hz and 20 Hz.

Abstract Number: 115935
Title: U.S. Army Anthropometric Standards for Rotary-Wing Aviators in the Light Observation Helicopter
Author(s): FARR, W.D.; BUESCHER, T.M.
Source: Aviation, Space, and Environmental Medicine
Year: 1989
Volume: 60
Issue: 7 Section II
Pages: A74-A76
Number of References: 6
Original Language: English
Classification Term(s): Static body measurements; Reach; Workstation dimensions
Classification Number(s): 03-04-01; 27-01-00; 27-01-01
Application(s): Aircraft; Aircrew; Armed forces; Helicopters
Abstract:
U.S. Army anthropometric standards for rotary-wing aviators were examined to determine if the standards allowed an adequate fit of the aviator to the cockpit of the OH-58A 'Kiowa' light observation helicopter, which now comprises the overwhelming majority of light helicopters in the active army and reserve forces. Thirty rated aviators with heights

</=70 in. were examined, and standard anthropometric measurements were made. Army regulations require these measurements on all initial-entry aviation students with heights </=68 in. The aviators were then placed in a representative OH-58A cockpit to determine their ability to reach all control surfaces and panel switches. Several aviators greater than 68 in. tall and, therefore, not subject to anthropometric testing upon entry into army aviation, could not perform all cockpit tasks without cockpit changes beyond the limited adjustments in the OH-58A. Several had developed aid devices, especially pads to support forearm-to-thigh 'spot welds' to ensure right arm stability on the cyclic control. The same problem was seen with some aviators less than 68 in. in height, who had been anthropometrically evaluated. The present standards do not adequately address functional ability in the OH-58A cockpit, which is the least adjustable cockpit in the combat inventory. Design modifications to accommodate these factors exist and should be used to retrofit existing aircraft and to design future aircrafts.

Abstract Number: 118346
Title: Incorporating Dynamic Field of View Information to Design the Next-Generation Black Hawk Helicopter Cockpit
Author(s): SIMON, R.; DUNN, D.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1989
Volume: -
Issue: -
Pages: 1124-1128
Number of References:
Original Language: English
Classification Term(s): Workstation visibility and audibility; Filters and antiglare devices; Glare control; Night vision devices; Windows
Classification Number(s): 27-02-01; 22-01-01; 22-01-06; 26-03-00; 29-03-05
Application(s): Armed forces; Helicopters
Abstract:
Changing flight tactics and increased use of Night Vision Goggles (NVGs) has focused attention on the limited Field of View (FOV) of the Army UH-60A Black Hawk Helicopter. To improve the FOV in the next generation Black Hawk, the U.S. Army asked an independent contractor to investigate the problem and propose alternatives. The study involved a comprehensive review of Army requirement documents, existing FOV studies, and accident data. Close attention was given to dynamic flight characteristics that affect FOV. Also, the study team collected technical data related to military rotary wing design, administered a survey to pilots; and interviewed users and other technical experts. The study revealed the current UH-60A design meets the requirements of MIL-STD-850B under static conditions. The only exception is the obstructed view that the door and windshield vertical structures create. However, under dynamic conditions the UH-60A cockpit design and normal flight characteristics substantially reduce the FOV in critical areas. The study produced eleven options that can improve and/or enhance the next generation Black Hawk's FOV if incorporated into the new design. Each option is presented and discussed.

Abstract Number: 120870
Title: Impact of a Chemical Protective Ensemble on Cognitive and Psychomotor Performance
Author(s): KAUFMAN, J.W.; DEJNEKA, K.Y.; MORRISSEY, S.J.; BITTNER, A.C.
Source: Advances in Industrial Ergonomics and Safety II, Edited by B. Das. Taylor & Francis, London
Year: 1990
Volume: -
Issue: -
Pages: 905-912
Number of References: 12
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; Cardiac processes; Chemical hazards; Cognitive processes; High temperature; Low temperature; Motor processes
Classification Number(s): 51-09-05; 02-09-00; 02-10-00; 03-02-01; 03-02-04; 33-01-01; 33-01-02; 49-06-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Today's military environment has created the need to provide personnel with adequate protection against chemical threats. The current study attempted to quantify decrements in cognitive and psychomotor performance and the heat load created by use of a chemical protective helicopter aircrew garment (CBR) under hot/humid conditions. Subjects wore either CBR or a flight coverall ensemble (FS) in both a cool and hot/humid environment while performing simulated helicopter crew tasks for up to 480 minutes. Cognitive and psychomotor tasks were not significantly affected by ensemble. It was concluded that the heat load from the CBR may prove to be a limiting factor for physical performance in hot work environments.

Abstract Number: 126531
Title: The Effect of Information Display Formats on Helicopter Pilots' Target Acquisition and Flying Performance
Author(s): DOMINESSY, M.E.; LUKAS, J.H.; MALKIN, F.J.; MONTY, R.A.; OATMAN, L.C.
Source: Military Psychology
Year: 1991

Volume: 3
Issue: 3
Pages: 163-176
Number of References: 23
Original Language: English
Classification Term(s): Coding of information; Charts and maps; CHOICE OF COMMUNICATION MEDIA; Coding by alphanumerics, words and abbreviations; Coding by graphic symbols, icons and pictograms; Display layout; Mental workload; Multifunction displays; Rating and ranking; Search; Time and speed
Classification Number(s): 08-03-00; 02-09-01; 07-01-00; 08-02-03; 08-03-06; 08-03-08; 10-00-00; 22-06-00; 25-03-00; 64-06-00; 65-02-00
Application(s): Aircrew; Helicopters
Abstract:
This study compared three information display formats for presenting tactical instructions to helicopter pilots for locating targets on a situation display. Verbal (text), graphic (symbols), or numeric (digits) instructions were presented for a subsequent target acquisition search task while subjects were either serving as copilot or simultaneously piloting the aircraft. Reaction times (RTs) to acknowledge the instructions were fastest for the numeric format and slowest for the text format. Once the instructions were understood, subjects searched and located the target in a situation display equally well regardless of format. For all formats, piloting performance was adversely affected and mental workload significantly increased while simultaneously performing the target acquisition search task. Practical implications of the findings are discussed.

Abstract Number: 126831
Title: Heat Stress on Helicopter Pilots during Ground Standby
Author(s): FROOM, P.; SHOCHAT, I.; STRICHMAN, L.; COHEN, A.; EPSTEIN, Y.
Source: Aviation, Space, and Environmental Medicine
Year: 1991
Volume: 62
Issue: 10
Pages: 978-981
Number of References: 24
Original Language: English
Classification Term(s): Thermal stress; High temperature
Classification Number(s): 33-04-00; 33-01-02
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The authors attempted to use measurements of ambient thermal conditions to characterize and then predict thermal conditions in the cockpit before takeoff and during an hour standby period in Bell 206 and Bell 212 helicopters with a crew of two and with the cockpit doors opened. Dry bulb, wet bulb, and globe temperatures were measured on 28 separate summer days. The wet bulb globe temperature index (WBGT) was used to estimate heat stress. Ambient WBGT at time 0 ranged from 13^oC to 31^oC. There was a 2.9 3.7 degree difference in WBGT between ambient and cockpit conditions at time 0 which increased to 7.2 3.5 degrees after 1 h. Because of the cooling effect of opening the helicopter cockpit doors, the cockpit WBGT actually decreased over the standby period when cockpit WBGT values were 30^oC or more at time 0. Thus, there was an inverse correlation between cockpit WBGT at time 0 and the change in cockpit WBGT over the 1-h period (r = -0767, p<0.001). The mean WBGT in the cockpit over the 1-h standby period was positively correlated with the ambient WBGT at time 0 (r = 0.783, p<0.001). It is concluded that the greenhouse effect results in a cockpit WBGT which is significantly higher than ambient conditions. Subsequent changes in cockpit WBGT depend on the balance between heat transfer from the pilot's bodies to the cockpit and the loss of heat after the doors of the helicopters are opened. Ambient thermal conditions can be used to predict heat stress during the ground standby period.

Abstract Number: 128092
Title: Laboratory-Based Evaluation of the Protection Provided against Cold Water by Two Helicopter Passenger Suits
Author(s): TIPTON, M.J.
Source: Journal of the Society of Occupational Medicine
Year: 1991
Volume: 41
Issue: 4
Pages: 161-167
Number of References: 20
Original Language: English
Classification Term(s): Clothing ensembles; Approaches to equipment testing; Body temperature regulation; Combined environments; Low temperature; Thermal comfort
Classification Number(s): 51-09-05; 03-02-04; 33-01-01; 33-07-00; 36-02-00; 63-14-00
Application(s): Air passengers; Helicopters
Abstract:
The thermal protection provided by two helicopter passenger immersion suits was evaluated. Suit A was a standard 'dry' suit and suit B was a 'dry' suit with inherent insulation provided by inflation of the outer shell of the suit. During four hours immersions in water at 4^oC with simulated rain, wind and waves, suit B provided significantly (p<0.01) better protection against the long-term effects of immersion than suit A. The skin and core temperature of subjects fell at slower rates over the immersion period when they wore suit B, they shivered less, had lower heart rates and were more comfortable in this suit. The problems of testing and selecting appropriate immersion suits are discussed and it is concluded that tests of immersion suits should be as realistic as possible and, when this is so, 'dry' suits with inherent insulation which is unaffected by leakage are likely to perform better in cold water than those without such insulation.

Abstract Number: 130356
Title: The Effect of Helicopter Vibration on Viewing Panel-Mounted Displays
Author(s): VOLLMERHAUSEN, R.; MAYES, K.
Source: 1992 SID International Symposium Digest of Technical Papers, Society for Information Display, Playa del Rey, California, USA
Year: 1992
Volume: -
Issue: -
Pages: 651-654
Number of References: 6
Original Language: English
Classification Term(s): Display quality ; VIBRATION; Vibration quality; Visual detection and acuity, contrast sensitivity and visual field
Classification Number(s): 25-02-00; 02-01-01; 31-00-00; 31-02-00
Application(s): Helicopters
Abstract:
A flight experiment was performed to quantify the degradation in visual task performance caused by helicopter vibration. Data were collected on panel display and observer's seat acceleration and on observer's contrast threshold. Significant increase in contrast threshold occurred, depending on flight profile and rotor balance. Methods to estimate the Modulation Transfer Function of the vibration induced display blur are described.

Abstract Number: 131493
Title: Administrative Risk Management for Helicopter Operators
Author(s): ADAMS, R.J.; PAYNE, B.
Source: International Journal of Aviation Psychology
Year: 1992
Volume: 2
Issue: 1
Pages: 39-52
Number of References: 10
Original Language: English
Classification Term(s): Work design and organisation for health and safety; Errors, accuracy and reliability; Evacuation procedures; First aid; Management; Rescue
Classification Number(s): 51-08-00; 02-11-02; 51-11-01; 51-11-02; 51-11-03; 56-01-00
Application(s): Air safety; Aircrew; Ambulance service; Emergency service vehicles; Helicopters
Abstract:
Everyone who saw the fireball of high technology and humanity mushroom over Florida January 28, 1986, carries its memory. But one person, the NASA manager who gave final approval for the Challenger launch, especially has to feel a sense of grief and responsibility. Caught between the pressure to satisfy politicians, the American people, NASA's launch schedule, and a complicated array of possible system failures, he made a decision that proved fatal. On a much more routine but no less lethal scale, most aviation operations managers are caught between the pressure to run an efficient, lean, and responsive operation and the ever-present possibility that an overlooked or underestimated 'O-ring' will fail. In the aviation business, the human element is the weak link or 'O-ring' more often than not. As the NASA manager knows only too well, no matter who is the pilot-in-command, the manager who selects the pilot; sets crew standards and duty cycles; and establishes company weather minimums and other operating standards is ultimately responsible for operational safety. This article is intended to provide an easy reference to the operating pitfalls, the human frailties, and the risks associated with managing flight operations. Helicopter air-ambulance operators are used to illustrate specific problems and provide extreme examples. The analysis identifies the inherent risks based on the latest National Transportation Safety Board (NTSB) accident data and describes techniques that can be used to balance the demands of running a business with the need for maintaining safety. Finally, the article concludes by highlighting the key concerns that should be carefully considered from a risk-management viewpoint.

Abstract Number: 133433
Title: Effects of 2 mg and 4 mg Atropine Sulfate on the Performance of U.S. Army Helicopter Pilots
Author(s): CALDWELL, J.A.; STEPHENS, R.L.; CARTER, D.J.; JONES, H.D.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 10
Pages: 857-864
Number of References: 15
Original Language: English
Classification Term(s): Drugs; Application of test batteries; Arousal; Brain function; Error, accuracy, reliability and frequency; Human performance; Time and speed
Classification Number(s): 06-07-00; 02-11-00; 03-01-05; 06-03-00; 64-07-00; 65-02-00; 65-03-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Atropine autoinjectors are issued on aviators for use in the event of organophosphate poisoning on the battlefield. This investigation assessed the effects of unchallenged 2 mg and 4 mg doses on flight performance, vision, tracking, cognitive performance, and electroencephalograms of 12 Army aviators. Effects were seen most often with the 4 mg dose in terms of aircraft control problems, vision disturbances, impaired tracking, reduced cortical activation, and decreased cognitive skill. These problems indicate helicopter

tactical flight is dangerous after an unchallenged 4 mg dose. Other types of flight should also be avoided for at least 12 h after atropine.

Abstract Number: 133603
Title: Development of an Adjustable Crewseat Cushion to Enhance Comfort
Author(s): VANINGEN-DUNN, C.; RICHARDS, M.K.
Source: Proceedings of the 30th Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 2-4, 1992. SAFE Association, Yoncalla, Oregon, USA
Year: 1992
Volume: -
Issue: -
Pages: 303-311
Number of References: 6
Original Language: English
Classification Term(s): Seating; Approaches to equipment testing; Effects on the musculo-skeletal system; Motor and postural fatigue; Ratings and preferences
Classification Number(s): 28-04-01; 06-04-06; 50-12-00; 63-14-00; 65-08-01
Application(s): Aircraft; Aircrew; Helicopters
Abstract:
Body aches are a common affliction of helicopter flightcrew members. A high incidence of reported discomfort takes the form of lower back pain and numbness in the buttocks and legs. This discomfort is a problem which can have a significant impact on flight safety, flightcrew effectiveness, and long-term health. Simula has addressed this comfort issue in several research programmes and conducted a programme for the U.S. Army to modify the existing Apache helicopter crewseat by developing adjustable cushions. This paper describes the approach taken to design an adjustable crewseat cushion assembly, and the results that were achieved. Design parameters determined from the crewseat and cockpit configuration, cyclic stick range of motion, and human anthropometry are presented. The adjustable crewseat cushion assembly is described and the cushion vibration testing, static testing, and dynamic analysis are summarized. Ten cushion shipsets were fabricated and installed into Apache aircraft for flight evaluation. A summary of the pilots' responses who have already evaluated the cushions is presented.

Abstract Number: 133720
Title: Documentation of Activity and Rest of a U.S. National Guard Attack Helicopter Battalion
Author(s): CALDWELL, J.L.; CORNUM, R.L.S.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 10
Pages: 925-929
Number of References: 14
Original Language: English
Classification Term(s): Rest pauses and work duration; Instrument recording; Job analysis and skills analysis; Sleep loss; TRAINING
Classification Number(s): 39-02-00; 06-01-01; 44-00-00; 63-05-02; 63-09-03
Application(s): Armed forces
Abstract:
A U.S. National Guard attack helicopter battalion was monitored in order to document the activity and rest obtained during the annual training exercises. A total of 39 soldiers wore wrist activity monitors during the 2-week training period. The data from these monitors discriminate activity from rest. Results indicated the following: 1) at some point during the exercises, everyone became sleep deprived; 2) the participants who received the most rest of the group were the enlisted headquarters personnel and the pilots; 3) the soldiers who received the least amount of sleep were the commander of the battalion and the maintenance personnel. Some recommendations are offered for future planning of National Guard training exercises.

Abstract Number: 133885
Title: Helmet-Mounted Active Noise Reduction in the RAN's Seahawk Helicopter
Author(s): KING, R.
Source: Unlocking Potential for the Future Productivity and Quality of Life, Proceedings of the 28th Annual Conference of the Ergonomics Society of Australia Inc, Melbourne, Australia, 2-4 December 1992, Edited by E. Hoffmann and O. Evans. Ergonomics Society of Australia Inc, Downer, ACT, Australia
Year: 1992
Volume: -
Issue: -
Pages: 132-141
Number of References: 3
Original Language: English
Classification Term(s): Auditory equipment; Headgear; Noise frequency ; Noise levels; Voice input devices; Voice output and speech synthesis
Classification Number(s): 51-10-02; 21-21-00; 23-02-00; 30-01-00; 30-02-04; 51-09-01
Application(s): Aircrew; Helicopters
Abstract:
Sound spectra were measured in the Seahawk helicopter at various crew positions and flight conditions in order to determine the noise attenuation properties of the ALPHA helmet and the effectiveness of active noise reduction (ANR) systems. Results show that if newly proposed hearing conservation guidelines are adopted, aircrew wearing the ALPHA helmet would require additional attenuation devices. Because of the nature of the acoustic environment in the Seahawk, an ANR system offers a number of advantages

over other attenuation devices (such as earplugs). Incorporating an ANR system in the Seahawk would allow realistic flight durations to be maintained, improve voice communication, and reduce aircrew fatigue.

Abstract Number: 134238
Title: Predictive Workload Analysis - RN EH101 Helicopter
Author(s): MACLEOD, I.S.; BIGGIN, K.; ROMANS, J.; KIRBY, K.
Source: Contemporary Ergonomics 1993. Proceedings of the Ergonomics Society's 1993 Annual Conference, Edinburgh, Scotland, 13-16 April 1993, Edited by E.J. Lovesey. Taylor & Francis, London
Year: 1993
Volume: -
Issue: -
Pages: 45-50
Number of References: 6
Original Language: English
Classification Term(s): Mental workload; Errors, accuracy and reliability; Human reliability and system reliability; Modelling human characteristics ; Task analysis; Workload demands
Classification Number(s): 07-01-00; 02-11-02; 41-03-05; 63-01-01; 63-05-01; 63-06-00
Application(s): Armed forces; Helicopters
Abstract:
The RN EH101 maritime patrol helicopter is to enter service with the Royal Navy near the end of the decade. The prime contractorship for this weapon system development was awarded to an IBM led IBM ASIC/WHL consortium in early 1992. A Human Engineering Programme Plan (HEPP) was mandated by the MoD contract and is being managed by WHL. A major HEPP requirement is for a predictive workload analysis of aircrew tasks. This paper covers aspects of the predictive workload analysis conducted by WHL in consultation with Ael. The predictive analysis includes two complementary approaches to the study of workload. One uses a time line based `snap-shot' approach which considers mission task time requirements versus the task time available and task associated attentional demand characteristics. The second approach uses a novel technique examining task related decision processes and their associated errors. This paper concentrates on the second approach. To set the paper's context, the `snap-shot' approach to the analysis is briefly discussed. The results from the predictive workload analysis will be validated under full simulation conditions in mid 1994.

Abstract Number: 134417
Title: A `HEART' Programme Reach and Vision Analysis of a Proposed CH-135 Aircraft Survivability Equipment Installation
Author(s): KOBIERSKI, R.D.; YOUNGSON, G.A.
Source: The Economics of Ergonomics. Proceedings of the 25th Annual Conference of the Human Factors Association of Canada, Hamilton, Ontario, Canada, October 25-28, 1992. The Association, Mississauga, Ontario, Canada
Year: 1992
Volume: -
Issue: -
Pages: 301-306
Number of References: 4
Original Language: English
Classification Term(s): Reach; Control layout; Modelling human characteristics; Resources
Classification Number(s): 27-01-01; 01-02-00; 25-05-00; 63-01-01
Application(s): Armed forces; Computer-aided design; Helicopters
Abstract:
The techniques and methodologies developed for the Canadian Forces' Human Engineering Analysis and Requirements Tools (HEART) Programme were applied to an Aircraft Survivability Equipment installation on the CH-135 helicopter. The methodology was applied to the proposed installation of a threat warning receiver and automated countermeasures dispenser which were designed to protect the helicopter against enemy gun and missile engagement. This analysis was the first application of the HEART Programme to a practical cockpit design issue, permitting design decisions regarding the suitability of equipment placement with the CH-135 cockpit to be made with confidence.

Abstract Number: 135846
Title: Changes in the Dark Focus of Accommodation Associated with Simulator Sickness
Author(s): FOWLKES, J.E.; KENNEDY, R.S.; HETTINGER, L.J.; HARM, D.L.
Source: Aviation, Space, and Environmental Medicine
Year: 1993
Volume: 64
Issue: 7
Pages: 612-618
Number of References: 30
Original Language: English
Classification Term(s): Visual accommodation and convergence; Motion sickness; Use of simulators
Classification Number(s): 02-01-03; 32-03-00; 63-02-00
Application(s):
Abstract:
The relationship between the dark focus of accommodation and simulator sickness, a form of motion sickness, was examined in three experiments. In Experiment 1, dark focus was measured in 18 college students in a laboratory setting before and after they viewed a projected motion scene depicting low altitude helicopter flight. In Experiments 2 and 3,

dark focus was measured in pilots (N = 6, and 23, respectively) before and after they `flew' in moving-base helicopter flight simulators with optical infinity CRT visual systems. The results showed that individuals who experienced simulator sickness had either an inward (myopic) change in dark focus (Experiments 1 and 3) or attenuated outward shifts in dark focus (Experiment 2) relative to participants who did not get sick. These results are consonant with the hypothesis that parasympathetic activity, which may be associated with simulator sickness, should result in changes in dark focus that are in a myopic direction. Night vision goggles, virtual environments, extended periods in microgravity, and head-up displays all produce related visual symptomatology. Changes in dark focus may occur in these conditions, as well, and should be measured.

Abstract Number: 136040
Title: Assessment of Pilot Performance and Mental Workload in Rotary Wing Aircraft
Author(s): SIREVAAG, E.J.; KRAMER, A.F.; WICKENS, C.D.; REISWEBER, M.; STRAYER, D.L.; GRENELL, J.F.
Source: Ergonomics
Year: 1993
Volume: 36
Issue: 9
Pages: 1121-1140
Number of References: 49
Original Language: English
Classification Term(s): Mental workload; Analog versus digital coding; Application of test batteries; Brain function; Cardiac processes; Coding by alphanumerics, words and abbreviations; Eye and head movements; Instrument recording; Person-to-person communication; Physiological and psychophysiological recording ; Ratings and preferences; Respiratory processes; Use of simulators
Classification Number(s): 07-01-00; 02-01-04; 03-01-05; 03-02-01; 03-02-02; 08-03-06; 08-03-10; 09-01-01; 63-02-00; 63-07-00; 63-09-03; 64-07-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
This research examined the processing demands imposed upon experienced pilots by two different communication formats, digital and verbal, in a high fidelity simulation of an advanced multi-function helicopter. The mental workload imposed by the type and magnitude of communication was assessed by a battery of subjective, performance, secondary, and physiological measures. The performance data indicated that the pilots had difficulty adhering to the Nap of the Earth altitude criterion with high communication demands, particularly with the digital communication system. This was presumably due to the requirement to spend more time scanning the multi-function displays with the digital than with the verbal communication system. On the other hand, the pilots were less prone to task shedding when they used the digital communication system possibly due to the provision of a permanent list of queries that was unavailable with the verbal system. Measures of heart rate variability and blink rate were larger with the verbal than with the digital system, presumably reflecting increased respiratory demands in the verbal condition as well as increased visual processing demands with the digital format. Finally, the probe evoked P300 component decreased in amplitude as a function of increases in the magnitude of communications. The results are discussed in terms of the structural and capacity demands of the communications systems that were proposed for the advanced multi-function helicopter.

Abstract Number: 138098
Title: Human Engineering Evaluation of Underwater Egress from a Helicopter
Author(s): MATTHEWS, B.G.
Source: Ergonomics - Tapping into Today's Technology, Proceedings of the 26th Annual Conference of the Human Factors Association of Canada, Fredericton, New Brunswick, 8-11 August 1993. Human Factors Association of Canada, Mississauga, Ontario
Year: 1993
Volume: -
Issue: -
Pages: 159-164
Number of References: 8
Original Language: English
Classification Term(s): Evacuation procedures; ALTITUDE, DEPTH AND SPACE; Doors, hatches and openings; Mock-ups, prototypes and prototyping; Opinions; Questionnaires and surveys; Ramps, stairs, poles and handrails; Static body measurements
Classification Number(s): 51-11-03; 03-04-01; 26-04-01; 26-04-03; 35-00-00; 63-03-00; 64-05-00; 65-08-02
Application(s): Helicopters
Abstract:
Concerns had been expressed regarding the ability of the navigator to successfully egress from a particular helicopter in the event of ditching and inversion at sea. Trials were held using a mock-up and four navigator subjects. Each subject received refresher training in general underwater egress techniques but no instructions were given for possible techniques specific to the aircraft in question. Critical anthropometric measures of the subjects were also taken. Each subject underwent three or four egress scenarios. Egress times were measured and a questionnaire was filled out after each trial. Each trial was videotaped and opinion was sought from the safety divers and egress training instructors. The results showed that all subjects could egress safely in a reasonable amount of time. Significant comments were made regarding a guide bar device which was designed to aid the egress.

Abstract Number: 138539

Title: Designing Displays for Using the Full Visual Field
Author(s): HARTZ, J.O.
Source: Proceedings of the XII European Annual Conference on Human Decision Making and Manual Control, Kassel, Germany, June 22-24, 1993. University of Kassel - Gesamthochschule Kassel, Kassel, Germany
Year: 1993
Volume: -
Issue: -
Pages: 5pp
Number of References: 13
Original Language: English
Classification Term(s): Display layout; Multifunction displays; Size, magnification and viewing distance; Visual perception of form, shape, angle, size and distance
Classification Number(s): 25-03-00; 02-01-06; 22-06-00; 25-01-01
Application(s): Helicopters
Abstract:
During recent years, the rapid development of digital displays and foreseeable relatively low prices and weights made this technology also affordable for the application in helicopter cockpits. The high reliability of this technology lends itself to use in many commercial helicopters. The flexibility of modern displays gives the designer of helicopters the advantage of including design ideas which are not common in the aircraft domain, but could be highly usable in the rotorcraft. The increasing automation of functions could shift the attention of pilots from monitoring system behaviour to concentrating on flying the helicopter. These possibilities may enforce a completely new design structure for the cockpit environment.

Abstract Number: 138835
Title: Trials of the Type 15 Army Helicopter Users' Helmet
Author(s): BRAITHWAITE, M.G.; CROFT, R.J.
Source: New Development in Mechanics, Biomechanics and Design Aspects of Military Helmets, Proceedings of the Conference held at Defence Research Agency, Farnborough, Hampshire, 1-3 December 1993. Defence Research Agency, Flight Systems Department, Farnborough
Year: 1993
Volume: -
Issue: -
Pages: 13pp
Number of References: 5
Original Language: English
Classification Term(s): Headgear; Approaches to equipment testing; Female; Male; Ratings and preferences; Usage
Classification Number(s): 51-09-01; 04-02-01; 04-02-02; 63-14-00; 65-08-01; 65-09-00
Application(s): Air passengers; Aircrew; Armed forces; Helicopters
Abstract:
The Type 15 helmet was developed in response to a requirement of the Army Air Corps to provide enhanced protection for helicopter passengers. It is believed to be the first helmet dedicated to a passenger role. Manufactured by Courtaulds Aerospace, the helmet comprises a Keviar shell based on the large size of the MK 4B aircrew helmet. The RAF IAM suspension system is incorporated allowing the helmet to be adjusted by the user and is designed to accommodate a wide range of head lengths and breadths. An AERDC Acceptability Trial involving all three Armed Services was conducted in 1992. The helmet was very well received by the user population although some comfort problems and integration problems became evident. Throughout the trial the helmet had an excellent serviceability record. Further integration assessments have been conducted since the trial and are reported. The paper includes the results of the AERDC trial and subsidiary assessments and discusses the concept of an 'omnifit' helmet.

Abstract Number: 141160
Title: Integrated Helmet System with Image Intensifier Tubes
Author(s): SCHREYER, H.; BOHM, H.D.V.; SVEDEVALL, B.
Source: Displays
Year: 1994
Volume: 15
Issue: 2
Pages: 98-105
Number of References: 9
Original Language: English
Classification Term(s): Headup and projected displays; Display quality; Night vision devices; Size, magnification and viewing distance
Classification Number(s): 22-05-00; 22-01-06; 25-01-01; 25-02-00
Application(s): Helicopters
Abstract:
Eurocopter has been under contract to the French and German ministries of defence for 5 years to develop the Tiger, a second-generation anti-tank helicopter. A piloting thermal imager has been installed on a steerable platform in the helicopter nose in order to achieve the possibility of flying round the clock. In addition to this sensor, which is sensitive at a wavelength of 10 micro-m, the German side has proposed using an integrated helmet system (IHS) in the PAH 2. This helmet, manufactured by GEC-Marconi Avionics, incorporates two cathode ray tubes (CRTs) and two image intensifier tubes (IITs), which allow the pilot to use an additional sensor in the visible and near infra-red spectrum. Eurocopter Deutschland has received the first demonstrator of this helmet for testing in the Eurocopter Visionics Laboratory. Later, the C-prototype will be integrated into a BK 117 helicopter (AVT Avionick Versuchstrager) for system integrated tests. This new helmet has a field of view of 40°, an exit pupil of 15 mm and improved possibilities of adjusting the optical part. Laboratory tests have been carried out to test important parameters such as optical resolution under low light level conditions, field of

view, eye relief and exit pupil. The CRT channels have been tested for resolution, distortion, vignetting and homogeneity. The requirements and the properties of the helmet, test procedures and the results of these tests are presented in this article.

Abstract Number: 142280
Title: A Simple Emergency Underwater Breathing Aid for Helicopter Escape
Author(s): TIPTON, M.J.; BALMI, P.J.; BRAMHAM, E.; MADDERN, T.A.; ELLIOTT, D.H.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 3
Pages: 206-211
Number of References: 22
Original Language: English
Classification Term(s): Respiratory equipment; ALTITUDE, DEPTH AND SPACE; Evacuation procedures; Low temperature; Respiratory processes; Time and speed
Classification Number(s): 51-10-05; 03-02-02; 33-01-01; 35-00-00; 51-11-03; 65-02-00
Application(s): Helicopters
Abstract:
Experiments were undertaken to determine whether a simple rebreathing system, termed 'Air Pocket' (AP), could, when integrated into an immersion dry suit, extend the underwater survival time of individuals when compared with their maximum breath hold time (BHTmax). Eight naive healthy male subjects undertook a series of resting submersions and simulated simple helicopter underwater escapes in water 25^oC and 10^oC. During the submersions the subjects breath-held maximally and then rebreathed using an otherwise empty AP. The BHTmax times of subjects and the total time they could remain underwater (RBT) were recorded. The results showed that the ability to rebreathe following a BHTmax extended the time all subjects could remain submerged, resting or exercising, in cold water by a factor of at least two. The average BHTmax during simulated helicopter underwater escapes in the cold water was 17.2 s. It is concluded that the ability of subjects to rebreathe immediately following maximum breath holding extends the time they can remain submerged in cold water to as much as 60 s. Further, if used unprimed, a simple rebreathing system will not introduce any additional dangers such as a pulmonary over-pressure accident.

Abstract Number: 145093
Title: Model of an Ergonomically Designed Helicopter Seat
Author(s): KROH, G.; PONGRATZ, H.; DUPUIS, H.; MEILLER, H.
Source: Proceedings of the 32nd Annual Symposium of the SAFE Association, Reno, Nevada, October 10-12, 1994. SAFE Association, Cottage Grove, Oregon, USA
Year: 1994
Volume: -
Issue: -
Pages: 157-163
Number of References:
Original Language: English
Classification Term(s): Seating; Control layout; Limb supports; Motor and postural fatigue; Posture; Reach; Workplace and equipment design; Workstation adjustability
Classification Number(s): 28-04-01; 03-04-04; 06-04-06; 25-05-00; 27-01-01; 27-01-03; 28-06-02; 49-04-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Most helicopter pilots complain of the poor workstation in today's generation helicopters, which forces them into unphysiological postures, inevitably causing back pain on prolonged flying missions. The reasons are, among others, a less than optimal shape of the upholstery which is far from the natural contours of the human body and an arrangement of the primary flight controls (stick, collective pitch) which can be operated only when the pilot bends and twists his upper body. Since this problem relates to the entire workstation of the pilot, a completely new seat design is proposed with sidearm controls for cyclic stick and collective pitch, integrated in the arm-rests. The model seat complies with ergonomic requirements and contains individually adjustable lumbar supports and arm-rests as well as solutions for microclimate control. This enables the pilot to operate the helicopter in all flight regimes in a reclined and relaxed and, above all, symmetrical posture.

Abstract Number: 148325
Title: Collision Avoidance: A Helicopter Simulator Study
Author(s): KRUK, R.; REGAN, D.
Source: Aviation, Space, and Environmental Medicine
Year: 1996
Volume: 67
Issue: 2
Pages: 111-114
Number of References: 23
Original Language: English
Classification Term(s): Visual perception of texture and movement; Decision making and risk assessment; Size, magnification and viewing distance; Time perception; Use of simulators
Classification Number(s): 02-01-07; 02-08-00; 02-09-07; 25-01-01; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
Six pilots flew a helicopter flight simulator with a helmet-mounted display. The pilot's task was to judge the time to collision with a second helicopter that disappeared at either 2,

2.5, or 3 s before collision. The field of view (FOV) was 66° (vertical) x 127° or 19° x 25° or 3° x 3°. With a stationary target and ownship forward speed of 60 kt, pilots estimated that collision with a stationary target would occur roughly 200 ms before the actual time to collision in the large and intermediate FOV conditions. In the case of ownship stationary and the target approaching at 60 kt, estimates of collision time showed considerably less lead in the large and intermediate FOV conditions. When the smallest FOV was used, estimates were the same whether closing speed was produced entirely by ownship motion or entirely by target motion. It is suggested that the too-early errors in estimating time to collision were caused by the impression of self-motion produced by stimulating the peripheral retina with a radially-expanding flow pattern.

Abstract Number: 150160
Title: Back Pain in Aircrew - an Initial Survey
Author(s): SHEARD, S.C.; PETHYBRIDGE, R.J.; WRIGHT, J.M.; MCMILLAN, G.H.G.
Source: Aviation, Space, and Environmental Medicine
Year: 1996
Volume: 67
Issue: 5
Pages: 474-477
Number of References: 15
Original Language: English
Classification Term(s): Effects on the musculo-skeletal system; Body equipment; Bodygear; Questionnaires and surveys; Workplace and equipment design
Classification Number(s): 50-12-00; 49-04-00; 51-09-04; 51-10-06; 64-05-00
Application(s): Aircrew; Helicopters
Abstract:
In the early 1990's staff at a Royal Naval Air Station formed the view that pilots and observers of the Navy Lynx helicopter fleet appeared to have a higher incidence of back pain, to be seeking medical assistance more frequently and to be spending more time medically 'unfit to fly' when compared to their counterparts in other helicopters. The authors aim to quantify the incidence of low back pain in helicopter aircrew by use of a questionnaire. This was used to establish the prevalence and nature of back pain in Naval aircrew (161) compared to a control group of randomly selected non-flying military personnel (310). Results show that aircrew (82%) experience significantly more back pain than controls (52%) (p<0.01) though the nature of pain was similar in both groups. Significantly more aircrew (73%) than controls (49%) (p<0.01) reported a previous history of back pain and report pain in shoulders (19%), midback (42%), lower back (72%) and across the buttocks (12%). Ergonomic factors were thought to be causative. Of aircrew surveyed, 11 (8%) had been issued with personal lumbar supports which resulted in major subjective improvements in flight-related symptoms. Helicopter aircrew have a higher incidence of back pain. Crew station design was identified as a major contributor to the prevalence of back pain while personal supports reduced the levels of discomfort. While these findings are not new, no significant steps have been taken to redesign the crew station. It is recommended that personal supports are provided to all aircrew and that a more detailed study of crew station ergonomics is indicated following a more comprehensive study of prevalence of back pain in Royal Navy aircrew.

Abstract Number: 156818
Title: Helicopter Door and Window Jettison Mechanisms for Underwater Escape: Ergonomic Confusion!
Author(s): BROOKS, C.J.; BOHEMIER, B.A.
Source: Aviation, Space, and Environmental Medicine
Year: 1997
Volume: 68
Issue: 9
Pages: 844-857
Number of References: 15
Original Language: English
Classification Term(s): Doors, hatches and openings; Comparison between input devices; Control layout; Handles; Windows
Classification Number(s): 26-04-01; 21-01-00; 25-05-00; 26-03-00; 28-06-03
Application(s): Helicopters
Abstract:
There are 23 different door, hatch, and window release mechanisms identified in 35 types of helicopter that earn their living over water. There is no standardization of the mechanism within each cockpit or among helicopter types, nor is there any standardization of the location relative to the operation, whether the mechanism matches the task or in which direction the door/hatch/window is jettisoned. New regulations are needed by military and civilian authorities to address the ergonomic confusion.

Abstract Number: 157446
Title: An Investigation of Helmet-Mounted Display Field-of-View and Overlap Tradeoffs
Author(s): JENNINGS, S.; DION, M.
Source: Ancient Wisdom - Future Technology. Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting, Albuquerque, New Mexico, September 22-26, 1997. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 32-36
Number of References: 15

Original Language: English
Classification Term(s): Headup and projected displays; Monocular versus binocular vision; Opinions; Rating and ranking; Size, magnification and viewing distance
Classification Number(s): 22-05-00; 02-01-10; 25-01-01; 64-06-00; 65-08-02
Application(s): Aircrew; Helicopters
Abstract:
NRC researchers investigated the tradeoffs between binocular-overlap and field-of-view in helmet-mounted displays. Four test pilots performed a series of manoeuvres in a helicopter while wearing field-of-view (FOV) limiting goggles. They evaluated a monocular FOV, a range of binocular overlaps, and unrestricted vision. Pilots evaluated the system performance and handling qualities using Cooper-Harper Handling Qualities Ratings, visual cue ratings, and subjective comments. The handling qualities of the helicopter/pilot system changed in a non-linear fashion as the binocular overlap increased. Pilot comments, preferences, and visual cue ratings showed the same trends as the handling qualities data. Practical applications of the results are discussed, including helicopter control system augmentation to allow improved performance in degraded visual conditions.

Abstract Number: 160756
Title: Time Estimation in Flight
Author(s): AWE, C.A.; JOHNSON, W.W.
Source: Proceedings of the Sixth International Symposium on Aviation Psychology, April 29 - May 2, 1991, Edited by R.S. Jensen, Volume I
Year: 1991
Volume: -
Issue: -
Pages: 560-565
Number of References: 7
Original Language: English
Classification Term(s): Time perception; Error, accuracy, reliability and frequency; Visual perception of texture and movement
Classification Number(s): 02-08-00; 02-01-07; 65-03-00
Application(s): Aircrew; Helicopters
Abstract:
Helicopter flights performed at low-levels, and high speeds place extreme demands on pilots; they must control the vehicle, avoid obstacles and navigate with very little margin for error. This is a particularly difficult task since helicopter pilots often move freely through an unfamiliar terrain without an explicit visible or electronic route to follow. It is even more problematic that instruments are relatively inaccurate at low altitudes. In this situation, helicopter pilots must correlate cues viewed in the external scene with information on a map to maintain their geographical orientation. Pilots must maintain spatial-temporal orientation by accurately estimating elapsed time, distance travelled and average speed to follow their flight path on the map and navigate. This research is concerned with the perception of time.

Abstract Number: 162011
Title: The Hazard of Spatial Disorientation during Helicopter Flight Using Night Vision Devices
Author(s): BRAITHWAITE, M.G.; DOUGLASS, P.K.; DURNFORD, S.J.; LUCAS, G.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 11
Pages: 1038-1044
Number of References: 16
Original Language: English
Classification Term(s): Night vision devices; Disorientation
Classification Number(s): 22-01-06; 35-05-00
Application(s): Aircraft; Aircrew; Helicopters
Abstract:
Night vision devices (NVDs) provide an enormous advantage to the operational effectiveness of military helicopter flying by permitting flight throughout the night. However, compared with daytime flight, many of the depth perception and orientational cues are severely degraded. These degraded cues predispose aviators to spatial disorientation (SD), which is a serious drawback of these devices. As part of an overall analysis of Army helicopter accidents to assess the impact of SD on military flying, the authors scrutinized the class A-C mishap reports involving night-aided flight from 1987 to 1995. The accidents were classified according to the role of SD by three independent assessors, with the SD group further analyzed to determine associated factors and possible countermeasures. Almost 43% of all SD-related accidents in this series occurred during flight using NVDs, whereas only 13% of non-SD accidents involved NVDs. An examination of the SD accident rates per 100,000 flying hours revealed a significant difference between the rate for day flying and the rate for flight using NVDs (mean rate for daytime flight = 1.66, mean rate for NVD flight = 9.00, p<0.001). The most important factors associated with these accidents were related to equipment limitations, distraction from the task, and training or procedural inadequacies. SD remains an important source of attrition of Army aircraft. The more than fivefold increase in risk associated with NVD flight is of serious concern. The associated factors and suggested countermeasures should be urgently addressed.

Abstract Number: 162578
Title: Developing a Modeling and Simulation Paradigm for Assessing the Encumbrance of Helicopter Aircrew Clothing and Equipment

Author(s): KOZYCKI, R.
Source: Proceedings of the 36th Annual Symposium of the SAFE Association, Phoenix, Arizona, September 14-16, 1998. SAFE Association, Nashville, Tennessee
Year: 1998
Volume: -
Issue: -
Pages: 271-279
Number of References: 6
Original Language: English
Classification Term(s): Clothing ensembles; Dynamic body measurements; Equipment for altitude and depth; Instrument recording; Modelling human characteristics ; Modelling system characteristics; Reach; Static body measurements
Classification Number(s): 51-09-05; 03-04-01; 03-04-02; 27-01-01; 51-10-07; 63-01-01; 63-01-02; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
Current protective and safety clothing and equipment items supplied to U.S. Army helicopter aircrews have been developed over the years as individual items dictated for the most part by special mission requirements. This lack of an effective, integrated design has resulted in equipment items that can be a physical burden to wear and cause a degradation in operational performance. The Air Warrior programme is a U.S. Army effort that seeks to correct some of the problems with the current equipment ensembles and eventually field the next generation of aircrew-mounted mission equipment. This future equipment will provide a fully integrated protective ensemble that will enhance the capabilities and performance of the aircrew. In conjunction with the Air Warrior programme, the US Army Research Laboratory (ARL) Human Research and Engineering Directorate (HRED) developed a modelling and simulation approach to examine the encumbrance of current helicopter aircrew clothing and equipment. This approach used 3D graphical anthropometric human figure models fitted with digitized Aviation Life Support Equipment (ALSE) as a means of examining the operational impact of this gear on the aircrew. Results obtained from this method were compared to data collected with a motion analysis optical tracking system on actual subjects wearing the same ALSE items. Based on the limited data collected, this method shows promise for evaluating future clothing and equipment ensembles.

Abstract Number: 162595
Title: Options for Liferaft Entry after Helicopter Ditching
Author(s): BROOKS, C.J.; POTTER, P.L.; DE LANGE, D.; BARANSKI, J.V.; ANDERSON, J.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 8
Pages: 743-749
Number of References: 4
Original Language: English
Classification Term(s): Evacuation procedures; Education, training and safety programmes; Female; Male; Ratings and preferences; Rescue; Use of simulators
Classification Number(s): 51-11-03; 04-02-01; 04-02-02; 51-02-00; 51-11-01; 63-02-00; 65-08-01
Application(s): Helicopters; Sea navigation; Ships
Abstract:
Dry and wet evacuations were conducted by 24 male and 19 female subjects from Nutec Super Puma Simulator into two different types of aviation aircraft. The results showed that dry evacuation on the windward side is the method of choice. The non-canopy raft is subjectively and objectively easier to enter both from the helicopter and the sea. In conclusion, the non-canopy raft is the raft of choice, the canopy raft needs a redesign to ensure that it always inflates the correct way and both rafts need a redesign of the painter anchor point. Aircrew should have special training in open water after traditional pool training. A helicopter ditching survival compass has been developed for training all who fly over water for a living.

Abstract Number: 162882
Title: The Optokinetic Cervico Reflex during Simulated Helicopter Flight
Author(s): BRAITHWAITE, M.G.; BEAL, K.G.; ALVAREZ, E.A.; JONES, H.D.; ESTRADA, A.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 12
Pages: 1166-1173
Number of References: 13
Original Language: English
Classification Term(s): Eye and head movements; Headup and projected displays; Instrument recording; Interaction between modalities; Night vision devices; Other sensory systems; Use of simulators; Vestibular processes; Visual sensory system
Classification Number(s): 02-01-04; 02-06-00; 02-07-00; 03-01-01; 03-01-03; 22-01-06; 22-05-00; 63-02-00; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
The optokinetic cervico reflex (OKCR) is a recently hypothesized, visually driven reflex that serves to stabilize the image of the external horizon on the retina during roll manoeuvres in high-performance aircraft. Although reported anecdotally, head tilt during helicopter flight has not been studied formally. Such research is required to determine the full impact and significance that it may have on the flying performance of a rotary-wing aviator. The aim of this study was to investigate the relationship between horizon position

and the perception of orientation and, thus, to generate vital information to assess whether OKCR plays an important role in spatial disorientation. Pilots of rotary-wing aircraft will exhibit the OKCR. A UH-60 flight simulator study, with 20 volunteer pilots participating, was performed to examine the effects of this reflex during day flight and during flight with night vision goggles (NVGs). The results confirm that the OKCR occurs during simulated helicopter flight, both with and without NVGs. As with previous studies, head roll increased during flight under visual meteorological conditions in relation to an increasing aircraft roll angle up to a maximum sustainable level and then remained constant. Head roll did not occur during flight under instrument meteorological conditions. The presence of the OKCR will impact rotary-wing operations. Various aspects are discussed, and recommendations are made for future research.

Abstract Number: 163050
Title: Working Postures in the S-70A-9 Black Hawk Helicopter
Author(s): BLANCHONETTE, P.; FORAN, D.; KING, R.; SIMPSON, P.
Source: Implementing Change: The Role of Standards. Proceedings of the 34th Annual Conference of the Ergonomics Society of Australia, Melbourne, Victoria, Australia, 5-7 October, 1998, Edited by M. Best, M. Di Stefano and O. Evans. Ergonomics Society of Australia, Downer, ACT, Australia
Year: 1998
Volume: -
Issue: -
Pages: 71-78
Number of References: 9
Original Language: English
Classification Term(s): Posture; Effects on the musculo-skeletal system; Motor and postural fatigue; Questionnaires and surveys; Ratings and preferences; Self recording; Unobtrusive observation; Work design and organisation factors; Work design and organisation for health and safety; Work measurement; Workplace and equipment design
Classification Number(s): 03-04-04; 06-04-06; 49-04-00; 49-07-00; 50-12-00; 51-08-00; 63-08-02; 63-09-02; 64-01-03; 64-05-00; 65-08-01
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
For the last ten years the Black Hawk helicopter has been providing the Australian Army with a utility helicopter which is in high demand for operational use. The Black Hawk has four crew, two pilots and two loadmasters. Musculoskeletal problems are emerging in the loadmaster population, putting at risk these aircrew who represent a substantial capital investment in terms of training. The Air Operations Division of the Defence Science and Technology Organisation was asked to investigate the impact of workstation design and job requirements on loadmaster health and the safety and effectiveness of the whole airborne system. This paper discusses the 'systems' approach taken to minimise the musculoskeletal problems experienced by the loadmasters.

Abstract Number: 164112
Title: Noise Measurement Standards and Issues: The Evaluation of Noise and Hearing Protection Devices in the Black Hawk Helicopter
Author(s): KING, R.B.; SALIBA, A.J.; GILBERT, N.E.
Source: Implementing Change: The Role of Standards. Proceedings of the 34th Annual Conference of the Ergonomics Society of Australia, Melbourne, Victoria, Australia, 5-7 October, 1998, Edited by M. Best, M. Di Stefano and O. Evans. Ergonomics Society of Australia, Downer, ACT, Australia
Year: 1998
Volume: -
Issue: -
Pages: 148-157
Number of References: 15
Original Language: English
Classification Term(s): Instrument recording; Auditory equipment; Effects on the auditory system; Exposure to noise; Headgear; Noise levels
Classification Number(s): 63-09-03; 30-01-00; 30-03-00; 50-03-00; 51-09-01; 51-10-02
Application(s): Aircrew; Armed forces; Helicopters; Maintenance
Abstract:
In the military environment, personnel can be exposed to very high levels of continuous noise. It is not uncommon for equipment such as helicopters and armoured vehicles to generate noise levels in the order of 100 to 120 dB(A) in spaces which are occupied by personnel. The incidence of noise induced hearing loss (NIHL) in personnel exposed to these environments has always been high with compensation payments to military personnel for NIHL costing hundreds of millions of dollars world-wide. NIHL has always been a problem for the Australian Army, which is particularly concerned about aircrew in the S-70A-9 Black Hawk helicopter. The purpose of this paper is twofold. Firstly the results of a comprehensive noise survey of the Sikorsky S-70A-9 Black Hawk helicopter environment using the Head Acoustic Measurement System (HMS) are reported. The attenuation properties of the hearing protection devices (HPDs) worn by aircrew (the ALPHA helmet) and maintenance crew (the Roanwell MX-2507 headset) were adequate hearing protection to meet current hearing conservation regulations which allow a permissible noise exposure of 85 dB(A) for an 8 h day. Possible solutions, such as the provision of a helmet-mounted active noise reduction (ANR) system, are proposed. Secondly, a brief overview of noise measurement methods is provided. Dummy head measurement devices such as the HMS are emerging technologies, not yet 'recognised' under Australian and international noise measurement standards. The relative merits and problems associated with 'traditional' measurement methods and the present generation of dummy head systems are discussed.

Abstract Number: 168197

Title: Evaluation of a New Universal Jettison Mechanism for Helicopter Underwater Escape
Author(s): BROOKS, C.J.; MILLER, L.; MORTON, S.; BARANSKI, J.
Source: Aviation, Space, and Environmental Medicine
Year: 1999
Volume: 70
Issue: 8
Pages: 752-758
Number of References: 5
Original Language: English
Classification Term(s): Evacuation procedures; Bars; Doors, hatches and openings; Levers; Ratings and preferences; Use of simulators; Windows
Classification Number(s): 51-11-03; 21-08-00; 21-13-00; 26-03-00; 26-04-01; 63-02-00; 65-08-01
Application(s): Helicopters
Abstract:
To date, there is no standard jettison mechanism for doors, windows, or hatches in ditched helicopters. A new Universal Escape Exit (UEE) has been invented and the performance has been compared with two current in-service systems in a helicopter underwater escape trainer. A total of 416 evacuations were conducted by 40 subjects in two experiments using the Survival Systems Limited's underwater escape trainer. The UEE had a distinct 2-s advantage to escape; and, in the majority of cases, was preferred to a rotating lever or a straight push out system. Further work should continue with UEE development for qualification in an operational helicopter.

Abstract Number: 168286
Title: An Ergonomic Comparison of Two Training Helicopters
Author(s): BENNETT, H.G.; LEGG, S.J.
Source: Toward the Millennium. Proceedings of the 8th Conference of the New Zealand Ergonomics Society, Rotorua, 14-15 May 1998, Edited by S.J. Legg and W. Cohen. New Zealand Ergonomics Society, Palmerston North, New Zealand
Year: 1998
Volume: -
Issue: -
Pages: 27-30
Number of References: 4
Original Language: English
Classification Term(s): Use of simulators; Questionnaires and surveys; Ratings and preferences; TRAINING; Use of expert opinion
Classification Number(s): 63-02-00; 44-00-00; 63-12-00; 64-05-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
The Hughes 300C and the Robinson R22 are the two main helicopters used to train civil helicopter pilots in New Zealand. Accident rates are high in both aircraft and the fatality rate for the Robinson is higher than that of the Hughes, yet anecdotally pilots appear to prefer flying the Robinson. This study was designed to obtain objective data concerning pilot preference and to undertake an ergonomic comparison of the two aircraft to try to identify areas of design deficiency that may contribute to the accidents. Evaluations consisted of (a) a mail questionnaire survey of New Zealand professional helicopter pilots' preferences and (b) an expert ergonomic appraisal of the two aircraft. The questionnaire responses indicated that pilots preferred the Robinson. However, the expert appraisal indicated that the Hughes was ergonomically better designed, suggesting that the survey approach may have given misleading information because the outcome of the expert ergonomic appraisal was consistent with the accident data. It is concluded that from an ergonomics perspective, the Hughes 300C is a better civil training helicopter than the Robinson R22.

Abstract Number: 169923
Title: Observation of the Opto-Kinetic Cervical Reflex while Piloting a Helicopter Equipped with a Visually-Coupled System
Author(s): CRAIG, G.; JENNINGS, S.; SWAIL, C.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 216-220
Number of References: 13
Original Language: English
Classification Term(s): Interaction between modalities; Eye and head movements; Headup and projected displays; Use of simulators; Vestibular processes
Classification Number(s): 02-07-00; 02-01-04; 02-06-00; 22-05-00; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
Recent examinations of pilot head movements in simulator environments have indicated that pilots tilt their heads in both the pitch and roll axes, in response to aircraft pitch and roll movements. It has been stated that the aim of these compensatory head movements is to maintain a level horizon that is centred in the pilot's field-of-view. This type of head movement has been referred to as an opto-kinetic cervical reflex (OKCR). To determine if this effect occurred in real flight conditions, the head movements of three qualified test pilots who flew a slalom manoeuvre were examined. Pilots flew a helicopter in normal visual conditions, while wearing an immersive helmet-mounted-display (HMD) with head roll compensation, and while wearing the same HMD without head roll compensation. The data from all pilots showed evidence of an OKCR response, i.e., a strong correlation

between aircraft roll and pilot head roll. The OKCR effect was observed in a baseline no HMD condition and when the pilots used the immersive HMD with and without roll compensation. The results suggest that helicopter pilots align their head with an earth based reference frame when manoeuvring close to the ground. The results also indicate that this reflex is active even when an HMD is used as the primary visual input for a pilot. Conventional attitude symbology displays are based on the assumption that pilots align their head with the aircraft body axis during manoeuvres. The results of this study suggest that examination of alternative attitude symbology designs is warranted.

Abstract Number: 171556
Title: Black Hawk Helicopter Loadmaster Ergonomics
Author(s): BLANCHONETTE, P.; KING, R.; CRONE, D.; SIMPSON, P.
Source: Contemporary Ergonomics 2000, Edited by P.T. McCabe, M.A. Hanson and S.A. Robertson. Taylor & Francis, London
Year: 2000
Volume: -
Issue: -
Pages: 328-332
Number of References: 6
Original Language: English
Classification Term(s): Motor and postural fatigue; Effects on the musculo-skeletal system; Modelling human characteristics ; Posture; Task analysis; Unobtrusive observation; Work design and organisation factors; Workplace and equipment design; WORKSTATION DESIGN
Classification Number(s): 06-04-06; 03-04-04; 27-00-00; 49-04-00; 49-07-00; 50-12-00; 63-01-01; 63-05-01; 64-01-03
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
For the past ten years the Black Hawk helicopter has been providing the Australian Army with a utility helicopter which is in high demand for operational use. The Black Hawk has four crew, consisting of two pilots and two loadmasters. Musculoskeletal problems are emerging in the loadmaster population, putting at risk these aircrew, who represent a substantial capital investment in terms of training and on-the-job experience. The Defence Science and Technology Organisation was asked by the Australian Army to investigate the impact of workstation design and job requirements on loadmaster health and the safety and effectiveness of the whole airborne system. This paper discusses the systems approach being taken to minimise the musculoskeletal problems experienced by the loadmasters.

Abstract Number: 172254
Title: A Human Factors Perspective on Helicopter Human External Loads
Author(s): SHEHAB, R.L.; SCHLEGEL, R.E.
Source: Houston... We Have a Solution! Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting, Houston, Texas, September 27-October 1, 1999. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1999
Volume: -
Issue: -
Pages: 931-935
Number of References: 4
Original Language: English
Classification Term(s): Work design and organisation factors; Body equipment; Data collection and recording; Emergency services; Surveys, statistics and analysis; Workplace and equipment design
Classification Number(s): 49-07-00; 48-01-00; 48-02-00; 49-04-00; 51-10-06; 51-11-00
Application(s): Helicopters
Abstract:
Human external loads (HEL) refer to operations where humans are transported while suspended below a helicopter. HEL operations are often required to access remote work sites, to access power lines in need of maintenance and repair, for transport of offshore ship captains, and for rescue operations. This paper reports a human factors investigation of HEL operations and the devices used to secure HELs involved in work (non-rescue) activities. The goal of this investigation was to determine if HEL operations pose a significant safety hazard. Specifically, the paper describes the various devices used to secure HELs, the accident history associated with HELs, and human actors' recommendations for the regulation of HEL devices and operations. Review of 616 helicopter accident reports revealed that only 1.5% of the accidents occurred during HEL operations and only 0.5% were directly attributable to the presence of an HEL.

Abstract Number: 172358
Title: Human Factors Associated with Escape from Side-Floating Helicopters
Author(s): JAMIESON, D.W.; COLESHAW, S.R.K.; ARMSTRONG, I.J.; SELLAR, C.; HOWSON, D.
Source: Contemporary Ergonomics 2000, Edited by P.T. McCabe, M.A. Hanson and S.A. Robertson. Taylor & Francis, London
Year: 2000
Volume: -
Issue: -
Pages: 129-133
Number of References: 8
Original Language: English
Classification Term(s): Evacuation procedures; Ratings and preferences; Use of simulators; Workplace and equipment design for health and safety
Classification Number(s): 51-11-03; 51-07-00; 63-02-00; 65-08-01

Application(s): Helicopters
Abstract:
Helicopters which are forced to ditch in water are inherently unstable due to their high centre of gravity. The Civil Aviation Authority (CAA) have, inter alia, identified the stability of ditched helicopters as an area for improvement. A flotation system was tested which allowed a helicopter model to come to rest on its side at an angle of around 150° after capsize. Before this system could be considered for operational use, it was important to assess the human factors associated with escape from this position and confirm it to be easier and safer than from a fully inverted helicopter. Trials were undertaken which required naive subjects to make several escapes from a helicopter simulator. Results showed that most subjects found it easier to escape when the simulator was floating on its side.

Abstract Number: 173091
Title: Vibrotactile Displays for Improving Spatial Awareness
Author(s): RAJ, A.K.; KASS, S.J.; PERRY, J.F.
Source: Ergonomics for the New Millennium. Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and 44th Annual Meeting of the Human Factors and Ergonomics Society, San Diego, California, USA, July 29-August 4, 2000. Human Factors and Ergonomics Society, Santa Monica, California, USA, Volume 1
Year: 2000
Volume: -
Issue: -
Pages: 181-184
Number of References: 12
Original Language: English
Classification Term(s): Tactile communication; Interaction between modalities; Knowledge of results, feedback and feedforward; Reaction time and speed of performance; Tactile displays; Use of simulators
Classification Number(s): 09-02-00; 02-07-00; 02-11-01; 07-06-00; 24-01-00; 63-02-00
Application(s): Aircraft; Aircrew; Situational awareness
Abstract:
This paper discusses the effects of tactile cueing on performance in a fixed base simulator helicopter hover task. Sixteen active-duty military helicopter pilots participated in a repeated measures two minute stationary hover test. Participants performed the hover task under four treatment conditions; tactile cueing (on/off) and secondary arithmetic task (on/off). Following each 2-minute hover, participants reported subjective situation awareness using the five-point China Lake Situation Awareness Scale (CLSA). Total time on target improved with tactile cueing with a significant task by display interaction. Performance on the arithmetic task remained consistent across conditions and no significant change was seen on CLSA scores between the tactile/no tactile conditions. Results demonstrate that tactile cues can be used to improve performance in spatial tasks, such as hovering a helicopter, especially in the presence of distracting secondary workload tasks. The lack of a significant difference in SA scores may be more related to the pilots' overall high confidence in their SA, despite their variation in performance, and highlights some of the difficulties encountered when attempting to measure SA.

Abstract Number: 173979
Title: An Exploratory Investigation of Relationships between Situation Awareness and Performance in an Attack Helicopter Domain
Author(s): ENTIN, E.B.
Source: Ergonomics for the New Millennium. Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and 44th Annual Meeting of the Human Factors and Ergonomics Society, San Diego, California, USA, July 29-August 4, 2000. Human Factors and Ergonomics Society, Santa Monica, California, USA, Volume 1
Year: 2000
Volume: -
Issue: -
Pages: 115-113
Number of References: 10
Original Language: English
Classification Term(s): MEASURES; Critical incident technique; Rating and ranking
Classification Number(s): 65-00-00; 64-06-00; 64-09-00
Application(s): Aircraft; Aircrew; Armed forces; Situational awareness
Abstract:
As part of a research programme studying display concepts to increase tactical situation awareness (SA) in the attack helicopter domain the author investigated the relationship between SA and performance. In order to test this relationship empirically, she developed two measures of SA that could be assessed independently of performance, a detailed measure and a high-level measure. In three phases of a simulated attack helicopter mission, the detailed measure, but not the high-level measure, was significantly correlated with a measure of performance. The results offer conditional empirical support for a relationship between SA and performance.

Abstract Number: 101025
Title: Pro-SWAT Applied to Advanced Helicopter Crewstation Concepts
Author(s): KUPERMAN, G.G.
Source: Progress for People. Proceedings of the Human Factors Society 29th Annual Meeting, Baltimore, Maryland, September 29-October 3, 1985, Edited by R.W. Swezey. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1985
Volume: -
Issue: -

Pages: 398-402
Number of References:
Original Language: English
Classification Term(s): Headup and projected displays; Mental workload; Rating and ranking
Classification Number(s): 22-05-00; 07-01-00; 64-06-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The Subjective Workload Assessment Technique was applied projectively (Pro-SWAT) to the prediction of workload to be expected in a single-pilot, advanced scout/attack helicopter weapon system. A composite mission scenario was created. Five configurations of the pilot/vehicle interface were synthesized, each based on some form of a virtual panoramic display (VPD). They were assessed at each of six segments extracted from the mission scenario. An analysis of variance, with predicted workload as the dependent measure, found highly significant differences between both mission segments and VPD concepts (p<0.01).

Abstract Number: 104801
Title: Empirical Workload and Communications Analysis of Scout Helicopter Exercises
Author(s): SHAFFER, M.T.; SHAFER, J.B.; KUTCHE, G.B.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1986
Volume: -
Issue: -
Pages: 628-632
Number of References:
Original Language: English
Classification Term(s): Workload demands; Instrument recording; Mental workload; Task analysis
Classification Number(s): 41-03-05; 07-01-00; 63-05-01; 63-09-03
Application(s): Helicopters
Abstract:
The objective was to find independent real-world data to validate results of paper-and-pencil analyses predicting workload savings by automating functions in an advanced scout-attack helicopter. Videotapes existed that had captured cockpit activities during force-on-force exercises. The videotapes were analysed to determine the relative workload contribution of communications and crew station activities for the pilot and copilot observer. The findings indicated search activity was the single most time consuming mission-related function other than flying the aircraft. Further, data entry required a crewmember's undivided attention; therefore automated communications should consider the implications of manual data entry which may increase rather than decrease workload.

Abstract Number: 108075
Title: The Application of Oculographic Testing during Flight with Regard to the Ergonomic Evaluation of the MI-2 Helicopter Cockpit
Author(s): TERELAK, J.; SZCZECHURA, J.
Source: Ergonomia (Poland)
Year: 1987
Volume: 10
Issue: 1
Pages: 9-24
Number of References:
Original Language: Polish
Original Title: Zastosowanie Badan Okulograficznych w Locie do Oceny Ergonomicznej Kabiny Smiglowca MI-2
Classification Term(s): Eye and head movements; Display layout; Search
Classification Number(s): 02-01-04; 02-09-01; 25-03-00
Application(s): Aircrew; Helicopters
Abstract:
Activities performed by pilots while carrying out flight tasks can result in great strain, mainly visual. Especially during low altitude flying, the way visual information from the pilot and navigation instruments as well as extrainstrumental information, is received, is of great significance. The aim of this study was the analysis of the points of sight fixation in the pilot's field of view while performing various types of flight manoeuvres. The tests have been carried out on an MI-2 helicopter during an experimental range flight. The eye movements were registered by means of a NAC-4 type oculograph enabling simultaneous registration of the visual field within the range of 40° in the vertical and 60° in the horizontal movements and of the sight fixation point on successive elements of the visual field. The position of the point corresponding to the sight fixation and picture being observed by the pilot was registered on film. The results provide data on the characteristics of the time of sight fixations on successive instruments and outside the cockpit in various flight phases, such as a reverse flight over an obstacle, etc. which have substantial meaning for aviation ergonomics.

Abstract Number: 157069
Title: An Examination of Two Emergency Breathing Aids for Use during Helicopter Underwater Escape
Author(s): TIPTON, M.J.; FRANKS, C.M.; SAGE, B.A.; REDMAN, P.J.
Source: Aviation, Space, and Environmental Medicine
Year: 1997
Volume: 68

Issue: 10
Pages: 907-914
Number of References: 22
Original Language: English
Classification Term(s): Respiratory equipment; Bodygear; Evacuation procedures; Headgear; Respiratory processes
Classification Number(s): 51-10-05; 03-02-02; 51-09-01; 51-09-04; 51-11-03
Application(s): Aircrew; Helicopters
Abstract:
There is a paucity of published work in which the performance of Emergency Underwater Breathing Aids (EUBA) has been examined in the wide range of scenarios in which helicopter underwater escape may be necessary. In this investigation two EUBA were examined: the Air Pocket (AP) rebreather and the Short Term Air Supply System (STASS) mini SCUBA set. Young, healthy male subjects undertook simple simulated helicopter underwater escapes in water at 15^oC and/or 5^oC. During the immersions the subjects attempted to remain submerged for 60 s while traversing back and forth along a ladder secured at a depth of 1.25 m. At each temperature the subjects used AP and STASS twice. The subjects were dressed in the Royal Navy winter sea helicopter aircrew equipment assembly and an aircrew helmet. Both AP and STASS significantly extended the underwater survival time of individuals when compared to their maximum breath-hold time (BHT). It is clear from the measurements made of gas concentrations in AP, the volume of air used from STASS, and subjective responses, that the 60-s submersions were achieved more easily with STASS than AP. It is concluded that in conditions similar to those of this experiment STASS will give a longer underwater duration than AP, but this benefit must be offset against the possible risk of pulmonary barotrauma associated with the use of STASS, as well as increased training and maintenance costs. Irrespective of the EUBA which is provided, in-water training, preferably including exposure to cold water, will significantly improve the ability of an individual to use it.

Abstract Number: 159451
Title: Back Pain in Australian Military Helicopter Pilots: A Preliminary Study
Author(s): THOMAE, M.K.; PORTEOUS, J.E.; BROCK, J.R.; ALLEN, G.D.; HELLER, R.F.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 5
Pages: 468-473
Number of References: 23
Original Language: English
Classification Term(s): Motor and postural fatigue; Effects on the musculo-skeletal system; Individual differences; Mental ability; Questionnaires and surveys; Ratings and preferences; State of health; Statistical analysis and psychometrics
Classification Number(s): 06-04-06; 05-02-01; 05-11-00; 49-01-00; 50-12-00; 63-10-01; 64-05-00; 65-08-01
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Several studies have highlighted the problem of back pain among helicopter pilots, but few have controlled for potential confounding factors in their analyses, or sought to examine the effects of back pain on operational readiness and flying performance. There have been no previous studies of the prevalence of back pain among Australian military pilots. The prevalence, risk factors, and consequences of low back pain were assessed in a cross-sectional survey of 200 Australian military helicopter pilots by self-completion questionnaire. Responses were received from 131 (66%) available pilots. The overall prevalence of reported back pain was 64% (95% CI 56%-72%), with a further 28% of pilots describing back discomfort while flying. More than half the pilots (55%) indicated that back pain had interfered with their concentration while flying, with 16% reporting that they had hurried flying missions because of pain. A minority of pilots (7%) had refused to fly because of back problems. After adjusting for age, education, BMI, posture and numbers of hours flown, multiple logistic regression modelling indicated that a prior history of back injury was the most significant predictor of back pain among rotary wing pilots (OR 2.63, 95% CI 1.11-6.23). It is concluded that the prevalence of back pain in Australian military helicopter pilots is unacceptably high and may be limiting operational readiness, pilot performance, flying safety, and pilot health. Urgent attention needs to be given to improved ergonomic design in aircraft, and both back pain prevention and back injury rehabilitation programmes.

Abstract Number: 166351
Title: Spatial Disorientation in U.S. Civil Aviation Helicopter Accidents
Author(s): MORTIMER, R.G.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 16-20
Number of References: 12
Original Language: English
Classification Term(s): Disorientation; Surveys, statistics and analysis
Classification Number(s): 35-05-00; 48-01-00
Application(s): Aircrew; Helicopters
Abstract:

An analysis of U.S. civil aviation helicopter spatial disorientation (SD) accidents was made for 1983-1996. The 1.2% of helicopter accidents involving spatial disorientation accounted for 5.9% of the fatalities. The helicopter was destroyed in 69.7% of the accidents. Factors associated with SD included: pressure to make the flight, not being a professional pilot, having less than 500 hours total time, obtaining a weather briefing, filing a flight plan, flying a turbine powered rotorcraft in darkness, with a ceiling of less than 1000', in precipitation and restrictions to visibility. About one quarter of the accidents were during EMS missions. Improved training, installation of equipment for IFR flight conditions and better design of flight displays appear to be needed in rotary-wing aircraft to reduce exposure to and effects of spatial disorientation.

Abstract Number: 101346
Title: Development of the Helicopter Crewman Jacket. Final Report
Author(s): LEWYCKYJ, J.Z.
Source: Naval Air Development Center, Warminster, Pennsylvania, USA, Report No. AD-A115635;NADC-82122-60
Year: 1982
Volume: -
Issue: -
Pages: 54pp
Number of References:
Original Language: English
Classification Term(s): Bodygear
Classification Number(s): 51-09-04
Application(s): Helicopters
Secondary Source: Scientific and Technical Aerospace Reports
Abstract:
This jacket, to be worn by Helicopter Mobile Crewmen or Helicopter passengers, provides for insulation and flotation to a wearer forced into cold water. It consists of an outer fire resistant aramid shell, a vest-like bladder attached to the shell and a layer of insulation. This bladder can be inflated through a CO2 inflation device by a pull on a beaded handle. It can also be inflated orally. When inflated, the jacket will keep the wearer face-up in the water.

Abstract Number: 103062
Title: Emergency Underwater Escape from Helicopters
Author(s): GILLESPIE, G.; LITTLE, W.L.
Source: Proceedings of the 23rd Annual Symposium of the SAFE Association, Las Vegas, Nevada, December 1-5, 1985. SAFE Association, Van Nuys, California, USA
Year: 1986
Volume: -
Issue: -
Pages: 152-154
Number of References:
Original Language: English
Classification Term(s): Respiratory equipment; Evacuation procedures; TRAINING; Workplace and equipment design for health and safety
Classification Number(s): 51-10-05; 44-00-00; 51-07-00; 51-11-03
Application(s): Aircrew; Helicopters
Abstract:
Unfortunately, the hazards associated with a helicopter crash or ditching at sea do not end with the water impact. Statistics from the Naval Safety Center show that from 1963 to 1983, almost 300 helicopters with a total of nearly 1200 occupants either crashed or were ditched at sea. Over 200 persons died in those mishaps, 150 were listed as lost/unknown, and 35 suffered either a fatal injury or an injury which lead to their drowning. Many of the 150 lost at sea are suspected drownings. The Navy has numerous ongoing programs to reduce this tragic loss of lives. Helicopter flotation, underwater lighting, crashworthy seating and fuel systems, and more realistic water survival training, have all been designed to improve aircrew survival. Regardless of these improvements, training, and survival skills however, time becomes the critical commodity in any emergency. Even under the best of conditions, it can take several seconds to think a problem through, and then react properly. In the near future, the Navy plans to introduce an Emergency Underwater Breathing Device to the operational helicopter community. This paper briefly describes this device, and discusses some of the philosophies surrounding the use of this type of equipment. Finally this paper provides a brief overview of the training planned when the device is issued to the fleet.

Abstract Number: 104441
Title: Noise, Vibration and Wakefulness during Helicopter Flights
Author(s): LOFSTEDT, P.; ENGLUND, K.; LINDMARK, A.; LANDSTROM, U.
Source: National Board of Occupational Safety and Health (Arbetarskyddsstyrelsen), Solna, Sweden, Arbete Och Halsa No. 1985:41
Year: 1985
Volume: -
Issue: -
Pages: 53pp
Number of References:
Original Language: Swedish
Original Title: Buller, Vibrationer och Vakenhet under Helikopterflygning
Classification Term(s): Arousal; Exposure to noise; Fatigue; Stress; VIBRATION
Classification Number(s): 06-03-00; 06-04-00; 07-03-00; 30-03-00; 31-00-00
Application(s): Aircrew; Helicopters
Abstract:
The investigation was carried out in collaboration with the AF 1 helicopter school AF 1 in Boden. Measurements were made on two different types of helicopter, Hkp 3 (Agusta Bell

204) and Hkp 6 (Agusta Bell 206 B). Three different parameters were recorded during flights: noise, vibration and wakefulness. The results of the noise measurements disclosed that exposure to noise and vibration was mainly correlated to the main rotor's energy and speed. Both types of exposure were dominated by frequencies under 10 Hz. Analysis of wakefulness during long flights lasted about four hours and short flights lasting less than two hours was based on EEG and EKG recordings. As expected, the level of wakefulness was influenced by the stress to which pilots were exposed. Increased alertness was found at the start and end of flights and when problems were encountered during a flight. In some instances there was also a gradual increase in fatigue during flights. The correlation between fatigue, and the types of flights and the external environmental factors noise and vibration is finally discussed.

Abstract Number: 104935
Title: Evaluation of an Active Seat Isolation System for Attenuation of Helicopter Vibration
Author(s): RUNNINGS, D.W.; SANTOIANNI, M.; VAN VLIET, M.; KRUK, R.V.; MCKINNON, G.M.
Source: Proceedings of the 19th Annual Meeting of the Human Factors Association of Canada, Richmond (Vancouver), British Columbia, August 22-23, 1986. The Association, Rexdale, Ontario
Year: 1986
Volume: -
Issue: -
Pages: 139-142
Number of References:
Original Language: English
Classification Term(s): Vibration equipment; Posture; Seating; VIBRATION
Classification Number(s): 51-10-04; 03-04-04; 28-04-01; 31-00-00
Application(s): Aircrew; Helicopters
Abstract:
Poor posture (resulting in spinal curvature) coupled with sustained low-frequency vibration (1-20 Hz) has been shown to adversely affect the health and performance of helicopter aircrew. Given that the flight characteristics of helicopters cannot easily be changed, the attenuation of vibration is of importance in current and future helicopter designs. As a result, a variety of vibration attenuation approaches have been investigated. Conventional solutions isolate the pilot through seat suspension via springs, dampers, and cushions. These seats are typically passive and attempt to attenuate vibration only in the vertical axis. This paper describes an alternative system which actively attenuates vibration in the vertical axis with potential for application to lateral and longitudinal axes. An active seat cushion based on an air over oil system has been developed. The system operates under a constant pressure algorithm. Results indicate that an attenuation of up to 95% at 0.2G has been achieved. The results are discussed within the context of an integrated cockpit where both vibration and posture are addressed.

Abstract Number: 106874
Title: Sweat Evaporation and Thermal Comfort Wearing Helicopter Passenger Immersion Suits
Author(s): LIGHT, I.M.; GIBSON, M.G.; AVERY, A.I.
Source: Ergonomics
Year: 1987
Volume: 30
Issue: 5
Pages: 793-803
Number of References:
Original Language: English
Classification Term(s): Thermal equipment; Body temperature regulation; Clothing ensembles; Instrument recording; Materials for clothing; Rescue; Static body measurements; Statistical analysis and psychometrics; Thermal comfort; Thermal stress
Classification Number(s): 51-10-03; 03-02-04; 03-04-01; 33-04-00; 33-07-00; 51-09-05; 51-09-06; 51-11-01; 63-09-03; 63-10-01
Application(s): Air passengers; Helicopters; Oil and petroleum industry
Abstract:
Two types of helicopter passenger immersion suit constructed from either a vapour permeable or vapour impermeable material were assessed in terms of their wearers' comfort, their vapour transmission and the moisture accumulation in undergarments. Environmental air temperatures of 21^oC and 30^oC were compared to simulate different helicopter operating temperatures, and the effects of wearing each type of suit. At 21^oC the suits' performances were comparable in terms of increase in undergarment weight, sweat loss, percentage skin temperature. At the higher temperature the permeable suit performed significantly better. There was less body weight loss, less sweat uptake into the undergarments and a greater amount of sweat being evaporated. Rectal temperatures and thermal comfort, however, were similar. At higher levels of thermal stress there may be an advantage in user acceptance and minimal decrement in reduction in cold water survival time from dampening if an immersion suit fabricated from a vapour permeable material is worn.

Abstract Number: 107849
Title: Ventilation Index of Helicopter Pilot Suits
Author(s): SULLIVAN, P.J.; MEKJAVIC, I.B.; KAKITSUBA, N.
Source: Ergonomics
Year: 1987
Volume: 30
Issue: 7
Pages: 1053-1061
Number of References:

Original Language: English
Classification Term(s): Clothing ensembles; Combined measures and indices; Materials for clothing; Thermal comfort; Thermal equipment
Classification Number(s): 51-09-05; 33-07-00; 51-09-06; 51-10-03; 65-07-00
Application(s): Aircrew; Helicopters
Abstract:
The main function of helicopter pilot suits used in offshore flights is to provide thermal protection in the event of cold water immersion and to allow maintenance of thermal comfort during normal use. As part of a larger study to assess the thermal characteristics of helicopter pilot suits, the ventilation index of four suits was determined using the methods outlined by Birnbaum and Crockford (1978). These methods involved determining the microenvironment volume and the rate of air exchange of the protective clothing assembly. Results showed that in the standing motionless subject, the Nomex and Cotton Ventile suits had the higher ventilation indices of 1.53 and 0.91 litres.min⁻¹, while the Nomex/Insulite and Goretex suits had substantially lower ventilation indices of 0.07 and 0.03 litres.min⁻¹. These ventilation indices are due to the fabrics used in construction and the design of the suit.

Abstract Number: 108893
Title: Simulator Design Features for Helicopter Shipboard Landings
Author(s): SHEPPARD, D.J.; MADDEN, J.; JONES, S.A.
Source: Rising to New Heights with Technology. Proceedings of the Human Factors Society 31st Annual Meeting, New York City, October 19-23, 1987. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1987
Volume: -
Issue: -
Pages: 233-237
Number of References:
Original Language: English
Classification Term(s): Use of simulators; Knowledge of results, feedback and feedforward; Seating; Size, magnification and viewing distance; System dynamics; TRAINING; Whole body acceleration and deceleration
Classification Number(s): 63-02-00; 07-06-00; 25-01-01; 28-04-01; 32-02-00; 37-04-00; 44-00-00
Application(s): Aircrew; Helicopters; Ships
Abstract:
The Vertical Takeoff and Landing Simulator (VTOL) at the Naval Training Systems Centre's (NTSC) Visual Technology Research Simulator (VTRS) was used to study the effects of simulator design features on pilot performance in helicopter shipboard landings. The research was designed to evaluate the effects of current design features on the SH-60B Operational Flight Trainer (OFT) used to train helicopter shipboard landing and four proposed simulator design modifications. These were: (1) scene detail (SH-60B OFT scene versus an upgraded VTRS scene), (2) field-of-view (VTRS wide versus a smaller SH-60B OFT field-of-view), (3) dynamic seat cueing (on versus off), and (4) dynamic inflow (standard rotor model available in existing trainers versus an updated rotor model). These factors were tested across two levels of sea state. On the basis of the factors studied in the experiment, the wider field-of-view, the more detailed scene and the updated rotor model are recommended for use. The dynamic seat cueing evaluated in this study is not recommended at this time.

Abstract Number: 113935
Title: An Empirically Validated Task Analysis (EVTA) of Low Level Army Helicopter Operations
Author(s): SHAFFER, M.T.; HENDY, K.C.; WHITE, L.R.
Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1988
Volume: -
Issue: -
Pages: 178-183
Number of References: 10
Original Language: English
Classification Term(s): Task analysis; Instrument recording; Mental workload
Classification Number(s): 63-05-01; 07-01-00; 63-09-03
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
A computer-based Empirically Validated Task Analysis (EVTA) of Canadian Forces light observation helicopter operations was conducted from video records of cockpit activity gathered during flight. The task analysis was performed in order to provide data for function analysis and workload prediction studies in support of the Canadian Forces Light Helicopter replacement project. Observable behaviours were categorized according to the type of activity involved and communications were analysed for content, agencies involved, and relevance to the crew's task. The results of this study indicate that data gathered from a controlled test environment can differ considerably from those obtained in operational settings and that miniature video cameras can be useful in obtaining information from environments which hitherto may have been inaccessible to all but operational personnel.

Abstract Number: 114435
Title: A Dissociation of Objective and Subjective Workload Measures in Assessing the Impact of Speech Controls in Advanced Helicopters
Author(s): VIDULICH, M.A.; BORTOLUSSI, M.R.

Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1988
Volume: -
Issue: -
Pages: 1471-1475
Number of References: 14
Original Language: English
Classification Term(s): Voice input devices; Attention, time sharing and resource allocation; Comparison between input devices; Headup and projected displays; Ratings and preferences; Time and speed; Use of simulators
Classification Number(s): 21-21-00; 02-11-03; 21-01-00; 22-05-00; 63-02-00; 65-02-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Among the new technologies that are expected to aid helicopter designers are speech controls. Proponents suggest that speech controls could reduce the potential for manual control overloads and improve time-sharing performance in environments that have heavy demands for manual control. This was tested in a simulation of an advanced single-pilot, scout/attack helicopter. Objective performance indicated that the speech controls were effective in decreasing the interference of discrete responses during moments of heavy flight control activity. However, subjective ratings indicated that the use of speech controls required extra effort to speak precisely and to attend to feedback. Although the operational reliability of speech controls must be improved, the present results indicate that reliable speech controls could enhance the time-sharing efficiency of helicopter pilots. Furthermore, the results demonstrated the importance of using multiple assessment techniques to completely assess a task. Neither the objective nor the subjective measures alone provided complete information. It was the contrast between the measures that was most informative.

Abstract Number: 114892
Title: Simulator Evaluation of Instructional and Design Features for Training Helicopter Shipboard Landing
Author(s): SHEPPARD, D.J.; JONES, S.A.; WESTRA, D.P.; MADDEN, J.J.
Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1988
Volume: -
Issue: -
Pages: 1261-1265
Number of References: 1
Original Language: English
Classification Term(s): Use of simulators; Knowledge of results, feedback and feedforward; Size, magnification and viewing distance; TRAINING
Classification Number(s): 63-02-00; 07-06-00; 25-01-01; 44-00-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The effects of four instructional issues and one simulator design feature for training helicopter shipboard landing on small ships were tested in the Vertical Take-off and Landing Simulator (VTOL) at the Visual Technology Research Simulator (VTRS), Naval Training Systems Center. They were: (1) field of view (VTRS versus a test field of view), (2) task chaining (segmented backward chaining versus whole task training), (3) augmented cueing (augmented cueing versus no augmented cueing), (4) length of training (18, 27, and 36 trials), and (5) the timing of seastate introduction (early versus late). The experiment utilized an in-simulator transfer-of-training paradigm in which pilots who were not proficient in the helicopter shipboard landing task were trained under one of several experimental conditions, then tested on the transfer condition (that represented maximum realism) in the simulator. Thirty-two pilots each completed a total of 54 trials (36 training, 18 transfer). Pilots were tested in the transfer condition (six trials) after their 18th, 27th, and 36th training trial. Of the experimental instructional issues, task chaining had the largest effect, with better performance in all segments of the task for pilots who were trained with the backward-chaining sequence, than for pilots who received whole task training. Augmented cueing did not yield the transfer performance anticipated. Seastate introduction had no effect on performance. Field of view had some marginal effects on vertical performance in the hover, with better performance for pilots who were trained with the combination VTRS field-of-view and backward-chaining. Results suggest a diminished rate of learning after 33 simulator trials (which includes 27 training trials and 6 transfer trials of the first probe).

Abstract Number: 117314
Title: The Occurrence of the Vection Illusion among Helicopter Pilots while Flying over Water
Author(s): UNGS, T.J.
Source: Aviation, Space & Environmental Medicine
Year: 1989
Volume: 60
Issue: 11
Pages: 1099-1101
Number of References: 12
Original Language: English
Classification Term(s): Visual illusions and after-effects; Questionnaires and surveys
Classification Number(s): 02-01-09; 64-05-00
Application(s): Aircrew; Helicopters
Abstract:

U.S. Coast Guard helicopter pilots were questioned on the occurrence of the vection illusion while flying over water under different light and sea conditions. A total of 267 (79.9%) pilots completed the study questionnaire. The illusion of vection was experienced by 248 (92.5%) of these pilots. The majority of the pilots, 209 (84.6%), reported that dark rather than light visual conditions increased the likelihood of experiencing vection. Vection was considered likely to occur over rough seas by more pilots [114 (46.2%)] than over smooth seas [81 (37.8%)]. Several pilots commented that they had responded to the illusion with aircraft movement. The vection illusion is a common experience among helicopter pilots while flying over open water. Low light conditions and rough sea states are conducive to experiencing the vection illusion. Pilots may respond to the illusion with aircraft control movements, which raises flight safety concerns.

Abstract Number: 117608
Title: Helmet Mounted Display Systems for Helicopter Simulation
Author(s): HAWORTH, L.A.; BUCHER, N.; RUNNINGS, D.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 86-90
Number of References: 7
Original Language: English
Classification Term(s): Virtual displays; Headup and projected displays; Size, magnification and viewing distance; Use of simulators; VIBRATION
Classification Number(s): 22-05-01; 22-05-00; 25-01-01; 31-00-00; 63-02-00
Application(s): Aircraft; Aircrew; Armed forces; Computer generated imagery
Abstract:
Simulation scientists continually pursue improved flight simulation technology with the goal of closely replicating the 'real world' physical environment. The presentation/display of visual information for flight simulation is one such area enjoying recent technical improvements that are fundamental for conducting simulated operations close to the terrain. Detailed and appropriate visual information is especially critical for Nap-of-the-Earth (NOE) helicopter flight simulation where the pilot maintains an 'eyes-out' orientation to avoid obstructions and terrain. This paper elaborates on the visually-coupled Wide Field Of View Helmet Mounted Display (WFOVHMD) system technology as a variable visual display system for helicopter simulation. In addition the paper discusses research conducted on the NASA-Ames Vertical Motion Simulator that examined one critical research issue for helmet mounted displays.

Abstract Number: 121594
Title: Back Pain and Exposure to Whole Body Vibration in Helicopter Pilots
Author(s): BONGERS, P.M.; HULSHOF, C.T.J.; DIJKSTRA, L.; BOSHUIZEN, H.C.; GROENHOUT, H.J.M.; VALKEN, E.
Source: Ergonomics
Year: 1990
Volume: 33
Issue: 8
Pages: 1007-1026
Number of References: 39
Original Language: English
Classification Term(s): Effects on the musculo-skeletal system; Age; Experience and practice; Motor and postural fatigue; Posture; Questionnaires and surveys; Rest pauses and work duration; Static body measurements; Vibration levels
Classification Number(s): 50-12-00; 03-04-01; 03-04-04; 04-01-00; 04-04-00; 06-04-06; 31-01-00; 39-02-00; 64-05-00
Application(s): Aircrew; Helicopters
Abstract:
In a questionnaire survey the prevalence of back pain in 163 helicopter pilots was compared to that in a control group of 297 non-flying air force officers who underwent the same pre-employment medical examination. Since pilots document their hours of flight in a person flight log, an accurate estimate of the duration of exposure could be made. In addition, vibration levels of the helicopters were measured and an accumulative vibration dose was calculated for each pilot. 'Transient' back pain of a short duration was more frequent amongst the pilots compared to the control group, and the prevalence of 'chronic' back pain of a persistent nature was also higher amongst the helicopter pilots. Transient back pain seemed to be most strongly related to the average hours of flight per day, whereas chronic back pain was more closely related to total hours of flight or the accumulative vibration dose. A significant higher prevalence of this chronic back pain as observed only after 2000 hours of flight or a vibration dose of 400 m²h/s⁴. The observed health effects may be due to vibration or constrained posture but are most likely due to concomitant exposure to both factors.

Abstract Number: 124235
Title: Personality, Task Characteristics and Helicopter Pilot Stress
Author(s): HARSS, C.; KASTNER, M.; BEERMAN, L.
Source: Stress and Error in Aviation, Edited by E. Farmer. Avebury Technical, Aldershot, Hants
Year: 1991
Volume: -
Issue: -
Pages: 3-14

Number of References: 13
Original Language: English
Classification Term(s): Stress; Cardiac processes; Fear, anxiety, mood and emotion; Mental ability; Night vision devices; Personality and temperament; Physiological and psychophysiological recording ; Questionnaires and surveys; Rating and ranking; Team work; Workload demands
Classification Number(s): 07-03-00; 03-02-01; 05-02-01; 05-03-00; 06-05-00; 22-01-06; 41-02-03; 41-03-05; 63-07-00; 64-05-00; 64-06-00
Application(s): Aircrew; Helicopters
Abstract:
A longitudinal research project on stress and strain of helicopter pilots engaged in low-altitude night flight with night vision goggles (NVGs) was carried out over three years. This chapter presents an overview of the design and theoretical background of the project. Psychological, physiological and observational data were collected before, during, and after flight. In the theoretical model, stress and strain in flight result from concrete actions by specific pilots in specific objectively definable situations. Traits, such as anxiety, risk-taking, and aggressiveness, are regarded as manifestations of behaviour regulation styles that appear during flight. These traits and behaviour regulation patterns are determined by cognitive processes, especially the pilot's perception of himself and the situation. By identifying those characteristics of the person and the environment that interact to produce critical flight situations and stress, it is possible to deduce weak points and give recommendations in the domain of flight safety. As examples of concrete situation-person interactions, the authors describe the measured, experienced, and observed stress of helicopter crews in relation to the personal characteristics of 'risk-taking', 'test anxiety' (worry cognitions), and 'attributions', and the situational characteristic of 'difficulty'.

Abstract Number: 124264
Title: Ultra-Cheap Simulation of Cognitive Load in a Two-Man Helicopter
Author(s): MACRAE, A.W.; PATTISON, S.E.
Source: Human Resource Management in Aviation, Edited by E. Farmer. Avebury Technical, Aldershot, Hants
Year: 1991
Volume: -
Issue: -
Pages: 101-105
Number of References:
Original Language: English
Classification Term(s): Person-to-person communication; Mental workload; Modelling system characteristics; Team work; Three-dimensional graphics; Use of simulators; Workload demands
Classification Number(s): 09-01-01; 07-01-00; 08-02-05; 41-02-03; 41-03-05; 63-01-02; 63-02-00
Application(s): Helicopters; Videogames
Abstract:
To investigate the effects of the spatial position of crew in a helicopter, the authors have adapted a commercially available computer game to model the cognitive demands of flight. Although the simulation does not aim to represent helicopter flight realistically, the demands made by the modified game on the players are very similar. Because the game has been available for several years it has been easy to locate a pool of enthusiastic and expert players who closely resemble flight crew in their characteristics and who require no preliminary training. Recordings are made of each game and of the verbal interactions of the players. Analysis of the recordings shows great variability in the patterns of utterances from one session to another and the preliminary data suggest that the most fruitful analysis is going to be of events leading up to the occasional calamities that occur.

Abstract Number: 124728
Title: Visual Tasks in Helicopter Shipboard Landing
Author(s): BERBAUM, K.S.; KENNEDY, R.S.; HETTINGER, L.J.
Source: Applied Ergonomics
Year: 1991
Volume: 22
Issue: 4
Pages: 231-239
Number of References: 24
Original Language: English
Classification Term(s): Protocol analysis; Human performance; Task analysis; Use of simulators; VISUAL COMMUNICATION; Visual perception of form, shape, angle, size and distance; Visual processes
Classification Number(s): 63-13-00; 02-01-00; 02-01-06; 02-11-00; 08-00-00; 63-02-00; 63-05-01
Application(s): Aircrew; Helicopters
Abstract:
The purpose of this research was to identify visual scene content important in helicopter shipboard landings, particularly in the hover phase, for a further study in a research simulator. A second purpose was to illustrate the use of a methodology (Protocol Analysis) which may hold promise for many areas of human factors research. Discussions with pilots, reviews of relevant Naval Aviation Training and Operational Procedures (NATOPS) manuals and observation of simulated helicopter shipboard landings suggested that the visual elements required may depend upon whether experienced or inexperienced pilots are flying, a simulator or an aircraft is flown, the environment is day or night, or the pilot seeks to acquire or maintain a skill level. A scenario involving an experienced pilot flying dusk/night approaches in a simulator was intensively studied. As he flew each approach, the pilot dictated real-time verbal protocols of his visual and control activities. These protocols were subsequently partitioned by the authors into nine phases defined in terms of range or altitude from the ship, and the visual tasks required in

each segment were described. An outcome of this analysis was a list of visual cue augmentations that may be useful for providing augmented feedback in training.

Abstract Number: 129279
Title: The Impact of Personality and Task Characteristics on Stress and Strain during Helicopter Flight
Author(s): HARSS, C.; KASTNER, M.; BEERMAN, L.
Source: International Journal of Aviation Psychology
Year: 1991
Volume: 1
Issue: 4
Pages: 301-318
Number of References: 17
Original Language: English
Classification Term(s): Personality and temperament; Cardiac processes; Combined measures and indices; Effector system; Fear, anxiety, mood and emotion; Night vision devices; Rating and ranking; Risk taking; Stress; Team work; Use of expert opinion; Workload demands
Classification Number(s): 05-03-00; 03-01-06; 03-02-01; 06-05-00; 07-03-00; 22-01-06; 41-02-03; 41-03-05; 48-03-02; 63-12-00; 64-06-00; 65-07-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
A longitudinal research project on stress and strain of helicopter pilots engaged in low-altitude night flight with night vision goggles (NVG) was carried out over 3 years. An overview is given regarding the design and theoretical background of the project. Psychological, physiological, and observational data were collected before, during, and after flight. In the theoretical model, stress and strain in flight result from concrete actions by specific pilots in specific objectively definable situations. Traits, such as anxiety, riskiness, and aggressiveness, are regarded as manifestations of behaviour regulation styles, which appear during flight. These traits and behaviour regulation patterns are determined by cognitive processes, especially the pilot's perception of himself and the situation. By identifying those characteristics of the person and the environment that (in an interaction) lead to critical flight situations and stress, it is possible to deduce weak points and give recommendations in the domain of flight security. As examples for concrete interactions between personality and situational variables, the observed stress of helicopter crews, which depends on the personality characteristics of riskiness and test anxiety (worry cognitions), and situation-characteristic difficulty are introduced.

Abstract Number: 129671
Title: The North Sea Helicopter Operators Safety Data Exchange
Author(s): ELWELL, R.; HARRIS, D.
Source: Offshore Safety and Reliability, Proceedings of the Safety and Reliability Society 1991 Symposium. The Society, Manchester
Year: 1991
Volume: -
Issue: -
Pages: 10pp
Number of References: 2
Original Language: English
Classification Term(s): Data collection and recording; Information and communication design for health and safety
Classification Number(s): 48-02-00; 51-05-00
Application(s): Helicopters; Offshore industries
Abstract:
A prerequisite in the continuing safe operation of complex systems is the free passage of relevant information. Both commercial considerations and an absence of adequate mechanisms for information flow hinders the process. Such a situation prevails in operations by helicopter companies in support of North Sea oil exploitation. A Safety Data Exchange is being established to provide a computerised system which will augment existing channels of communication. It is controlled by the Applied Psychology Unit (APU), at the Cranfield Institute of Technology. The Safety Data Exchange will run on a computer database accessible, via telephone line, to all contributors to the system. Contributors include the helicopter companies themselves, their pilots, and their maintenance personnel. The scope of reporting includes human, operational and mechanical failings and inadequacies. Reports lodged in the system will be anonymous. There will thus be no personal or commercial penalty for the participation. Contribution to the Safety Data Exchange is made via computer/modem access or proformae sent through the post. Contributors will be encouraged to access the computer database to conduct their own analyses of the data.

Abstract Number: 133403
Title: The Effect of Trans-Cockpit Authority Gradient on Navy/Marine Helicopter Mishaps
Author(s): ALKOV, R.A.; BOROWSKY, M.S.; WILLIAMSON, D.W.; YACAVONE, D.W.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 8
Pages: 659-661
Number of References: 6
Original Language: English
Classification Term(s): Status; Errors, accuracy and reliability; Surveys, statistics and analysis; Team work

Classification Number(s): 04-08-00; 02-11-02; 41-02-03; 48-01-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:
Navy and Marine Corps helicopter mishaps which had a pilot causal factor assigned were examined to determine if the relative military rank of the pilot and copilot was associated with the rate of occurrence per 100,000 flight hours. All class A and B helicopter flight mishaps for the 11 calendar year 1980-1990 were examined. Although no statistically significant differences were noted, pairing pilots who were of equal rank yielded the lowest rate, seemingly refuting Elwyn Edward's notion that a flat `trans-cockpit authority gradient' may lead to greater problems in the cockpit than his hypothetical `optimum gradient'. Moreover, when copilots flew with pilots who differed by two or more ranks, the largest pilot error rate was revealed. This last finding seems to support Edward's hypothesis that a steep `trans-cockpit authority gradient' may be detrimental to aviation safety.

Abstract Number: 133665
Title: Heat Strain during At-Sea Helicopter Operations and the Effect of Passive Microclimate Cooling
Author(s): BANTA, G.R.; BRAUN, D.E.
Source: Aviation, Space, and Environmental Medicine
Year: 1992
Volume: 63
Issue: 10
Pages: 881-885
Number of References: 23
Original Language: English
Classification Term(s): Thermal stress; Body temperature regulation; Bodygear; Cardiac processes; Equipment for altitude and depth; High temperature; Physiological and psychophysiological recording ; Thermal equipment
Classification Number(s): 33-04-00; 03-02-01; 03-02-04; 33-01-02; 51-09-04; 51-10-03; 51-10-07; 63-07-00
Application(s): Aircrew; Helicopters
Abstract:
Twelve Navy, H-3 helicopter aircrew members were monitored (heart rate, skin and rectal temperatures) in both microclimate cooling (ice) vest and non-vest conditions during at-sea operations in the high heat environment of the Persian Gulf. During all flights and flight phases, ambient dry bulb temperatures ranged from 31.0^oC (in-flight) to 48.6^oC (hover). Heart rate was greatest during hover and on-deck (range: 89.9 to 145.0 beats/min) without an ice vest, yet was significantly reduced with ice (range: 79.7 to 86.0 beats/min) (p<0.05). Rectal temperature was not found to be different between vest and non-vest conditions; however, change across flight phases in both conditions was significant (p<0.05). Analysis of variance demonstrated significantly lower mean weighted skin temperatures (p<0.05) when wearing the ice vest. These data suggest that wearing a protective cooling vest can reduce the heat strain associated with helicopter flight in high heat environments.

Abstract Number: 135993
Title: Personality Profiles of U.S. Army Helicopter Pilots Screened for Special Operations Duty
Author(s): CALDWELL, J.A.; O'HARA, C.; CALDWELL, J.L.; STEPHENS, R.L.; KRUEGER, G.P.
Source: Military Psychology
Year: 1993
Volume: 5
Issue: 3
Pages: 187-199
Number of References: 12
Original Language: English
Classification Term(s): Personality and temperament; Questionnaires and surveys; SELECTION AND SCREENING
Classification Number(s): 05-03-00; 43-00-00; 64-05-00
Application(s): Aircrew; Helicopters
Abstract:
Minnesota Multiphasic Personality Inventory (MMPI) data were analyzed from two groups of aviators: U.S. Army helicopter pilots being screened for acceptance into U.S. Army Special Operations and helicopter pilots participating in a variety of research studies at the U.S. Army Aeromedical Research Laboratory. Using analysis of variance procedures, it was found that the two groups differed in terms of their scores on some validity scales and several clinical scales. Using discriminant analysis, observed differences in both test-taking attitude (K scores) and Masculinity-Femininity (Mf scores) classified subjects into Special Operations applicants or `more conventional' aviators with an accuracy ranging from 66% (for the entire sample) to 76% (for the age-matched groups on which the discriminant function was based).

Abstract Number: 136491
Title: Fatal Mishap Report: First SPH-4B Flight Helmet Recovered from a U.S. Army Helicopter Mishap
Author(s): BRUCKART, J.E.; MCENTIRE, B.J.; LICINA, J.R.; BRANTLEY, D.K.; SHANAHAN, D.F.
Source: Aviation, Space, and Environmental Medicine
Year: 1993
Volume: 64
Issue: 8
Pages: 755-759
Number of References: 16

Original Language: English
Classification Term(s): Headgear; Injuries resulting from accidents; Surveys, statistics and analysis; Whole body acceleration and deceleration
Classification Number(s): 51-09-01; 32-02-00; 48-01-00; 50-01-00
Application(s): Aircrew
Abstract:
The most common cause of death in helicopter accidents is head injury. Flight helmets can be designed to distribute and attenuate crash forces to the head. Experience derived from crashes using the U.S. Army, SPH-4 flight helmet has led to modifications to improve protection. Within the past year, the Army has introduced the SPH-4B flight helmet which includes several new features to reduce injury in future mishaps. The first SPH-4B flight helmet recovered from a fatal mishap is described and correlated with the injuries to the wearer. The new shell and liner reduced the impact forces to the head. There were no side impacts to determine the performance of the crushable earcups in the helmet. The new SPH-4B flight helmet has several new and distinctive features that should improve survival in future helicopter crashes. Careful study of life support equipment retrieved from crashes is important to understand how the equipment performs in the crash environment.

Abstract Number: 104794
Title: A Methodology for Predicting Crew Workload in New Weapon Systems
Author(s): ALDRICH, T.B.; SZABO, S.M.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1986
Volume: -
Issue: -
Pages: 633-637
Number of References:
Original Language: English
Classification Term(s): Workload demands; Mental workload; Task analysis; Team work
Classification Number(s): 41-03-05; 07-01-00; 41-02-03; 63-05-01
Application(s): Armed forces; Helicopters
Abstract:
The Army currently is evaluating the feasibility of single-crewmember operation of a multipurpose, lightweight helicopter, designated the LHX. To determine if a single operator can perform the LHX scout and attack missions, 29 mission segments were analysed for excessive workload. The mission segments were divided into flight control support, and mission functions; the functions were divided into performance elements (tasks) and were positioned on mission segment timelines. For each performance element, the man-machine interface was identified and estimates of the visual, auditory, cognitive, and psychomotor components of workload were assigned. The mission/task/workload data were used to build one- and two-crewmember computer models designed to predict total workload and to identify overloads in each mission segment. Two baseline analyses were conducted to predict workload under low-automation conditions for one- and two-crewmember LHX configurations. In addition, iterative analyses were conducted to predict the reduction in workload associated with each of 26 individual automation options and 16 combinations of options. The methodology provides a systematic means of predicting human operator workload in advance of system design.

Abstract Number: 104991
Title: A Trilevel Interaction Design Model for Pilot Part-Task Training
Author(s): ROMAN, J.H.; PISTONE, R.A.; STODDARD, M.L.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1986
Volume: -
Issue: -
Pages: 126-130
Number of References:
Original Language: English
Classification Term(s): Use of simulators; Experience and practice; Long term memory and semantic memory; TRAINING; Use of expert opinion
Classification Number(s): 63-02-00; 02-09-04; 04-04-00; 44-00-00; 63-12-00
Application(s): Aircrew; Computer-aided instruction; Helicopters
Abstract:
Development of effective, scenario-driven training exercises requires both an instructional design and a delivery system that match the subject domain and needs of the students. The Training Rsearch Team at Los Alamos National Laboratory conducts research and development of prototype training systems. One of the Team's efforts is a joint research project, supported with funding and behavioural science guidance from the Army Research Institute, to develop a prototype part-task trainer for student helicopter pilots. The Team designed a 'trilevel interaction' model and a Level III interative videodisc delivery system for this project. The model, founded on instructional and psychological theory, should be transferable to other domains where part-task training is appropriate.

Abstract Number: 105294
Title: Effects of Chemical Defense Antidotes (Atropine) on Aviator Performance (Simulated Flight and Zero Input Tracking Analyzer)
Author(s): STONE, L.W.; SIMMONS, R.R.; JONES, H.D.; CARTER, D.J.; CHRISTIANSEN, R.S.

Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1986
Volume: -
Issue: -
Pages: 1187-1191
Number of References:
Original Language: English
Classification Term(s): Drugs; Manual control; Use of simulators
Classification Number(s): 06-07-00; 02-11-05; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
Army aviation is at serious risk in chemical and biological warfare environments. One of the potential countermeasures for aviators against the chemical threat is the development of antidote and pretreatment drugs. Just as the chemical agent carries the threat of degrading aviator performance, antidote and pretreatment drugs could independently produce problems either alone or in combination with an agent. This paper briefly outlines part of the first phase of a systematic program using controlled, simulated flight conditions and a Zero Input Tracking Analyzer (ZITA) to identify and measure flight performance and psychomotor effects of unchallenged atropine (one of the chemical defense antidotes) on aviators. Each of 12 U.S. Army helicopter aviators voluntarily received three dosages: 0 mg (saline solution), 2 mg of atropine sulfate, and 4 mg of atropine sulfate. Results indicate that simulator flight performance data did prove to be sensitive in identifying and measuring effects of 4 mg of atropine. Additionally, some ZITA tests showed a statistically significant degradation with the 4 mg dosage.

Abstract Number: 105358
Title: Effects of Stimulus Characteristics and Task Demands on Pilots' Perception of Dichotic Messages
Author(s): WENZEL, E.M.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1986
Volume: -
Issue: -
Pages: 1177-1181
Number of References:
Original Language: English
Classification Term(s): Auditory communication; Attention, time sharing and resource allocation; Information and communication design for health and safety; Mental workload; Voice output and speech synthesis
Classification Number(s): 09-01-00; 02-11-03; 07-01-00; 23-02-00; 51-05-00
Application(s): Aircrew; Helicopters
Abstract:
The experiment is an initial investigation of pilot performance when auditory advisory messages are presented dichotically, either with or without a concurrent pursuit task requiring visual/motor dexterity. The dependent measures were percent correct and correct reaction times for manual responses to the auditory messages. Two stimulus variables which show facilitory effects in traditional dichotic-listening paradigms, differences in pitch and semantic content of the messages, were examined to determine their effectiveness during the functional stimulation of helicopter pursuit. In an effort to further manipulate task demands competition between pairs of subjects was varied; subjects accumulated points for the advisory messages for accuracy alone or for both accuracy and reaction times which were faster than their opponent's. In general, the combined effects of the stimulus and task variables are additive. When interactions do occur they suggest that an increase in task demands can sometimes mitigate, but usually does not remove, any processing advantages accrued from stimulus characteristics. The implications of these results for cockpit displays are discussed.

Abstract Number: 105441
Title: Development and Evaluation of a Proportional Displacement Sidearm Controller for Helicopters
Author(s): KRUK, R.V.; RUNNINGS, D.W.; KING, M.; LIPPAY, A.L.; MCKINNON, G.M.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1986
Volume: -
Issue: -
Pages: 865-869
Number of References:
Original Language: English
Classification Term(s): Multifunction controls ; Control dynamics; Joysticks; Kinaesthetic and proprioceptive processes; Rating and ranking; Use of simulators; Use of test rigs
Classification Number(s): 21-17-00; 02-05-00; 21-09-00; 25-04-00; 63-02-00; 63-02-01; 64-06-00
Application(s): Aircrew; Helicopters
Abstract:
Associated with the development of fly-by-wire control systems for use in helicopters has been the prospect of replacing all of the current manual flight controls in the cockpit with a single sidearm controller. For the most part, the technology available for this concept has consisted of variations of force sensing sidearm controllers. The human proprioceptive system, however, does not perform optimally in force discrimination and stable

maintenance of force outputs. One consequence of this is that operator feedback with respect to direction and magnitude of control input with force sensing manual control systems is relatively poor. An alternative approach applying proportional displacement sensing rather than force sensing was developed and evaluated via laboratory studies and flight tests in a research helicopter. The results to date indicate that pilot workload and performance with a displacement sensing controller are equivalent to conventional controls and superior to a force sensing controller across a wide spectrum of flight conditions and manoeuvres. All four control functions (i.e. roll, pitch, yaw, and collective) were in one hand in both the force and displacement sensing configurations. A sidearm controller utilizing displacement sensing rather than force sensing retains most of the advantages of the latter (e.g. simplicity, compactness) while offering superior compatibility with human operator sensorimotor characteristics.

Abstract Number: 105459
Title: Recognition of Synthesized, Compressed Speech in Noisy Environments
Author(s): GARDNER, D.J.; BARRETT, B.; BONNEAU, J.R.; DOUCET, K.; VANDERWEYDEN, P.; DRESEL, K.M.
Source: A Cradle for Human Factors. Proceedings of the Human Factors Society 30th Annual Meeting, Dayton, Ohio, September 29-October 3, 1986. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1986
Volume: -
Issue: -
Pages: 927-930
Number of References:
Original Language: English
Classification Term(s): Voice output and speech synthesis; Communication and masking in noise; Intelligibility
Classification Number(s): 23-02-00; 09-01-02; 30-03-03
Application(s): Helicopters
Abstract:
The purpose of the present study was to investigate the recognition of synthesized, compressed speech under helicopter noise vs. ambient noise conditions. Subjects performed an isolated word recognition task for stimuli generated by the VOTAN V-5000A speech synthesizer/recognizer. Results indicated that recognition performance, both in terms of percentage correct and average response time, deteriorated as a function of speech compression and level of noise. Implications of these results for the employment of compressed, synthesized speech warning systems in rotary wing aircraft are discussed.

Abstract Number: 105685
Title: Military Training and Human Factors Contributions to the British Simulation Industry
Author(s): CRAMPIN, T.
Source: Contemporary Ergonomics 1987, Edited by E.D. Megaw. Taylor and Francis, London
Year: 1987
Volume: -
Issue: -
Pages: 110-116
Number of References:
Original Language: English
Classification Term(s): TRAINING; Modelling and simulation; Task analysis; Use of simulators
Classification Number(s): 44-00-00; 63-01-00; 63-02-00; 63-05-01
Application(s): Aircraft; Aircrew; Helicopters
Abstract:
This paper describes, by example, how human factors has made a valuable contribution to simulation and military training. The appropriate application to task analysis techniques deployed in a commercial environment is explained. Examples include flight refuelling and helicopter low-level operations. A brief explanation is provided on the importance of matching the technology to the human skills to be trained. The paper concludes by highlighting the important role played by Universities and Research Establishments. The value of marketing human factors in a manner understood by the non-expert is emphasised.

Abstract Number: 106916
Title: A Qualitative Model of Human Interaction with Complex Dynamic Systems
Author(s): HESS, R.A.
Source: IEEE Transactions on Systems, Man, and Cybernetics
Year: 1987
Volume: SMC-17
Issue: 1
Pages: 33-51
Number of References:
Original Language: English
Classification Term(s): Modelling human characteristics ; Allocation of function; Human performance; Mental workload; Protocol analysis; System performance and evaluation; Tracking movements; User's model, mental models and cognitive maps
Classification Number(s): 63-01-01; 02-10-04; 02-11-00; 05-10-00; 07-01-00; 37-10-00; 38-01-00; 63-13-00
Application(s): Aircrew; Helicopters
Abstract:

A qualitative model describing human interaction with complex dynamic systems is developed. The model is hierarchical in nature and consists of three parts: a behaviour generator, an internal model, and a sensory information processor. The behaviour generator is responsible for action decomposition, turning higher level goals or missions into physical action at the human-machine interface. The internal model is an internal representation of the environment which the human is assumed to possess and is divided into four submodel categories. The sensory information processor is responsible for sensory composition. All three parts of the model act in consort to allow anticipatory behaviour on the part of the human in goal-directed interaction with dynamic systems. Human workload and error are interpreted in this framework, and the familiar example of an automobile commute is used to illustrate the nature of the activity in the three model elements. Finally, with the qualitative model as a guide, verbal protocols from a manned simulation study of a helicopter instrument landing task are analysed with particular emphasis on the effect of automation on human-machine performance.

Abstract Number: 107848
Title: Determination of Clothing Microenvironment Volume
Author(s): SULLIVAN, P.J.; MEKJAVIC, I.B.; KAKITSUBA, N.
Source: Ergonomics
Year: 1987
Volume: 30
Issue: 7
Pages: 1043-1052
Number of References:
Original Language: English
Classification Term(s): Clothing ensembles; Instrument recording; Materials for clothing; Static body measurements; Thermal comfort; Thermal equipment; Thermal stress
Classification Number(s): 51-09-05; 03-04-01; 33-04-00; 33-07-00; 51-09-06; 51-10-03; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
An improved method has been developed for determining the microenvironment volume of protective clothing assemblies. Subjects wearing four different helicopter pilot suits were enclosed in an impermeable polyvinyl outer suit. Air from within the enclosed environment was evacuated at a constant rate with a vacuum source until internal pressure decreased to -30 H₂O. The volume of air evacuated from the microenvironment was estimated by integrating the exhaust flow rate. The inherent compliance of the polyvinyl outersuit was first converted into the volume Ve, during the trials for subjects wearing only jogging shorts. The clothing microenvironment volume (Vmicro)) was then calculated by subtracting Ve from the volume evacuated while subjects wore suits. The observed inter-individual variations in microenvironment volume reflect the subjects' different body sizes. It is concluded, that the new method enables faster determinations of Vmicro and allows correction for the inherent compliance of the polyvinyl outersuit. In addition, the present method allows more objective determination of Vmicro compared to the original method as proposed by Crockford and Rosenblum (1974).

Abstract Number: 108718
Title: Attention Theory and Training Research
Author(s): CONNELLY, J.G.; WICKENS, C.D.; LINTERN, G.; HARWOOD, K.
Source: Rising to New Heights with Technology. Proceedings of the Human Factors Society 31st Annual Meeting, New York City, October 19-23, 1987. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1987
Volume: -
Issue: -
Pages: 648-651
Number of References:
Original Language: English
Classification Term(s): TRAINING; Attention, time sharing and resource allocation; Manual control; Tracking movements
Classification Number(s): 44-00-00; 02-10-04; 02-11-03; 02-11-05
Application(s): Aircrew; Helicopters
Abstract:
This study used elements of attention theory as a methodological basis to decompose a complex training task in order to improve training efficiency. The complex task was a microcomputer flight simulation where subjects were required to control the stability of their own helicopter while acquiring and engaging enemy helicopters in a threat environment. Subjects were divided into whole-task, part-task, and part/open loop adaptive task groups in a transfer of training paradigm. The effect of reducing mental workload at the early stages of learning was examined with respect to the degree that subordinate elements of the complex task could be automated through practice of consistent, learnable stimulus-response relationships. Results revealed trends suggesting the benefit of isolating consistently mapped sub-tasks for part-task training and the presence of a time-sharing skill over and above the skill required for the separate subtasks.

Abstract Number: 108830
Title: Constant Wear Thermal Protection Garments for Helicopter Personnel
Author(s): MEKJAVIC, I.B.; SULLIVAN, P.J.
Source: Environmental Ergonomics, Edited by I.B. Mekjavic, E.W. Banister and J.B. Morrison. Taylor & Francis, London
Year: 1988
Volume: -

Issue: -
Pages: 240-263
Number of References:
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; Combined measures and indices; High temperature; Low temperature; Materials for clothing; Reviews; Thermal equipment
Classification Number(s): 51-09-05; 01-04-00; 03-02-04; 33-01-01; 33-01-02; 51-09-06; 51-10-03; 65-07-00
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 109438
Title: Cockpit Automation Concept Development for the NUH-60 (STAR) Aircraft
Author(s): RILEY, D.D.; STRINGER, P.G.
Source: Rising to New Heights with Technology. Proceedings of the Human Factors Society 31st Annual Meeting, New York City, October 19-23, 1987. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1987
Volume: -
Issue: -
Pages: 1383-1387
Number of References:
Original Language: English
Classification Term(s): DISPLAY AND CONTROL CHARACTERISTICS; Allocation of function; AUDITORY DISPLAYS; INPUT DEVICES AND CONTROLS; Team work; VISUAL DISPLAYS
Classification Number(s): 25-00-00; 21-00-00; 22-00-00; 23-00-00; 38-01-00; 41-02-03
Application(s): Aircraft; Helicopters
Abstract:
A study was performed to derive an automation and avionics integration design concept for the NUH-60 Systems Testbed for Avionics Research (STAR) aircraft. The STAR, a one-of-a-kind reconfiguration of the UH-60 Black Hawk helicopter, is being developed by the U.S. Army Avionics Research and Development Activity to provide a flight demonstrator and research vehicle for state-of-the-art cockpit technology. The work was directed toward determining cockpit design preferences associated with single-pilot performance of the Army scout and utility missions. Emphasis was placed on high workload phases of the missions during which eyes-out-of-the-cockpit and hands-on-controls performance capabilities would be most crucial. A number of cockpit-based design alternatives in the areas of communication, navigation, aircraft survivability equipment (ASE) operations, subsystem status monitoring, and aircraft performance computation and prediction were systematically derived and proposed.

Abstract Number: 111487
Title: Investigation of an Automatically Adjustable Energy Absorber
Author(s): GLATZ, J.D.; WARRICK, J.C.
Source: Proceedings of the 25th Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 16-19, 1987. The Association, Newhall, California, USA
Year: 1987
Volume: -
Issue: -
Pages: 183-189
Number of References:
Original Language: English
Classification Term(s): Seating; Manikins and fitting trials; Static body measurements; Use of test rigs; Whole body acceleration and deceleration; Workplace and equipment design for health and safety
Classification Number(s): 28-04-01; 03-04-01; 32-02-00; 51-07-00; 63-02-01; 63-04-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:
Occupants involved in helicopter accidents in which the structural integrity of the airframe is maintained, may sustain disabling spinal injuries unless crashworthy, energy absorbing seats are employed. Current energy absorbing seat systems use load limiting devices to reduce these potentially injurious occupant decelerations. The first type developed was designed with `fixed' energy absorber limit loads set for the 50th percentile occupant weight. However, they perform inefficiently at the extremes of the occupant weight range. More recent configurations provide optimum performance regardless of occupant weight. This is attained by permitting the occupant to adjust the limit load of the seat's energy absorber according to his weight. A drawback to these systems is possible performance degradation if they are improperly adjusted. This paper describes a programme to investigate the performance of a developmental energy absorber system that passively adjusts for the occupant's weight.

Abstract Number: 111519
Title: An Analysis of Noise-Induced Hearing Loss in Army Helicopter Pilots
Author(s): FITZPATRICK, D.T.
Source: Aviation, Space & Environmental Medicine
Year: 1988
Volume: 59
Issue: 10
Pages: 937-941

Number of References:
Original Language: English
Classification Term(s): Exposure to noise; Age; Auditory equipment; Auditory sensitivity; Effects on the auditory system; Experience and practice
Classification Number(s): 30-03-00; 02-02-01; 04-01-00; 04-04-00; 50-03-00; 51-10-02
Application(s): Aircraft; Aircrew; Helicopters
Abstract:
Hearing loss in the aviation environment has been attributed to a variety of factors ranging from aircraft noise exposure to the ageing process. Consequently, this study was conducted to determine the relative contribution of age, total flight hours, type of aircraft, and use of hearing protection to hearing loss in U.S. Army aviators. Information from a survey of the aviators in an aviation brigade was combined with audiometric records to create the data file. The final study group, 83% of the unit aviators, was evaluated for hearing loss using two criteria: 1) existing U.S. army standards, and 2) four empirical categories of significant threshold shift. Data analysis suggests that hearing loss is primarily a function of noise exposure as measured by total flight hours. Age was found to be a less significant factor; aircraft type has no significant effect. The results indicate that combination hearing protection appears to significantly lower the risk of hearing loss.

Abstract Number: 111877
Title: An Update of State-of-the-Art Survival Items for USN/USMC Aircrew
Author(s): GILLESPIE, G.; SLOANE, M.
Source: Proceedings of the 25th Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 16-19, 1987. The Association, Newhall, California, USA
Year: 1987
Volume: -
Issue: -
Pages: 74-83
Number of References:
Original Language: English
Classification Term(s): Equipment for altitude and depth; Clothing; Emergency and warning devices; Evacuation procedures; Personal equipment; Reviews; Seating
Classification Number(s): 51-10-07; 01-04-00; 28-04-01; 51-06-01; 51-09-00; 51-10-00; 51-11-03
Application(s): Air safety; Aircrew; Helicopters
Abstract:
In an effort to upgrade the survival equipment provided to USN/USMC aircrew, a NAVAIR sponsored ad hoc committee meeting of aircrew personnel and survival equipment experts was held at NAS Miramar on 25-28 August, 1987. The objective was to establish the survival equipment needed for known survival environments and to identify, where possible, state-of-the-art items that would fulfill those needs. The specific survival equipment requirements of the ejection seat, fixed-wing/non-ejection seat, and the helicopter communities were examined separately by three subcommittees to identify deficiencies of current equipment, to develop requirements and to recommend off-the-shelf replacements/additions from military and commercial sources. A new list of approved survival items was developed by the committee to cover both general and specific requirements; the list will replace a previous one established at a similar committee meeting, held in 1970. In addition, survival equipment requirements requiring future product development were also identified.

Abstract Number: 111881
Title: Space Station Emergency Egress and EVA Lighting Considerations and Candidate Koch Hardware
Author(s): GROSS, H.G.
Source: Proceedings of the 25th Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 16-19, 1987. The Association, Newhall, California, USA
Year: 1987
Volume: -
Issue: -
Pages: 22-28
Number of References:
Original Language: English
Classification Term(s): Evacuation procedures; Design of illuminants; Illumination levels; Layout for illumination; Weightlessness; Workstation visibility and audibility
Classification Number(s): 51-11-03; 27-02-01; 29-01-00; 29-03-00; 29-04-00; 35-04-00
Application(s): Air safety; Aircraft; Astronautics; Helicopters; Space technology
Abstract:
The special conditions of the Space Station result in a unique set of scenarios, both inside and outside the spacecraft, which relate to emergency situations. Careful analysis is needed to determine the best method for providing both normal and emergency egress/ingress lighting for such situations. The effects of zero G, orbital velocity, inside atmospheric pressure, outside vacuum and modes of traverse, are discussed regarding the unusual emergency situations that can arise. Readiness for such eventualities needs to be anticipated for the 30 year life of the Space Station. The `worst cases' for lighting are those that produce adverse optical conditions that persist in the zero G condition. Examples that can occur inside are: accidental or explosive dispersion of particulates/aerosols into the cabin air; smoke from a fire; spacecraft rupture by a meteoroid or by space debris, resulting in depressurization and condensation of cabin moisture into fog. Examples that can occur outside are: accidental rupture or explosion of stored materials, resulting in their dispersion throughout the area; collision of space objects generating millions of hazardous fine particles; puncture of an astronaut's life support system by these; exhaust from spacecraft/missile engines or their nearby explosion. The advantages of certain features of newly developed lighting devices and systems for Space Station internal emergencies, and normal and emergency EVA lighting, particularly for adverse optical conditions, are discussed. Much is based on the latest

research and development for helicopter and commercial airliner emergency egress lighting that is relevant.

Abstract Number: 111923
Title: Energy Absorbing System Design and Evaluation Using a Discrete Element Model of the Spine
Author(s): PRIVITZER, E.
Source: Proceedings of the 25th Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 16-19, 1987. The Association, Newhall, California, USA
Year: 1987
Volume: -
Issue: -
Pages: 190-195
Number of References:
Original Language: English
Classification Term(s): Modelling human characteristics ; Biomechanics; Seating; Whole body acceleration and deceleration; Workplace and equipment design for health and safety
Classification Number(s): 63-01-01; 03-04-00; 28-04-01; 32-02-00; 51-07-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:
The Head-Spine Model (HSM) is a highly-discretized 3-D idealization of the mechanical behaviour of the human head-spine-torso structure. It was developed to study the dynamic response of this structure to high-G impact loads transmitted along the spine. This paper describes the application of the HSM to both the design and the evaluation of energy absorbing seats/systems (EAS). The model's spinal injury prediction feature, which is referred to as the Spinal Injury Function (SIF) and is used to evaluate the severity of 3-D impact environments, makes it an ideal analytical tool for these types of applications. The crash attenuating performances of two types of vertically stroking helicopter crew seats were evaluated in a relative sense by comparing the HSM-SIF and internal load predictions from simulations of high-G impact tests conducted with the seats. An EAS model was developed and coupled to the HSM. This model consists of a deformable element representing the energy absorbing characteristics of, for example, an inverted tube type of energy absorber. The application of the HSM plus EAS model to the design of an energy absorber was demonstrated by determining the stroking load which corresponded to a specified limit on the HSM-SIF.

Abstract Number: 113021
Title: Helicopter Human Factors
Author(s): HART, S.G.
Source: Human Factors in Aviation, Edited by E.L. Wiener and D.C. Nagel. Academic Press, San Diego
Year: 1988
Volume: -
Issue: -
Pages: 591-638
Number of References: 90
Original Language: English
Classification Term(s): Introduction of ergonomics; Display layout; Multifunction controls ; Multifunction displays; Night vision devices; Noise levels; Stimulus-response compatibility; Thermal stress; VIBRATION; Virtual displays; Workload demands
Classification Number(s): 01-08-00; 21-17-00; 22-01-06; 22-05-01; 22-06-00; 25-03-00; 25-06-01; 30-01-00; 31-00-00; 33-04-00; 41-03-05
Application(s): Aircrew; Armed forces; Helicopters
Abstract:

Abstract Number: 113316
Title: TASKILLAN: A Simulation to Predict the Validity of Multiple Resource Models of Aviation Workload
Author(s): WICKENS, C.D.; HARWOOD, K.; SEGAL, L.; TKALCEVIC, I.; SHERMAN, B.
Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1988
Volume: -
Issue: -
Pages: 168-172
Number of References: 13
Original Language: English
Classification Term(s): Mental workload; Attention, time sharing and resource allocation; CHOICE OF COMMUNICATION MEDIA; Error, accuracy, reliability and frequency; Modelling human characteristics; Rating and ranking; Use of simulators; Workload demands
Classification Number(s): 07-01-00; 02-11-03; 10-00-00; 41-03-05; 63-01-01; 63-02-00; 64-06-00; 65-03-00
Application(s): Aircrew; Helicopters
Abstract:
The objective of this research was to establish the validity of predictive models of workload in the context of a controlled simulation of a helicopter flight mission. The models that were evaluated contain increasing levels of sophistication regarding their assumptions about the competition for processing resources underlying multiple task performance. Ten subjects performed the simulation which involved various combinations of a low level flight task with three cognitive side tasks, pertaining to navigation, spatial

awareness and computation. Side task information was delivered auditorily or visually. Results indicated that subjective workload is best predicted by relatively simple models that simply integrate the total demands of tasks over time (r = 0.65). In contrast, performance is not well predicted by these models (r less than 0.10), but is best predicted by models that assume differential competition between processing resources (r = 0.47). The relevance of these data to predictive models and to the use of subjective measures for model validation is discussed.

Abstract Number: 113591
Title: Simulator Sickness in U.S. Navy Flight Simulators
Author(s): KENNEDY, R.S.; LILIENTHAL, M.G.; BERBAUM, K.S.; BALTZLEY, D.R.; MCCAULEY, M.E.
Source: Aviation, Space & Environmental Medicine
Year: 1989
Volume: 60
Issue: 1
Pages: 10-16
Number of References: 24
Original Language: English
Classification Term(s): Motion sickness; Checklists; Circadian rhythms; TRAINING; Use of simulators; Visual fatigue
Classification Number(s): 32-03-00; 06-02-01; 06-04-01; 44-00-00; 63-02-00; 64-02-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Flight simulators have become a major factor in pilot training. A general finding from Navy research on simulator design is that equipment features that offer faithful representation improve pilot performance and promote pilot acceptance. To the extent that an aircraft produces motion sickness, its simulator should induce the same result. However, reports of simulator sickness appear to be increasing and a shortcoming in simulation is implied when these effects occur in simulators during manoeuvres that do not occasion them in the aircraft. This article presents incidence data from surveys of the 10 simulators at 6 different Naval/Marine Corps Air Stations. Approximately 1,200 simulator flights were recorded. Some severe motion sickness symptoms were recorded and some simulators induced unsteadiness afterwards. Individuals experiencing effects may be at risk if they drive themselves home or return to demanding activities at work. The simulators which exhibited the highest incidences of sickness were helicopter simulators with cathode ray tube (CRT) infinity optics and six-degree-of-freedom moving base systems. Of those studied, fixed-wing, fixed-base, dome displays had relatively low incidence of simulator sickness.

Abstract Number: 114735
Title: Special Considerations for Helicopter Safety
Author(s): ADAMS, R.J.
Source: Aviation Psychology, Edited by R.S. Jensen. Gower Technical, Aldershot, Hampshire
Year: 1989
Volume: -
Issue: -
Pages: 210-230
Number of References: 15
Original Language: English
Classification Term(s): Surveys, statistics and analysis; Achievement; Causation models; DISPLAY AND CONTROL CHARACTERISTICS; Errors, accuracy and reliability; TRAINING
Classification Number(s): 48-01-00; 02-11-02; 05-05-00; 25-00-00; 44-00-00; 48-03-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:

Abstract Number: 114812
Title: A Computer-Based Safety Assessment for Flight Evacuation: SAFE
Author(s): SHIVELY, R.J.
Source: Riding the Wave of Innovation. Proceedings of the Human Factors Society 32nd Annual Meeting, Anaheim, California, October 24-28, 1988. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1988
Volume: -
Issue: -
Pages: 885-888
Number of References: 9
Original Language: English
Classification Term(s): Information and communication design for health and safety; Decision making and risk assessment; Evacuation procedures; USE OF SUPPORT
Classification Number(s): 51-05-00; 02-09-07; 46-00-00; 51-11-03
Application(s): Aircrew; Decision support systems; Helicopters; Medicine; Nursing
Abstract:
Recently, the U.S. emergency medical services (EMS) industry has received a great deal of negative publicity concerning its safety record. It has been noted that the EMS industry has an accident rate that is five times that of the rest of the helicopter industry (Harvey and Jensen, 1987; Harvey, 1986). While it is true that during 1987 and early 1988 the safety record has improved, the industry cannot become complacent. The National Transportation and Safety Board recently conducted a study of the EMS industry and returned specific recommendations for the FAA and NASA. One of the critical factors in EMS missions is the pilot's decision accept or reject a mission. This can often be

influenced by such factors as the urgency of the care required. This, along with other factors, may prompt a pilot to accept a mission of unacceptable risk. The present paper presents a computer-based decision aid, based upon earlier work by the Army and Coast Guard, to assist the pilot in objective assessment of the probable risk of an EMS mission. Data for validation of this technique will be collected at an EMS operator and from the EMS Safety Reporting Service.

Abstract Number: 115785
Title: Human Performance Models for Computer-Aided Engineering
Author(s): ELKIND, J.I.; CARD, S.K.; HOCHBERG, J.; HUEY, B.M.
Source: National Academy Press, Washington, D.C.
Year: 1989
Volume: -
Issue: -
Pages: 309pp
Number of References:
Original Language: English
Classification Term(s): PSYCHOLOGICAL ASPECTS; Cognitive processes; Human performance; Modelling and simulation; Modelling human characteristics ; Reviews; Visual processes
Classification Number(s): 02-00-00; 01-04-00; 02-01-00; 02-09-00; 02-11-00; 63-01-00; 63-01-01
Application(s): Aircrew; Helicopters
Abstract:
The Panel on Pilot Performance Models for Computer-Aided Engineering was formed by the National Research Council to conduct a study that would provide advice and guidance in a number of areas important for the Army-NASA Aircrew/Aircraft Integration (A³I) programme which is developing a prototype of a human factors computer-aided engineering (CAE) facility for the design of helicopter cockpits. The objectives of the study were to review current models of human performance; to identify those that would be most useful for the CAE facility; to identify limitations of the models; to provide guidance for the use of these models in the CAE facility; and to recommend research on models and modelling that might overcome existing limitations.

Abstract Number: 115787
Title: Combining Views
Author(s): HOCHBERG, J.
Source: Human Performance Models for Computer-Aided Engineering, Edited by J.I. Elkind, S.K. Card, J. Hochberg and B.M. Huey. National Academy Press, Washington, D.C.
Year: 1989
Volume: -
Issue: -
Pages: 159-165
Number of References: 38
Original Language: English
Classification Term(s): Visual processes; Eye and head movements; Monocular versus binocular vision
Classification Number(s): 02-01-00; 02-01-04; 02-01-10
Application(s):
Abstract:
Two quite different kinds of processes for combining views are required in the set of problems associated with nap of the earth (NOE) helicopter design: (1) the integration of successive views into a large or more inclusive perceived layout and (2) the combination of binocular views into a single cyclopean field from which information from the two individual views may or may not be retrievable. Models seem possible in restricted areas of both processes, but none currently meets the criteria listed in the introduction.

Abstract Number: 116159
Title: A Survey of U.S. Army Aeromedical Equipment
Author(s): MITCHELL, G.W.; ADAMS, J.E.
Source: Aviation, Space & Environmental Medicine
Year: 1989
Volume: 60
Issue: 8
Pages: 807-810
Number of References: 8
Original Language: English
Classification Term(s): EQUIPMENT DESIGN; Evacuation procedures; Questionnaires and surveys; System friendliness, usability and acceptability
Classification Number(s): 28-00-00; 37-01-00; 51-11-03; 64-05-00
Application(s): Ambulance service; Armed forces; Helicopters; Medicine
Abstract:
Medical equipment is necessary to support patients requiring air transportation, but it may not be compatible with the aviation environment. Aircraft systems may cause errors in the functioning of medical equipment, or that equipment may interfere with the aircraft. Medical equipment has been tested, primarily for fixed wing aircraft, to military standards by the U.S. Air Force. This study reports 1986 and 1987 surveys which document the use of such equipment on U.S. Army medical evacuation aircraft and compares items in current use to the U.S. Air Force's test results. Of the 115 different nonissue items reported in use, 32 have been formally evaluated, and 9 of those were judged unacceptable for use on aircraft. Only two items reported in the survey were tested inflight in helicopters. The remaining 83 items have not been tested. Helicopters have unique requirements, and the U.S. Army has begun a programme to evaluate medical equipment for helicopter use.

Abstract Number: 116201
Title: Accidental Hypothermia and Frost-Bite in Antarctica
Author(s): SULLIVAN, P.G.
Source: Medical Journal of Australia
Year: 1987
Volume: 146
Issue: 3
Pages: 155-158
Number of References: 28
Original Language: English
Classification Term(s): Low temperature; Body temperature regulation; Combined environments; Education, training and safety programmes; Effects on the cardiovascular system; Regional and geographical differences
Classification Number(s): 33-01-01; 03-02-04; 04-07-00; 36-02-00; 50-07-00; 51-02-00
Application(s): Exploration
Secondary Source: Safety and Health at Work. ILO-CIS Bulletin (CIS 88-630)
Abstract:
The author presents a case study of 2 members of an Antarctic expedition whose boat capsized near the shore, and who then had to swim ashore in 4^oC water. Once ashore they had to wait 6h for a rescue by helicopter, while wearing wet clothes and with minimal protection from the wind and exposure to subzero temperatures. At rescue, one patient had extensive frost-bite, a core temperature of 30^oC, and he was in deep mental stupour. The other victim was considerably less hypothermic and suffered from only mild frost-bite. Contrary to expectations, the man who fared much better was taller and thinner than the other man. The role of cold-weather training, extensive to outdoors experience and psychological preparation are discussed. The main treatment of the hypothermic patient was by rapid rewarming in a hot (40^oC) bath. He recovered completely in 3 days.

Abstract Number: 117202
Title: Design for Trainability: Assessment of Operational Complexity in Man-Machine Systems
Author(s): YUFIK, Y.M.; HARTZELL, E.J.
Source: Designing and Using Human-Computer Interfaces and Knowledge-Based Systems, Edited by G. Salvendy and M.J. Smith. Elsevier, Amsterdam
Year: 1989
Volume: -
Issue: -
Pages: 160-167
Number of References: 37
Original Language: English
Classification Term(s): Modelling human characteristics ; Design and development process; Task complexity; TRAINING
Classification Number(s): 63-01-01; 07-09-00; 38-02-00; 44-00-00
Application(s): Aircrew; Computer-aided design; Helicopters
Abstract:
This paper reports progress in the development of a computer-aided engineering system for the design of helicopter crewstations. The system will apply computational human factors methods to predict pilot training requirements early in the conceptual phase of design. The authors focus on operational complexity as one of the training predictors, and introduce methods for deriving complexity measures from design characteristics and pilot mental models. They argue that dependency graphs can be used to represent evolution of pilot models in the course of training, and propose complexity measures reflecting uncertainty resolved in graphs manipulation. They indicate motivations of this work, then describe pilot models, followed by key concepts of complexity assessment.

Abstract Number: 117367
Title: Predictive Performance Models and Multiple Task Performance
Author(s): WICKENS, C.D.; LARISH, I.; CONTORER, A.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 96-100
Number of References: 8
Original Language: English
Classification Term(s): Attention, time sharing and resource allocation; Charts and maps; Mental workload; Modelling human characteristics; Rating and ranking; Ratings and preferences; Statistical analysis and psychometrics; Workload demands
Classification Number(s): 02-11-03; 07-01-00; 08-02-03; 41-03-05; 63-01-01; 63-10-01; 64-06-00; 65-08-01
Application(s): Helicopters
Abstract:
This symposium presents five models that predict how performance of multiple tasks will interact in complex task scenarios. The models are discussed, in part, in terms of the assumptions they make about human operator divided attention. The different assumptions about attention are empirically validated in a multitask helicopter flight simulation reported in the present paper. It is concluded from this simulation that the most important assumption relates to the coding of demand level of different component tasks. The potential gains to be made multiple resource assumptions remain uncertain.

Abstract Number: 117454
Title: Review of Workload: Measurement and Prediction
Author(s): HENDY, K.C.; CAMPBELL, E.L.; LANDRY, L.N.; HAMILTON, K.M.
Source: Proceedings of the Human Factors Association of Canada 22nd Annual Conference, Toronto, Ontario, November 26-29, 1989. Human Factors Association of Canada, Mississauga, Ontario
Year: 1989
Volume: -
Issue: -
Pages: 31-39
Number of References: 41
Original Language: English
Classification Term(s): Mental workload; Combined measures and indices; Modelling and simulation; Modelling human characteristics ; Psychophysics and psychological scaling; Rating and ranking; Ratings and preferences; Task analysis
Classification Number(s): 07-01-00; 63-01-00; 63-01-01; 63-05-01; 63-11-00; 64-06-00; 65-07-00; 65-08-01
Application(s):
Abstract:
This paper reviews some issues in workload research and discusses the workload measurement and prediction methods under study at the Defence and Civil Institute of Environmental Medicine (DCIEM). Workload measurement has focused on the use of the NASA Task Load Index (TLX) with particular concern for: test-retest reliability; the relationship between individual scale values, overall workload scores, and ratings of global workload; and issues related to the method used to combine individual scale values into an overall workload rating. Workload prediction at DCIEM is based on task network simulations using the Micro SAINT simulation package. Task network simulations have been developed for crew activity in low-level helicopter operations and various workload models (both attentional demand and time-line based) have been compared for their ability to predict operator's perceived workload.

Abstract Number: 117465
Title: Simulation Assessment of a Pilot Visual Cue System for Shipboard Landings
Author(s): STAGER, P.; REID, L.
Source: Proceedings of the Human Factors Association of Canada 22nd Annual Conference, Toronto, Ontario, November 26-29, 1989. Human Factors Association of Canada, Mississauga, Ontario
Year: 1989
Volume: -
Issue: -
Pages: 277-281
Number of References: 11
Original Language: English
Classification Term(s): Design of graphics; Coding by colour; Error, accuracy, reliability and frequency; Mental workload; Modelling and simulation; Ratings and preferences; System dynamics; Use of simulators; Workload demands
Classification Number(s): 08-02-00; 07-01-00; 08-03-05; 37-04-00; 41-03-05; 63-01-00; 63-02-00; 65-03-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Simulation trials were conducted to assist in the development of a Pilot Visual Cue Subsystem (PVCS) to be used by helicopter pilots in making free-deck landings with the Indal Technologies Inc. RAST Mk III system. The simulation provided an elementary representation of a rotary wing aircraft and the dynamic visual scene associated with a landing on a Canadian Forces DDH 280 vessel. Six pilots from the Canadian Armed Forces with shipboard landing experience flew a variety of trials in the simulator. Flying performance could not be discriminated on the basis of the displays but pilot preferences indicated that two of the displays appeared to be acceptable for an operational environment and should be assessed in subsequent sea trials.

Abstract Number: 117579
Title: Touch Panel Sampling Strategies and Keypad Performance Comparisons
Author(s): BERINGER, D.B.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 71-75
Number of References: 10
Original Language: English
Classification Term(s): Comparison between input devices; Error, accuracy, reliability and frequency; Handgear; Membrane keyboards; Specialised keyboards; Touch panels; Touch screens and displays
Classification Number(s): 21-01-00; 21-02-03; 21-15-01; 21-15-02; 21-15-03; 51-09-02; 65-03-00
Application(s): Helicopters
Abstract:
A study was conducted to improve accuracy of touch input devices to be used in helicopter environments through serial sampling and minima selection algorithms. Neither first nor last contact point was congruent with a point of minimum error and sampling techniques were derived to reduce error without using 'touch-mouse' strategies, being most effective for the infrared panel. Wearing flight gloves and using the nonpreferred

hand had no practical detrimental effects on performance for a high-resolution touch input task. In a second study several types of mechanical keypads were compared with the two types of touch-input devices. Results obtained with this menu-selection task suggested no practical degradation in performance when substituting the touch input devices for bezel-mounted hardware keys. This was true of both error rate (in a qualified sense) and response time. It was concluded that the touch-input devices could provide flexibility for high-resolution input using maps and other spatial forms of data while allowing effective use of previously developed menus and menu-selection routines without the need for auxiliary bezel-mounted mechanical keys.

Abstract Number: 117604
Title: Instrument Scanning and Subjective Workload with the Peripheral Vision Horizon Display
Author(s): HAMELUCK, D.; STAGER, P.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 18-22
Number of References: 6
Original Language: English
Classification Term(s): Headup and projected displays; Eye and head movements; Mental workload; Rating and ranking; Ratings and preferences; Search; Status displays and boards; Workload demands
Classification Number(s): 22-05-00; 02-01-04; 02-09-01; 07-01-00; 22-09-00; 41-03-05; 64-06-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
The Peripheral Vision Horizon Display (PVHD) is an expanded artificial horizon line that is intended to provide the pilot with orientation information through peripheral vision. The potential advantage is a reduction in the requirement to constantly refer to the attitude indicator (AI) in order to maintain awareness of orientation during instrument meteorological conditions (IMC). Four helicopter pilots flew two types of instrument approaches to determine whether the degree to which pilots rely on the AI would be altered when the PVHD was in operation. Only two pilots showed a reduction in the visual workload associated with the need to scan the AI. The general trend in the data indicated an increase in subjective workload with the PVHD. It was argued that motion of the PVHD distracted the pilots from their routine instrument scan, although this result might not generalize to pilots more experienced with the display. It was concluded that the PVHD might be of significant benefit in situations where the pilot must look outside the cockpit and stable orientation cues are not visible.

Abstract Number: 117605
Title: Instrument Scanning and Subjective Workload with the Peripheral Vision Horizon Display
Author(s): HAMELUCK, D.; STAGER, P.
Source: Proceedings of the Human Factors Association of Canada 22nd Annual Conference, Toronto, Ontario, November 26-29, 1989. Human Factors Association of Canada, Mississauga, Ontario
Year: 1989
Volume: -
Issue: -
Pages: 83-87
Number of References: 6
Original Language: English
Classification Term(s): Headup and projected displays; Eye and head movements; Mental workload; Rating and ranking; Ratings and preferences; Search; Status displays and boards; Workload demands
Classification Number(s): 22-05-00; 02-01-04; 02-09-01; 07-01-00; 22-09-00; 41-03-05; 64-06-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
The Peripheral Vision Horizon Display (PVHD) is an expanded artificial horizon line that is intended to provide the pilot with orientation information through peripheral vision. The potential advantage is a reduction in the requirement to constantly refer to the attitude indicator (AI) in order to maintain awareness of orientation during instrument meteorological conditions. Four helicopter pilots flew two types of instrument approaches to determine whether the degree to which pilots rely on the AI would be altered when the PVHD was in operation. Only two pilots showed a reduction in the visual workload associated with the need to scan the AI. The data indicated an increase in subjective workload with the PVHD. It was argued that motion of the PVHD distracted the pilots from their routine instrument scan, although this result might not generalize to pilots more experienced with the display. It was concluded that the PVHD might be of significant benefit in situations where the pilot must look outside the cockpit and stable orientation cues are not visible.

Abstract Number: 118377
Title: Noise and Vibrations in Cabins and Oxygen Tents during Aircraft and Helicopter Transport Operations
Author(s): LINDBERG, L.; DAHLGREN, T.; LEDING, L.; LANDSTROM, U.
Source: National Board of Occupational Safety and Health (Arbetarskyddsstyrelsen), Solna, Sweden, Investigation Report 1989:15
Year: 1989

Volume: -
Issue: -
Pages: 37pp
Number of References: 6
Original Language: Swedish
Classification Term(s): NOISE; Combined environments; EQUIPMENT DESIGN; VIBRATION
Classification Number(s): 30-00-00; 28-00-00; 31-00-00; 36-02-00
Application(s): Aircraft; Helicopters; Medicine
Abstract:

Abstract Number: 118986
Title: The Use of Human Information Processing Models for Workload Prediction Using Task Network Simulations
Author(s): HENDY, K.C.; CAMPBELL, E.L.; SCHUCK, M.M.
Source: Contemporary Ergonomics 1990, Edited by E.J. Lovesey. Taylor & Francis, London
Year: 1990
Volume: -
Issue: -
Pages: 129-134
Number of References: 18
Original Language: English
Classification Term(s): Mental workload; Attention, time sharing and resource allocation; Modelling human characteristics ; Rating and ranking; Ratings and preferences; Task analysis
Classification Number(s): 07-01-00; 02-11-03; 63-01-01; 63-05-01; 64-06-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Methods based on task network simulations represent one increasingly used technique for front-end human engineering analysis. The objective of the work reported in this paper was to compare a number of human information processing models for their ability to predict subjective workload when used with task network simulations of low-level helicopter operations. Attentional demand models, which considered the intensity of processing effort of tasks, were found to best predict subjective workload. Those models which considered the portion of time an operator was occupied, or the number of tasks serviced, were the worst predictors.

Abstract Number: 119129
Title: Lumbar Support in Seating: Effects on Erector Spinae Muscle Activity, Posture and Discomfort
Author(s): MESSENGER, A.J.; GRIFFIN, M.J.
Source: Contemporary Ergonomics 1990, Edited by E.J. Lovesey. Taylor & Francis, London
Year: 1990
Volume: -
Issue: -
Pages: 293-298
Number of References: 6
Original Language: English
Classification Term(s): Seating; Biomechanics; Instrument recording; Posture; Rating and ranking; Ratings and preferences
Classification Number(s): 28-04-01; 03-04-00; 03-04-04; 63-09-03; 64-06-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Fourteen male subjects were asked to sit in a helicopter pilot's seat fitted with five alternative lumbar supports varying in thickness from 0 to 80 mm. Electromyographic (EMG) activity and back posture were measured and discomfort ratings obtained. Increasing the lumbar support thickness from 0 to 80 mm increased lumbar lordosis. The thoracic region of the erector spinae muscles appeared to be the most sensitive to changes in lumbar support thickness: increasing lumbar support thickness significantly reduced EMG activity. In the lumbar region of the erector spinae muscles, EMG activity was lowest with no lumbar support. Increasing lumbar support thickness produced few other significant changes but a general increase in muscle activity in the lumbar region. Ratings for discomfort in the lower back and overall discomfort was greatest with the 80 mm lumbar support.

Abstract Number: 120121
Title: Development and Evolution of the U.S. Army SPH-Series Aircrew Helmet
Author(s): PALMER, R.W.
Source: Proceedings of the 27th Annual Symposium of the SAFE Association, New Orleans, Louisiana, December 5-8, 1989. SAFE Association, Newhall, California, USA
Year: 1990
Volume: -
Issue: -
Pages: 102-107
Number of References: 14
Original Language: English
Classification Term(s): Headgear; Equipment for altitude and depth; Use of test rigs; Whole body acceleration and deceleration
Classification Number(s): 51-09-01; 32-02-00; 51-10-07; 63-02-01
Application(s): Aircrew; Armed forces; Helicopters

Abstract:
The Sound Protective Helmet (SPH-4), a derivative of the Navy SPH-3, has been used by the Army since 1970. As our knowledge of crash environments and human impact tolerance has increased through analyses of aircraft accidents and laboratory research, the performance of the standard SPH-4 helmet has been reappraised continuously. As a result, this helmet has been upgraded to provide greater levels of impact protection. Improvements made in the helmet's liner, suspension assembly, retention assembly, and earcups have resulted in the improved performance of the SPH-4 helmet. Two new helmets have evolved from the SPH-4's course of development. They are the improved SPH-4 and the Head Gear Unit, Personal (HGU-56/P), which will replace the SPH-4 in the future. A third helmet, for use in the light helicopter experimental (LHX), currently is under development. This report presents and discusses, in chronological order, the improvements that have been made in impact protection and retention capabilities. The effects these improvements have had on the performance of the SPH-4 and the new helmets are also discussed. The SPH-4, the improved SPH-4, and the HGU-56/P are compared in terms of major design features, impact protection, and retention capabilities. The testing methodology currently used at the U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama, is also presented and discussed.

Abstract Number: 120187
Title: Human Engineering Methods and Aircrew Systems
Author(s): MANTON, J.G.; HUGHES, P.K.; FORD, C.M.
Source: Ergonomics, Technology and Productivity, Proceedings of the 25th Annual Conference of the Ergonomics Society of Australia, 26-29 November 1989. Ergonomics Society of Australia, Fortitude Valley, Queensland
Year: 1989
Volume: -
Issue: -
Pages: 81-93
Number of References: 25
Original Language: English
Classification Term(s): Task analysis; Human performance; Mental workload; Modelling human characteristics ; Rest pauses and work duration; Systems analysis; Team work; Workload demands
Classification Number(s): 63-05-01; 02-11-00; 07-01-00; 39-02-00; 41-02-03; 41-03-05; 63-01-01; 63-05-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The introduction of a complex system such as a new aircraft may give rise to unforeseen human-machine interface problems. There are, however, many human factors oriented tools which can be used to highlight the critical aspects of system performance. This paper explores the use of traditional diagram methods to describe and analyse operator tasks in a future military helicopter. It also shows how these task descriptions can be used to generate task networks of aircrew activities which can then be modelled by a suitable computer program such as Micro SAINT.

Abstract Number: 121595
Title: Back Disorders and Occupational Exposure to Whole-Body Vibration
Author(s): BOSHUIZEN, H.C.; BONGERS, P.M.; HULSHOF, C.T.J.
Source: International Journal of Industrial Ergonomics
Year: 1990
Volume: 6
Issue: 1
Pages: 55-59
Number of References: 3
Original Language: English
Classification Term(s): Effects on the musculo-skeletal system; Absenteeism; Standards, codes of practice, guidelines and recommendations; Vibration levels
Classification Number(s): 50-12-00; 01-05-00; 31-01-00; 54-01-00
Application(s): Agricultural vehicles; Aircrew; Cranes; Driving; Helicopters; Mechanical materials handling; Physically handicapped
Abstract:
During the past five years, a number of epidemiological studies on occupational exposure to whole-body vibration have been carried out at the Coronel Laboratory. These studies include both retrospective follow-up studies on long-term sick leaves and disability pensioning among crane-operators (N = 1,084) and tractor drivers (N = 423) and questionnaire studies on the prevalence of back pain among tractor drivers (N = 455), helicopter pilots (N = 133) and lift-truck drivers (N = 233). Measurements (according to the ISO 2631 (1985)) were conducted to establish the acceleration levels of the tractors, the helicopters and the lift-trucks. The prevalence of back pain, in most studies, was significantly higher among workers exposed to whole-body vibration compared to workers not exposed to whole-body vibration. Incidence rates of sick leave and disability pensioning due to back disorders, in particular intervertebral disc disorders, were in some studies higher in occupations that expose workers to whole body vibration. The relationship between the received vibration dose and the prevalence of back pain as observed in these studies is explored.

Abstract Number: 122633
Title: Taskillan II: Pilot Strategies for Workload Management
Author(s): SEGAL, L.D.; WICKENS, C.D.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1990

Volume: -
Issue: -
Pages: 66-70
Number of References: 25
Original Language: English
Classification Term(s): Performance strategies; Attention, time sharing and resource allocation; Mental workload; Output and productivity; Use of simulators; Workload demands
Classification Number(s): 02-11-04; 02-11-03; 07-01-00; 41-03-05; 63-02-00; 65-06-00
Application(s): Aircrew; Helicopters
Abstract:
This study focused on the strategies used by pilots in managing their workload level, and their subsequent task performance. Sixteen licensed pilots flew 42 missions on a helicopter simulation, and were evaluated on their performance of the overall mission, as well as individual tasks. Pilots were divided into four groups, defined by the presence or absence of scheduling control over tasks and the availability of intelligence concerning the type and stage of difficulties imposed during the flight. Results suggest that intelligence supported strategies that yielded significantly higher performance levels, while scheduling control seemed to have no impact on performance. Both difficulty type and the stage of difficulty impacted performance significantly, with strongest effects for time stress and difficulties imposed late in the flight.

Abstract Number: 123059
Title: Primary Flight Training Performance of Student Naval Aviators with Vision Waivers
Author(s): BOHNKER, B.; ANZALONE, F.; MITTELMAN, M.; MARKOVITS, A.
Source: Aviation, Space, and Environmental Medicine
Year: 1991
Volume: 62
Issue: 2
Pages: 162-164
Number of References: 11
Original Language: English
Classification Term(s): SELECTION AND SCREENING; Selection and screening for health and safety; TRAINING; Visual detection and acuity, contrast sensitivity and visual field
Classification Number(s): 43-00-00; 02-01-01; 44-00-00; 51-03-00
Application(s): Aircrew
Abstract:
Performance was studied for student naval aviators with waivers for defective uncorrected distance visual acuity who underwent primary flight training at NAS Whiting Field, FL, for fiscal year 1987 (cases = 45). Outcome variables were completion rate, primary flight training grades and flight hours. Controls for completion rate were all other students during that period (N = 1443). For training grades and hours, controls were selected who completed the same training squadron within 1 month of the case. Two controls were selected who progressed to the jet pipeline, with two additional controls selected who progressed to the same pipeline as the cases, either maritime/patrol or helicopter (controls = 180). Results demonstrated the cases were significantly more likely to complete training (p=0.029), but not significantly different in primary flight grades or hours. These results suggest student naval aviators on vision waivers were competitive with their contemporaries.

Abstract Number: 123243
Title: A Secondary Analysis Comparing Subjective Workload Assessments with U.S. Army Aircrew Training Manual Ratings of Pilot Performance
Author(s): STEWART, J.E.; LOFARO, R.J.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1990
Volume: -
Issue: -
Pages: 104-108
Number of References: 9
Original Language: English
Classification Term(s): Rating and ranking; Learning, skill development, knowledge acquisition and concept attainment; Ratings and preferences; Workload demands
Classification Number(s): 64-06-00; 02-09-09; 41-03-05; 65-08-01
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
The present research effort sought to determine the validity of subjective workload estimates for Aircrew Training Manual (ATM) tasks for the UH-60 helicopter generated via a modified Delphi technique. Delphi weights were found to predict performance ratings on the ATM tasks; ATM tasks associated with accidents also had higher Delphi weights than did those not so associated.

Abstract Number: 123321
Title: Tracking and Letter Classification under Dichoptic and Binocular Viewing Conditions
Author(s): GOPHER, D.; GRUNWALD, A.; STRAUCHER, Z.; KIMCHI, R.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1990
Volume: -

Issue: -
Pages: 1557-1561
Number of References: 5
Original Language: English
Classification Term(s): Monocular versus binocular vision; Attention, time sharing and resource allocation; Design of graphics; Error, accuracy, reliability and frequency; Eye pieces and glasses; Headup and projected displays; Manual control; Night vision devices; Time and speed
Classification Number(s): 02-01-10; 02-11-03; 02-11-05; 08-02-00; 22-01-03; 22-01-06; 22-05-00; 65-02-00; 65-03-00
Application(s): Helicopters
Abstract:
Subjects were required to fly a simulated helicopter path, while also classifying letter pairs presented intermittently at 5 retinal locations. Binocular and dichoptic conditions were compared by employing colour filters. Tracking under dichoptic conditions was strongly influenced by the absence of a common optical axis. Classification performance also deteriorated and was influenced by the conditions of tracking.

Abstract Number: 123512
Title: Effects of Noise and Workload on Performance with Two Object Displays vs. a Separated Display
Author(s): ZHANG, K.; WICKENS, C.D.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1990
Volume: -
Issue: -
Pages: 1499-1503
Number of References: 5
Original Language: English
Classification Term(s): Coding of information; Attention, time sharing and resource allocation; Coding by colour; Coding by shape; Coding by size; Graphs; Multifunction displays; Noise levels; Search; Time and speed
Classification Number(s): 08-03-00; 02-09-01; 02-11-03; 08-02-02; 08-03-01; 08-03-02; 08-03-05; 22-06-00; 30-01-00; 65-02-00
Application(s): Helicopters
Abstract:
This study examines the effects of stress on the processing of displayed information from two types of object displays, when dimensions were formed by the colour and size of a bar, by the height and width of a rectangle, and from a separated two bargraph display. Subjects either integrated information across the two dimensions of each display or focused attention on each dimension, in a simulated airborne decision task. In Experiment 1 (14 subjects), stress was imposed via three levels of workload of a concurrent visual search task. In Experiment 2 (14 subjects), it was imposed by 88 dB helicopter noise. Results indicated that information integration was best supported by the rectangle display at higher levels of workload. Both the colour bar and the bargraph display were associated with poor performance on the integration task, but were superior on the focused attention task. Hence, an emergent feature of the rectangle (its area), rather than objectness per se, was the critical element supporting information integration and disrupting focused attention. The imposition of noise enhanced the subjective feeling of stress. Noise did not influence performance on the decision task, but differentially affected the resources necessary to extract that information. Noise reduced the resource demands of both object displays and increased the resource demands of the separate bargraph display.

Abstract Number: 123805
Title: A Comparison of Two Types of Training Interventions on Team Communication Performance
Author(s): LASSITER, D.L.; VAUGHN, J.S.; SMALTZ, V.E.; MORGAN, B.B.; SALAS, E.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1990
Volume: -
Issue: -
Pages: 1372-1376
Number of References: 20
Original Language: English
Classification Term(s): TRAINING; Information systems and communication; Modelling system characteristics; Person-to-person communication; Team work
Classification Number(s): 44-00-00; 09-01-01; 41-02-03; 56-05-00; 63-01-02
Application(s): Aircrew; Helicopters; Videogames
Abstract:
The purpose of this research was to examine the effects of different types of training interventions on team communication. Forty-five teams of two persons each viewed one of three training videotapes (control, knowledge, and skills), then performed a low-fidelity helicopter simulation exercise. Trained raters were used to rate teams in terms of levels of their communications and mission performances. Finally, attitudes concerning aircrew coordination were measured before and after training using the Cockpit Management Attitude Questionnaire (CMAQ) developed by Helmreich, Wilhelm, & Gregorich (1988). Results indicated that team communication skills were affected by the type of training intervention the team received. Specifically, the communication of teams in the skills group was significantly better than that of the other two groups. No significant effect of training intervention was found for the mission performance or the attitude data, although a significant correlation was found between team communication performance and team

mission performance. These results are discussed in terms of their relevance to the design of training interventions for enhancing team training and performance.

Abstract Number: 123911
Title: Pre-Flight Risk Assessment in Emergency Medical Service (EMS) Helicopters
Author(s): SHIVELY, R.J.
Source: Countdown to the 21st Century. Proceedings of the Human Factors Society 34th Annual Meeting, Orlando, Florida, October 8-12, 1990. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1990
Volume: -
Issue: -
Pages: 1052-1056
Number of References: 10
Original Language: English
Classification Term(s): Rescue; Combined environments; Environmental design; Mental workload; Rating and ranking; Ratings and preferences; Workload demands
Classification Number(s): 51-11-01; 07-01-00; 36-02-00; 41-03-05; 49-05-00; 64-06-00; 65-08-01
Application(s): Air safety; Aircrew; Coast guards; Decision support systems; Expert systems; Helicopters; Medicine
Abstract:
The EMS industry has been the subject of several television and newspaper articles (Harvey and Jensen, 1987) which emphasized the negative aspects, (e.g., fatal accidents and high accident rates), rather than the life saving services performed. The accident rate of the EMS industry is five times as high as that of other civil helicopters. This high accident rate coupled with the dramatic rise in the number of programmes (from a single service at its inception in 1972 to over 180 today, Spray, 1987), prompted the National Transportation Safety Board (NTSB) to study the accidents that occurred between May 11, 1978 and December 3, 1986 (NTSB, 1988). The NTSB report concluded that 'Sound pilot judgment is central to safe flight operations'. They further stated that '... factors unique to EMS helicopter operations - such as the influence of the mission itself, program competition, and EMS program management perspectives - can drastically influence pilot judgment during the EMS mission'. One of the most difficult decisions that a pilot must make is whether to accept or decline a mission. A pre-flight risk assessment system (SAFE) was developed at NASA-Ames Research Center for civil EMS operations to aid pilots in making this decision objectively. The ability of the SAFE system to predict risk profiles of missions was tested at an EMS operator. The results of this field study demonstrated that the usefulness of SAFE was highly dependent on the type of mission flown.

Abstract Number: 124250
Title: The Human Factor in Situation Displays. Impact of an Air-to-Air Combat Task on Piloting Performance
Author(s): OATMAN, L.C.; MONTY, R.A.; LUKAS, J.H.; MALKIN, F.J.; DOMINESSY, M.E.
Source: Contemporary Ergonomics 1991, Edited by E.J. Lovesey. Taylor & Francis, London
Year: 1991
Volume: -
Issue: -
Pages: 101-106
Number of References:
Original Language: English
Classification Term(s): Coding of information; Charts and maps; CHOICE OF COMMUNICATION MEDIA; Coding by alphanumerics, words and abbreviations; Coding by graphic symbols, icons and pictograms; Information layout and format; Ratings and preferences; Search; Use of simulators
Classification Number(s): 08-03-00; 02-09-01; 08-02-03; 08-03-06; 08-03-08; 08-04-00; 10-00-00; 63-02-00; 65-08-01
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
This experiment compared three information display formats for presenting instructions to helicopter crews regarding which of several potential targets they were to engage. Text (alphanumerics), graphic (symbols), or numeric (digits) instructions were presented visually for the subsequent target acquisition search task while subjects were either serving as a copilot or simultaneously piloting a simulated aircraft. Each experimental condition was examined at two levels of task difficulty. Task difficulty was defined as the number of digits (two or four) in the track number which is used to identify the aircraft. Results and practical implications of the work are discussed.

Abstract Number: 126473
Title: Perceptual Style and Tracking Performance
Author(s): ATCHLEY, P.
Source: International Journal of Aviation Psychology
Year: 1991
Volume: 1
Issue: 3
Pages: 255-259
Number of References: 13
Original Language: English
Classification Term(s): Cognitive style; Error, accuracy, reliability and frequency; Manual control; Use of simulators
Classification Number(s): 05-09-00; 02-11-05; 63-02-00; 65-03-00

Application(s): Aircrew
Abstract:
The relationship between perceptual style and tracking of a target was examined. Four pilots were given the Embedded Figures Test to assess their degrees of field dependence or independence. Then they flew in a helicopter simulator and attempted to track an airborne target. A high negative correlation was found between perceptual style and tracking performance. Field-independent subjects were able to track the target for longer periods than field-dependent subjects.

Abstract Number: 126644
Title: Empirical Comparisons of Knowledge Acquisition Techniques
Author(s): MCCLOSKEY, B.P.; GEIWITZ, J.; KORNELL, J.
Source: Visions. Proceedings of the Human Factors Society 35th Annual Meeting, San Francisco, California, September 2-6, 1991. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1991
Volume: -
Issue: -
Pages: 268-272
Number of References: 16
Original Language: English
Classification Term(s): Knowledge engineering and acquisition; Interviews; Protocol analysis; Rating and ranking; Use of expert opinion
Classification Number(s): 17-05-00; 63-12-00; 63-13-00; 64-04-00; 64-06-00
Application(s): Aircrew; Expert systems
Abstract:
The degree to which a knowledge-acquisition technique (KAT) extracts useful information from a human expert varies, in large part, as a function of the type of expert system being developed. The present study employed two KATs, ARK (a structured-interview technique) and Repertory Grid (a similarity-judgement technique), to elicit knowledge from U.S. Army helicopter pilots with expertise in mission planning. The resultant knowledge bases were compared in terms of their applicability to two tasks: attack route evaluation and attack route planning. The study revealed important qualitative and quantitative differences in the knowledge bases elicited by the two KATs. The Repertory Grid method elicited dimensions with which the efficiency of attack routes could be classified and, in general, appears to be well-suited for use in development of 'convergent' expert systems intended to perform tasks involving categorization or evaluation. In contrast, ARK elicited procedural information (e.g., goals, strategies, and rules) with which route planning could be performed, and appears better suited for obtaining information to be used in the development of 'divergent' expert systems designed to conduct tasks involving planning or scheduling. The results have implications for the selection of KATS and the design of knowledge-elicitation sessions, and suggest that further analyses of the knowledge-acquisition process be conducted.

Abstract Number: 127282
Title: Elaboration of an Approach for Accompanying the Modernization Project of a Helicopter Electric Systems Manufacturing Unit
Author(s): BOSSARD, P.; BELLIES, L.; DOPPLER, F.
Source: Designing for Everyone: Proceedings of the 11th Congress of the International Ergonomics Association, Paris, Edited by Y. Queinnec and F. Daniellou. Taylor & Francis, London, Volume 2
Year: 1991
Volume: -
Issue: -
Pages: 1359-1361
Number of References:
Original Language: English
Classification Term(s): Introduction of ergonomics
Classification Number(s): 01-08-00
Application(s): Aircraft; Electronics industry; Helicopters
Abstract:

Abstract Number: 155217
Title: Skill Learning of Model Helicopter Maneuvering
Author(s): MASUDA, K.; NAGATA, M.; KANNO, T.; HAYAKAWA, S.
Source: From Experience to Innovation - IEA '97. Proceedings of the 13th Triennial Congress of the International Ergonomics Association, Tampere, Finland, June 29-July 4, 1997, Edited by P. Seppala, T. Luopajarvi, C.H. Nygard and M. Mattila. Finnish Institute of Occupational Health, Helsinki, Volume 3
Year: 1997
Volume: -
Issue: -
Pages: 55-57
Number of References: 3
Original Language: English
Classification Term(s): TRAINING; Learning, skill development, knowledge acquisition and concept attainment; Modelling system characteristics; Use of simulators
Classification Number(s): 44-00-00; 02-09-09; 63-01-02; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 156346

Title: Training Head Movement in Visual Scanning: An Embedded Approach to the Development of Piloting Skills with Helmet-Mounted Displays
Author(s): SEAGULL, F.J.; GOPHER, D.
Source: Journal of Experimental Psychology: Applied
Year: 1997
Volume: 3
Issue: 3
Pages: 163-180
Number of References: 35
Original Language: English
Classification Term(s): TRAINING; Eye and head movements; Headup and projected displays; Monocular versus binocular vision; Night vision devices; Search; Time and speed; Use of simulators
Classification Number(s): 44-00-00; 02-01-04; 02-01-10; 02-09-01; 22-01-06; 22-05-00; 63-02-00; 65-02-00
Application(s): Aircrew
Abstract:
Pilots using a single-eye helmet-mounted display (HMD) for night vision have orientation problems that are strongly affected by head movement. However, it is precisely this behaviour that is called upon to expand the limited field of view. The reported experiment trained pilots to use head movement in visual scanning. Participants piloted a simulated helicopter using either a single-eye HMD or a binocular through-the-window display. In training, participants piloted HMD flights while carrying out a secondary task that required systematic head movement. Results show that trained groups performed considerably better than control groups in subsequent HMD test flights. These groups learned to increase their head movement, whereas control groups spontaneously reduced theirs. Relatively short but directed training was hence highly effective in reshaping basic scanning behaviour and improving performance in a complex, dynamic visual environment.

Abstract Number: 156641
Title: Effects of Weight and Center of Gravity Location of Head-Supported Devices on Neck Loading
Author(s): ASHRAFIUON, H.; ALEM, N.M.; MCENTIRE, B.J.
Source: Aviation, Space, and Environmental Medicine
Year: 1997
Volume: 68
Issue: 10
Pages: 915-922
Number of References: 4
Original Language: English
Classification Term(s): Biomechanics; Headgear; Manikins and fitting trials; Modelling human characteristics ; Night vision devices; Virtual displays
Classification Number(s): 03-04-00; 22-01-06; 22-05-01; 51-09-01; 63-01-01; 63-04-00
Application(s): Air safety; Aircrew; Armed forces; Helicopters
Abstract:
A comprehensive study of the effect of head-supported devices (HSDs) on neck loading during helicopter accidents is presented. The new Articulated Total Body (ATB) model which treats the neck as deformable segment was used for crash simulation. Different categories of human and manikin subjects were considered under several crash scenarios. Simulations were theoretically designed to include a wide range of HSDs by changing their weights and centre of gravity (CG) locations relative to the head, and studying the effects of these changes. Since HSDs were only theoretically included in the model, detachment of specific detachable devices used in most military applications was not modelled in the study. Hence, two typical detachable devices were modelled and selected simulations were repeated and compared not only to provide a measure of accuracy for the original results but also to see the effects of separation of these devices from the helmet.

Abstract Number: 156872
Title: Establishing a Spinal Injury Criterion for Military Seats
Author(s): RAPAPORT, M.; FORSTER, E.; SCHOENBECK, A.; DOMZALSKI, L.
Source: Proceedings of the 35th Annual Symposium of the SAFE Association, Phoenix, Arizona, September 8-10, 1997. SAFE Association, Nashville, Tennessee
Year: 1997
Volume: -
Issue: -
Pages: 156-164
Number of References: 15
Original Language: English
Classification Term(s): Whole body acceleration and deceleration; Biomechanics; Effects on the musculo-skeletal system; Evacuation procedures; Manikins and fitting trials; Modelling human characteristics ; Seating; Statistical analysis and psychometrics; Use of test rigs
Classification Number(s): 32-02-00; 03-04-00; 28-04-01; 50-12-00; 51-11-03; 63-01-01; 63-02-01; 63-04-00; 63-10-01
Application(s): Aircraft; Aircrew; Armed forces; Helicopters
Abstract:
This paper describes the test programme conducted with Hybrid III crash test dummies to establish a lumbar spinal load injury criterion for military crash resistant seat compliance testing. The effort was sponsored under the Naval Air Systems Command's (PMA-202) Advanced Crashworthy Aircrew Survival Systems (ACASS) Program. Dynamic testing was conducted on the Horizontal Accelerator Facility at the Naval Air Warfare Center, Aircraft Division, Warminster, PA. The test programme examined the lumbar spinal response of Hybrid III test dummies when exposed to predominantly vertical helicopter crash pulses under controlled laboratory conditions. Sufficient data were acquired to

conduct a statistical analysis of the Hybrid III's lumbar spine response to compressive loading (i.e., +Gz headward direction). The analysis supports the recommendation to employ lumbar force as a primary physiological criterion for military crash resistant seat compliance. Also, the merits of using this injury indicator during escape system testing are discussed.

Abstract Number: 157178
Title: A Human-Machine Interaction Analysis Using Layered Protocol Theory
Author(s): FARRELL, P.S.E.
Source: Ergonomics at Work III: A National Approach. Proceedings of the 29th Annual Conference of the Human Factors Association of Canada, Winnipeg, Manitoba, September 13-17, 1997. Human Factors Association of Canada, Mississauga, Ontario
Year: 1997
Volume: -
Issue: -
Pages: 39-43
Number of References: 7
Original Language: English
Classification Term(s): Approaches to equipment testing; Cognitive processes; Information systems and communication; Knowledge base and rule base; Knowledge engineering and acquisition; Language communication and comprehension; PERSON-MACHINE DIALOGUE MODE; Speech; System design and interface engineering; System performance and evaluation; Systems analysis; User's model, mental models and cognitive maps
Classification Number(s): 63-14-00; 02-09-00; 02-09-10; 02-10-05; 05-10-00; 11-00-00; 17-03-00; 17-05-00; 37-10-00; 37-11-00; 56-05-00; 63-05-00
Application(s): Aircraft
Abstract:
Human-machine interface design continues to be an area of concern for theorists and practitioners alike. The interface must make the machine's states more transparent to the user, and vice versa, as the systems become more complex. Layered Protocol Theory provides a framework for analysing the interaction between the human and the machine. This framework was applied to the interaction between a pilot and a helicopter avionics management system. Interaction deficiencies were identified and solutions were proposed to address the deficiencies.

Abstract Number: 157356
Title: An In-Flight Investigation of the Efficacy of Dextroamphetamine for Sustaining Helicopter Pilot Performance
Author(s): CALDWELL, J.A.; CALDWELL, J.L
Source: Aviation, Space, and Environmental Medicine
Year: 1997
Volume: 68
Issue: 12
Pages: 1073-1080
Number of References: 16
Original Language: English
Classification Term(s): Drugs; Arousal; Brain function; Error, accuracy, reliability and frequency; Human performance; Manual control
Classification Number(s): 06-07-00; 02-11-00; 02-11-05; 03-01-05; 06-03-00; 65-03-00
Application(s): Aircrew; Helicopters
Abstract:
A promising countermeasure for fatigue in sustained aviation operations is stimulant administration. However, well-controlled, aviation-relevant studies of the efficacy of medications such as Dexedrine^R are virtually nonexistent. In this investigation, flight performance, mood, and alertness were evaluated in 10 UH-60 pilots during sleep deprivation periods under Dexedrine^R or placebo. Relative to placebo, Dexedrine^R improved flight performance during straight-and-levels, climbs, descents, right turns, and a left-descending turn, with tendencies towards better performance during the left turns and the instrument landing system approach. Dexedrine^R markedly reduced subjective feelings of fatigue, confusion, and depression while increasing feelings of vigor. Central nervous system arousal was enhanced by Dexedrine^R relative to placebo. No significant side effects occurred, although Dexedrine^R was associated with mild asymptomatic increases in heart rate and BP. Thus, Dexedrine^R appears effective for the short-term sustainment of aviator performance during sustained operations. However, future work should investigate the efficacy of stimulants for longer-term use (e.g., more than 40 h of continuous wakefulness).

Abstract Number: 158146
Title: Factors Affecting User Response to Polygon Displays
Author(s): PIONEK, J.; HEIDENREICH, M.; SHANAHAN, M.; SCHOEPKE, D.
Source: Ancient Wisdom - Future Technology. Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting, Albuquerque, New Mexico, September 22-26, 1997. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 1052-1055
Number of References: 4
Original Language: English
Classification Term(s): Coding of information; Coding by colour; Coding by shape; Gender; Multifunction displays; Time and speed

Classification Number(s): 08-03-00; 04-02-00; 08-03-02; 08-03-05; 22-06-00; 65-02-00
Application(s):
Abstract:
The concept of polygon displays as error detection devices is a recent area of interest in such environments as nuclear power plants and airplane and helicopter cockpits. Operators in these areas are concerned about the flooding of important information upon the limited capacity of the human eye and brain. A polygon display may alleviate the problem of confusing information by encompassing many fault displays into one simple, symmetric display. This type of visual display is an optimal method for 'at a glance' scanning and lower order perception. If a problem arises in the relevant system, the vertex that corresponds to the fault location will become skewed, and the polygon will appear irregular. The authors propose that polygon displays of different sizes and types will elicit varying reaction times of the detection of faults in these displays. A pilot study was conducted to determine preliminary answers to this query.

Abstract Number: 158235
Title: Enhancing System Safety with 3-D Audio Displays
Author(s): HAAS, E.C.; GAINER, C.; WIGHTMAN, D.; COUCH, M.; SHILLING, R.
Source: Ancient Wisdom - Future Technology. Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting, Albuquerque, New Mexico, September 22-26, 1997. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 868-872
Number of References: 9
Original Language: English
Classification Term(s): AUDITORY DISPLAYS; Auditory processes; Monaural versus binaural hearing
Classification Number(s): 23-00-00; 02-02-00; 02-02-03
Application(s): Aircrew; Helicopters; Virtual reality
Abstract:
The enhancement of multiple radio communications can be an important system safety consideration. This study was conducted to determine how accurately helicopter pilots could process radio communications information in a simulated cockpit environment when the messages were presented under different modes (diotic, dichotic and 3-D audio). The dependent variable was the total number of points scored in the radio communications identification task. Subjects were 11 certified U.S. Army AH-64 pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the U.S. Army. Multivariate statistical analysis indicated that presentation mode was significant. Pilots scored the greatest number of points in the identification task while using 3-D audio, fewer with dichotic presentation, and the least with diotic presentation. There was a statistically significant difference between the 3-D and diotic presentation. The data imply that 3-D audio provides an effective mode of message presentation in systems with multiple radio communications.

Abstract Number: 160586
Title: Flight Performance Effects of Thermal Stress and Two Aviator Uniforms in a UH-60 Helicopter Simulator
Author(s): REARDON, M.J.; FRASER, E.B.; OMER, J.M.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 6
Pages: 569-576
Number of References: 14
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; Equipment for altitude and depth; Human performance; Temperature; Thermal stress; Use of simulators
Classification Number(s): 51-09-05; 02-11-00; 03-02-04; 33-01-00; 33-04-00; 51-10-07; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
The effect on flight performance of the four combinations of an unencumbered mission oriented protective posture (MOPP) aviator battle dress uniform (ABDU) and encumbered MOPP4 over ABDU flight ensemble in cool (70^oF or 21.1^oC, 50% relative humidity [RH]) and hot (100^oF or 37.8^oC, 50% RH) UH-60 simulator cockpit conditions were evaluated with a repeated measures, 2 x 2 factorial study using nine crews. The encumbered MOPP4 uniform had the most frequent adverse effect on flight performance followed by heat stress, with less frequent effects from the combination or interaction of these two factors. This study confirmed that heat stress and wearing an encumbered U.S. Army MOPP4 flight uniform significantly reduced endurance and flight performance in a UH-60 simulator.

Abstract Number: 160590
Title: Effects of Active Noise Reduction on Noise Levels at the Tympanic Membrane
Author(s): WAGSTAFF, A.S.; WOXEN, O.J.; ANDERSEN, H.T.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 6

Pages: 539-544
Number of References: 13
Original Language: English
Classification Term(s): Auditory equipment; Communication and masking in noise; Noise levels
Classification Number(s): 51-10-02; 30-01-00; 30-03-03
Application(s): Aircraft; Aircrew
Abstract:
Active noise reduction (ANR) is an electronic system that works by continuous sampling of noise inside the earshell of the headset with a small microphone. This signal is inverted in phase through the headset speaker, thus reducing noise levels by destructive interference of the acoustic field. The system provides good low-frequency noise attenuation, but aircrew differ in their subjective opinion of ANR. This study is an attempt to provide an objective assessment of the effect of ANR on noise levels at the tympanic membrane. There were 7 subjects with normal ears who were placed in an environment of recorded noise from a BO-105 helicopter. A microphone probe was inserted to within 5 mm of the tympanic membrane of each subject's right ear. Noise levels in the ear were measured without a headset and with two different ANR headsets. Measurements were performed with and without the ANR system on, and with and without white noise through the headset communication system. The white noise was used to simulate aircraft communication noise. The two headsets had differing levels of passive and active attenuation. The ANR system produced a substantial low-frequency attenuation. However, noise levels in the mid frequencies increased somewhat when the ANR system was switched on. This effect was augmented when white noise in the communications system was introduced, particularly for one of the two headsets. Low-frequency noise attenuation of ANR systems is substantial, but an increased mid- and high-frequency noise level caused by the ANR may affect both communication and overall noise levels. The data provide advice on what factors should be taken into account when ANR is evaluated for use in an aviation operational environment.

Abstract Number: 160807
Title: Visual Cues to Geographical Orientation during Low-Level Flight
Author(s): BATTISTE, V.; DELZELL, S.
Source: Proceedings of the Sixth International Symposium on Aviation Psychology, April 29 - May 2, 1991, Edited by R.S. Jensen, Volume I
Year: 1991
Volume: -
Issue: -
Pages: 566-571
Number of References: 8
Original Language: English
Classification Term(s): Performance strategies; Charts and maps; Disorientation; Emergency services; Questionnaires and surveys; Rating and ranking; Trained versus untrained; Usage; User's model, mental models and cognitive maps
Classification Number(s): 02-11-04; 04-05-00; 05-10-00; 08-02-03; 35-05-00; 51-11-00; 64-05-00; 64-06-00; 65-09-00
Application(s): Aircrew; Helicopters
Abstract:
In an effort to investigate the relationships among geographical orientation, pilot decision making and workload in emergency medical service (EMS) flights, a field study of an operational EMS service was conducted. Only the data relevant to geographical orientation are reported in this paper. Three methods of data collection were employed in the field study to investigate the terrain features used by EMS pilots to maintain geographical orientation: (1) questionnaire (Topographical Information Utilization Inventory); (2) pilot-generated map of their service area; and (3) pilot-generated mission map after each flight. The map data collected during the EMS field study were compared to protocols collected in the laboratory, where pilots viewed a simulated flight over different types of unfamiliar terrain and verbally identified the features used to maintain geographical orientation. Verbal protocols were used in the laboratory because U.S. Army aviators performing the navigation function during a mission verbally provide map terrain information to the pilot flying the vehicle. Also, these pilots could not be expected to memorize and draw maps of these complex and unfamiliar terrains after a single flight. The EMS pilots' questionnaire data were compared with data from NON-EMS helicopter pilots with similar flight experience.

Abstract Number: 160977
Title: The Effects of Speech Controls on Performance in Advanced Helicopters in a Double Stimulation Paradigm
Author(s): BORTOLUSSI, M.R.; VIDULICH, M.A.
Source: Proceedings of the Sixth International Symposium on Aviation Psychology, April 29 - May 2, 1991, Edited by R.S. Jensen, Volume I
Year: 1991
Volume: -
Issue: -
Pages: 216-221
Number of References: 5
Original Language: English
Classification Term(s): Voice input devices; Attention, time sharing and resource allocation; CHOICE OF COMMUNICATION MEDIA; Headup and projected displays; Mental workload; Multifunction displays; Rating and ranking; Reaction time and speed of performance; Time and speed
Classification Number(s): 21-21-00; 02-11-01; 02-11-03; 07-01-00; 10-00-00; 22-05-00; 22-06-00; 64-06-00; 65-02-00
Application(s): Armed forces; Helicopters

Abstract:
The potential benefit of speech as a control modality has been investigated with mixed results. Earlier studies suggest that speech controls can reduce the potential of manual control overloads and improve time-sharing performance. However, these benefits were not without costs. Pilots reported higher workload levels associated with the use of speech controls. To further investigate these previous findings, an experiment was conducted in a simulation of an advanced single-pilot, scout/attack helicopter at NASA-Ames' ICAB (interchangeable cab) facility. Objective performance data suggested that speech control modality was effective in reducing interference of discrete, time-shared responses during continuous flight control activity. Subjective ratings, however, indicated that the speech control modality increased workload. Post-flight debriefing indicated that these results were mainly due to the increased effort to speak precisely to a less than perfect voice recognition system.

Abstract Number: 160986
Title: Utilizing 3-D Auditory Displays to Enhance Safety in Systems with Multiple Radio Communications
Author(s): HAAS, E.C.
Source: Advances in Occupational Ergonomics and Safety 2, Edited by S. Kumar. IOS Press, Amsterdam
Year: 1998
Volume: -
Issue: -
Pages: 715-718
Number of References: 3
Original Language: English
Classification Term(s): AUDITORY DISPLAYS; Auditory perception; Auditory sensitivity; Information systems and communication; Monaural versus binaural hearing; Use of simulators
Classification Number(s): 23-00-00; 02-02-01; 02-02-02; 02-02-03; 56-05-00; 63-02-00
Application(s): Armed forces; Helicopters
Abstract:
The enhancement of multiple radio communications can be an important system safety consideration. A study was conducted to determine how accurately helicopter pilots could process multiple radio communications information in a simulated cockpit environment when the messages were presented under three different presentation modes (diotic [monaural], dichotic [stereo], and three-dimensional [3-D] audio), and with a different number of simultaneous takers (one, two or three). Subjects were 12 U.S. Army pilots between the ages of 18 and 35 who possessed hearing and visual acuity within thresholds acceptable to the U.S. Army. Multivariate statistical analysis indicated all main effects and their interaction were significant. As the number of simultaneous talkers increased, pilots using 3-D audio displays obtained the greatest number of statistically significant correctly identified radio communications. The data imply that 3-D audio provides a safe and effective mode of message presentation in systems with multiple radio communications.

Abstract Number: 161318
Title: Transfer of Training from a Low Cost Helicopter Simulator
Author(s): DOHME, J.
Source: Proceedings of the Sixth International Symposium on Aviation Psychology, April 29 - May 2, 1991, Edited by R.S. Jensen, Volume II
Year: 1991
Volume: -
Issue: -
Pages: 910-915
Number of References: 2
Original Language: English
Classification Term(s): Use of simulators; Combined measures and indices; Learning, skill development, knowledge acquisition and concept attainment; TRAINING
Classification Number(s): 63-02-00; 02-09-09; 44-00-00; 65-07-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:

Abstract Number: 161726
Title: Loadmaster Posture - an Investigation of Loadmaster Posture in the S-70A-9 Black Hawk Helicopter: Work in Progress
Author(s): BLANCHONETTE, P.; KING, R.; FORAN, D.; SIMPSON, P.
Source: Ergonomics Australia
Year: 1998
Volume: 12
Issue: 4
Pages: 18-21
Number of References: 8
Original Language: English
Classification Term(s): Posture; Motor and postural fatigue
Classification Number(s): 03-04-04; 06-04-06
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 161744
Title: Tolerance to Head-Up Tilt and Suspension with Elevated Legs

Author(s): MADSEN, P.; SVENDSEN, L.B.; JORGENSEN, L.G.; MATZEN, S.; JANSEN, E.; SECHER, N.H.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 8
Pages: 781-784
Number of References: 21
Original Language: English
Classification Term(s): Posture; Cardiac processes; Rescue
Classification Number(s): 03-04-04; 03-02-01; 51-11-01
Application(s):
Abstract:
Orthostatic hypotension is usually a benign event. However, some patients are disabled by frequent syncopal events, and vertical transportation during helicopter rescue for example, may even be fatal. Normal orthostatic tolerance is poorly defined, so the authors evaluated the response to 50° head-up tilt. Also, the effect of leg elevation was examined in order to establish the influence of venous return, and a fatal accident associated with orthostasis is reported. There were 79 volunteers who were subjected to 50° head-up tilt, and 9 subjects performed 1 h suspension by double straps placed around the thorax and knee joints, respectively. The time to presyncope and changes in BP, heart rate, thoracic electrical impedance, central venous pressure and central venous and muscle oxygen saturations were measured. The results show that head-up tilt resulted in hypotension, bradycardia and presyncopal symptoms in 69 subjects within 1 h (87%; half time 27 min), but during suspension with elevated legs in only one subject (11%; p<0.02). In presyncopal subjects the central blood volume was reduced as reflected by an elevated thoracic electrical impedance and reduced central venous and muscle oxygen saturations. To conclude, during 50° head-up tilt, half of 79 subjects near-fainted within 27 min, whereas elevation of the legs secured venous return to the heart and prevented presyncopal symptoms. The high rate of near-fainting in normal subjects should be taken into account during evaluation of patients with syncope, and it emphasizes the use of a position that secures venous return during transportation.

Abstract Number: 161807
Title: Flight Crew Fatigue I: Objectives and Methods
Author(s): GANDER, P.H.; GRAEBER, R.C.; CONNELL, L.J.; GREGORY, K.B.; MILLER, D.L.; ROSEKIND, M.R.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 9 Pt.2
Pages: B1-B7
Number of References: 43
Original Language: English
Classification Term(s): Fatigue; Fear, anxiety, mood and emotion; HOURS OF WORK; Physiological and psychophysiological recording ; Self recording
Classification Number(s): 06-04-00; 06-05-00; 39-00-00; 63-07-00; 63-09-02
Application(s): Aircrew
Abstract:
In 1980, NASA-Ames Research Center, Moffett Field, CA, initiated a programme to assess flight crew fatigue, determine its potential operational consequences, and provide practical countermeasure suggestions. To assess the extent of the problem, crewmembers were monitored before, during, and after commercial short-haul (fixed-wing and helicopter aircraft), overnight cargo, and long-haul operations. A total of 197 volunteers were studied on 94 trip patterns with 1299 flight segments and 2046 h of flying time. This paper outlines the programme and describes the common methodology used in these studies, which are then presented in detail in the four subsequent papers. The sixth paper offers a synthesis of this work, reviewing the major causes of flight crew fatigue and making specific suggestions about ways to manage it in different operations.

Abstract Number: 161811
Title: Flight Crew Fatigue VI: A Synthesis
Author(s): GANDER, P.H.; ROSEKIND, M.R.; GREGORY, K.B.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 9 Pt.2
Pages: B49-B60
Number of References: 55
Original Language: English
Classification Term(s): Fatigue; Circadian rhythms; Fear, anxiety, mood and emotion; HOURS OF WORK; Nutrition and diet; Sleep; Sleep loss; Sleep pattern
Classification Number(s): 06-04-00; 06-01-00; 06-01-01; 06-01-02; 06-02-01; 06-05-00; 06-06-00; 39-00-00
Application(s): Aircrew
Abstract:
Sleep, circadian rhythms, subjective fatigue, mood, nutrition, and physical symptoms were monitored in flight crews before, during and after scheduled commercial operations. Duty-related changes in these measures were examined in four different types of air transport: short-haul fixed-wing; short-haul helicopter; domestic overnight cargo; and long-haul. The extent of these changes, and the duty-related and physiological factors contributing to them, are compared among the different operations. During all operations, the level of sleep loss was such that the majority of crewmembers would be expected to have become increasingly sleepy across trip days, with some experiencing performance decrements. In addition, during overnight cargo and long-haul operations, crewmembers

were sometimes flying aircraft during the circadian low point in alertness and performance. Specific recommendations for reducing flight crew fatigue are offered for each operating environment.

Abstract Number: 161911
Title: Navigational Demands of Low-Level Helicopter Flight
Author(s): DELZELL, S.; BATTISTE, V.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 838-842
Number of References: 9
Original Language: English
Classification Term(s): Person-to-person communication; Charts and maps; Event frequency; Information systems and communication; Stimulus-response compatibility
Classification Number(s): 09-01-01; 08-02-03; 25-06-01; 56-05-00; 65-04-00
Application(s): Aircrew; Helicopters
Abstract:
This study was designed to assess the verbal references to map, terrain, direction, and position, that navigators and pilots communicate during a simulated low-level flight. Two-person crews were asked to communicate normally while negotiating six short flight missions that varied widely in regard to map-terrain characteristics. Half of the crews performed the exercises with fixed, north-up maps and the other half used moveable maps that were adjusted to maintain a track-up correspondence to the flight route. An analysis was performed to compare differences in crew communication patterns between map orientations, characteristics and navigation tasks. The results showed differences in the frequency of communication across categories for map characteristics but not for map orientations or tasks. A difference in the proportion of communications between pilot and navigator occurred when crews were lost. Pilots communicated more than navigators when crews were lost and the reverse was true when crews were not lost. The results support and extend findings from a distance error performance analysis performed on the same flight missions.

Abstract Number: 162013
Title: Further Development of the Panoramic Night Vision Goggle
Author(s): CRAIG, J.L.; GEISELMAN, E.E.
Source: Proceedings of the 36th Annual Symposium of the SAFE Association, Phoenix, Arizona, September 14-16, 1998. SAFE Association, Nashville, Tennessee
Year: 1998
Volume: -
Issue: -
Pages: 26-30
Number of References: 9
Original Language: English
Classification Term(s): Night vision devices; Display quality ; Headup and projected displays; Mental workload; Rating and ranking; Size, magnification and viewing distance; Use of simulators
Classification Number(s): 22-01-06; 07-01-00; 22-05-00; 25-01-01; 25-02-00; 63-02-00; 64-06-00
Application(s): Armed forces
Abstract:
A novel approach to significantly increasing the field of view (FOV) of night vision goggles (NVGs) has been developed. This approach uses four image intensifier tubes instead of the usual two to produce a 100 degree wide FOV. A conceptual demonstrator device was fabricated in November 1995 and limited flight evaluations were performed. Further development of this approach continues with eleven advanced technology demonstrators scheduled for delivery by the end of December 1998 that will feature five different design configurations. Some of the units will be earmarked for ejection seat equipped aircraft due to their low profile design allowing the goggle to be retained safely during and after ejection. Other deliverables will be more traditional in design approach and concentrate more on transport and helicopter aircraft as well as ground personnel. Planned testing to collect both subjective and quantitative data will begin in November 1998.

Abstract Number: 162038
Title: Flight Simulator Evaluation of a Novel Flight Instrument Display to Minimize the Risks of Spatial Disorientation
Author(s): BRAITHWAITE, M.G.; DURNFORD, S.J.; GROH, S.L.; JONES, H.D.; HIGDON, A.A.; ESTRADA, A.; ALVAREZ, E.A.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 8
Pages: 733-742
Number of References: 11
Original Language: English
Classification Term(s): Multifunction displays; Attention, time sharing and resource allocation; Coding by colour; Disorientation; Error, accuracy, reliability and frequency; Mental workload; Questionnaires and surveys; Use of simulators
Classification Number(s): 22-06-00; 02-11-03; 07-01-00; 08-03-05; 35-05-00; 63-02-00; 64-05-00; 65-03-00
Application(s): Aircrew; Helicopters
Abstract:

Spatial disorientation (SD) in flight remains a major source of attrition. Many SD accidents would occur regardless of the instrument display in use, since the aircrew are simply not looking at the instruments. However, there are a number of accidents which might be amenable to improved instrument displays. In an attempt to improve maintenance and reattainment of correct orientation with a reduced cognitive workload, a novel instrument display has been developed. This paper describes an assessment of the display in a UH-60 helicopter flight simulator. This study tested the hypothesis that during instrument flight and recovery from unusual attitudes, the novel display permits a more accurate maintenance and reestablishment of flight parameters than the standard flight instruments. There were 16 male aviators who flew a simulated instrument flight profile and recovery from unusual attitudes using both the standard flight instruments and the novel display. The two display formats were tested both with and without a secondary task. When compared with the standard instruments, both control of flight parameters and recovery from unusual attitudes were significantly improved when using the novel display. Analysis of the secondary task scores showed that cognitive workload was reduced when using the novel display. Analysis of the secondary task scores showed that cognitive workload was reduced when using the novel display compared with the standard instruments. Results from all aspects of the assessment indicated benefits of the new display. Future testing should be carried out during real flight, and the display should be further developed to be used in a head-up display or helmet-mounted device.

Abstract Number: 162177
Title: An Evaluation of the British Army Spatial Disorientation Sortie in U.S. Army Aviation
Author(s): BRAITHWAITE, M.G.; HUDGENS, J.J.; ESTRADA, A. ; ALVAREZ, E.A.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 8
Pages: 727-732
Number of References: 6
Original Language: English
Classification Term(s): Disorientation; Rating and ranking; TRAINING
Classification Number(s): 35-05-00; 44-00-00; 64-06-00
Application(s): Aircrew; Armed forces
Abstract:
Following didactic instruction, most aircrew are able to experience some of the disorienting illusions and limitations of the orientation senses in a variety of ground-based devices. In order to reinforce instruction in spatial disorientation (SD) within the environment in which they operate, British Army Air Corps helicopter pilots also receive an airborne demonstration of the limitations of their orientation senses prior to rotary-wing instrument flight training. The objective of this assessment was to determine whether the SD demonstration sortie would be an effective adjunct in training aircrew in SD in the U.S. Army. There were 45 aviators and training personnel who experienced the sortie and gave their opinion in questionnaires. The following conclusions were made: The manoeuvres performed in the SD demonstration sortie, and the sortie overall, were extremely effective at demonstrating the limitations of the orientation senses; the SD sortie attracted a significantly higher rating in its effectiveness to train aviators in SD than all the currently available methods; the introduction of the sortie into the initial flight training syllabus would be a distinct enhancement to the SD training of aviators and associated personnel; and the introduction of the sortie into refresher training in field units would also be an advantage. In conclusion, other services are encouraged to consider this enhancement to the SD training of aviators.

Abstract Number: 162594
Title: Feasibility Study for a Helicopter Survival Seat Pack
Author(s): PENSOTTI, L.; TURIEO, M.; STOKES, J.; REEPS, S.
Source: Proceedings of the 36th Annual Symposium of the SAFE Association, Phoenix, Arizona, September 14-16, 1998. SAFE Association, Nashville, Tennessee
Year: 1998
Volume: -
Issue: -
Pages: 371-386
Number of References: 10
Original Language: English
Classification Term(s): Equipment for altitude and depth; Emergency services; Questionnaires and surveys; Ratings and preferences; Reach; Seating; Static body measurements
Classification Number(s): 51-10-07; 03-04-01; 27-01-01; 28-04-01; 51-11-00; 64-05-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
The main purpose of this study was to investigate the feasibility of a seat pack concept as a method for carrying survival gear. The primary concerns were safety; integration and compatibility with aircraft; bulk reduction; mobility and reach; and ease of use. Comfort and usability were also evaluated.

Abstract Number: 163235
Title: Semantic Reactions to Dynamic Acoustic Stimuli
Author(s): EDWORTHY, J.; HELLIER, E.J.
Source: Noise Effects '98. Proceedings of the 7th International Congress on Noise as a Public Health Problem, Sydney, Australia, Edited by N. Carter and R.F.S. Job. Noise Effects '98 Pty, Sydney, Volume 1
Year: 1998

Volume: -
Issue: -
Pages: 209-212
Number of References: 10
Original Language: English
Classification Term(s): Auditory coding; Auditory perception; Communication and masking in noise; Information and communication design for health and safety; Ratings and preferences
Classification Number(s): 09-01-03; 02-02-02; 30-03-03; 51-05-00; 65-08-01
Application(s):
Abstract:
It is frequently the case that people are expected to carry out complex, high workload tasks in noisy environments. Usually they will need to be warned or informed of changes in the status of important operational parameters whilst carrying out other tasks, so the design of these warning sounds is of great importance. One example, for instance, would be changes in rotor speed in helicopters - it is important to indicate any such changes as quickly and as accurately as possible, but because the pilot can be overwhelmed (and can miss) important visual information, conveying such information auditorily is the only sensible option. However, as the noise environment is both high in level and complex in spectrum, it means that the pilot cannot use any naturally occurring acoustic cues, and that spoken messages and warnings may be misheard. Thus nonverbal sounds are typically used in such scenarios. Depending upon their acoustic structure, different sounds convey different semantic meanings to the listener. Thus it is important to get as good a match as possible between the type of sound used for a particular function, and its semantic meaning as typically interpreted by listeners. For example, sounds that convey meanings like 'fast', 'urgent' and 'rising' would be best used to indicate an increase in rotor speed. In the study presented here, the relationship between changes in acoustic stimuli and changes in their semantic description is quantified. All participants were presented with a set of acoustic stimuli - ascending and descending pitch sequences, sequences which increased or decreased in speed, and sequences which became more or less harmonically complex. Participants were asked to rate each of the stimuli along 42 different adjectives, using 7-point Likert-type scales. A series of analyses indicated the adjectives with which each of the stimuli was most strongly associated. Ascending pitch was most associated with 'rising' and 'straining' while descending pitch was most associated with 'dropping'. Increasing speed was associated with 'starting up', 'dangerous', and 'urgent', while decreasing speed was associated with 'jerky' and 'tight'. Changes in harmonic structure were associated with adjectives such as 'steady' and 'controlled'. These results have now been applied to the design of trend monitoring sounds for use in the helicopter cockpit so that the conveyed meaning is psychologically appropriate.

Abstract Number: 163789

Title: Helmet-Mounted Displays and Facial Injury in US Army AH-64A Apache Accidents
Author(s): CROWLEY, J.S.
Source: Journal of the Royal Army Medical Corps
Year: 1998
Volume: 144
Issue: 3
Pages: 144-147
Number of References: 9
Original Language: English
Classification Term(s): Injuries resulting from accidents; Headup and projected displays; Surveys, statistics and analysis; Workplace and equipment design
Classification Number(s): 50-01-00; 22-05-00; 48-01-00; 49-04-00
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
There is concern that the helmet display unit (HDU) used by AH-64 Apache helicopter pilots might contribute to facial injury in a crash. The US Army accident database was searched for HDU-related injuries in survivable Apache accidents 1985-1995. Four aviators in three crashes sustained HDU-related injury. These involved three periorbital contusions and two minor eye injuries. There were no sequelae. This equates to an incidence of 0.57 injured individuals per 100,000 flying hours or 8.0 injured aviators per 100 survivable Class A-C accidents in which the HDU was worn. Applying these data to the projected UK Army Apache flying hour programme suggests that one HDU-related injury might be encountered approximately every 10.1 years. This estimate should be interpreted with caution. Serious injury remains a possibility due to the proximity of the HDU to the eye and face.

Abstract Number: 140639
Title: Recent Helicopter Inflatable Restraint Developments
Author(s): ZIMMERMANN, R.E.; SMITH, K.F.; VINCENC, T.F.
Source: Proceedings of the 31st Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 8-10, 1993, SAFE Association, Yoncalla, Oregon
Year: 1994
Volume: -
Issue: -
Pages: 288-297
Number of References: 7
Original Language: English
Classification Term(s): Body equipment; Approaches to equipment testing; WORKSTATION DESIGN
Classification Number(s): 51-10-06; 27-00-00; 63-14-00
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 140644
Title: The Ergonomics of Jettisoning Escape Hatches in a Ditched Helicopter
Author(s): BROOKS, C.J.; BOHEMIER, A.P.; SNELLING, B.A.; SNELLING, G.R.
Source: Aviation, Space & Environmental Medicine
Year: 1994
Volume: 65
Issue: 5 Section I
Pages: 387-395
Number of References: 9
Original Language: English
Classification Term(s): Evacuation procedures; Doors, hatches and openings; Use of simulators; Windows
Classification Number(s): 51-11-03; 26-03-00; 26-04-01; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
The first formal investigation of the problem of location, operation and jettison of escape windows and hatches of helicopters following ditching has been conducted in a new simulator. There were 48 aircrew who attempted 298 escapes using a variety of 24 escape routes and 9 different types of escape hatch. Overall results, while superficially indicating that the task was easy, in fact revealed many unforeseen problems. Specifically, there was no standardization of hatches and levers, there were problems with location and operation of levers principally due to poor design, and an ergonomics study has not been conducted to investigate the problem. Underwater escape training with hatches in position must be mandatory for all who fly offshore or over water for a living, and further research should be conducted to design a better standard hatch and jettison system.

Abstract Number: 140684
Title: Modeling Human Body Dynamic Response to Abrupt Acceleration
Author(s): OBERGEFELL, L.; KALEPS, I.
Source: Proceedings of the 31st Annual Symposium of the SAFE Association, Las Vegas, Nevada, November 8-10, 1993, SAFE Association, Yoncalla, Oregon
Year: 1994
Volume: -
Issue: -
Pages: 341-346
Number of References: 4
Original Language: English
Classification Term(s): Modelling human characteristics ; Emergency services; Evacuation procedures; Seating; Whole body acceleration and deceleration; WORKSTATION DESIGN
Classification Number(s): 63-01-01; 27-00-00; 28-04-01; 32-02-00; 51-11-00; 51-11-03
Application(s): Air safety; Helicopters
Abstract:
The predictive simulation of human dynamic response to abrupt accelerations encountered during emergencies can provide guidance for improved safety and crashworthiness design. The Articulated Total Body (ATB) model, a computer simulation program, is used by the Armstrong Laboratory for the prediction of human body dynamics during aircraft crashes, ejections, emergency escape, and other hazardous environment exposures. It is used to evaluate safety of proposed structures in the aircraft cockpit before prototypes are built or costly tests conducted. When testing is conducted, the model is used to provide data that can not be measured, such as forces within the body, and to supplement test data with parameter variation simulations. Because of its capability to predict both internal forces and external forces acting on the body, the ATB model can also be used in accident investigation. For example, the safety of a cargo plane was evaluated for head strikes with a head up display during a survivable crash, emergency escape through a chute was simulated to investigate body clearances and possible impacts with aircraft structures, body motion and limb flail during ejection have been studied, and energy absorbing seats in a helicopter have been simulated.

Abstract Number: 141662
Title: Small Letter Contrast Sensitivity: An Alternative Measure of Visual Resolution for Aviation Candidates
Author(s): RABIN, J.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 1
Pages: 56-58
Number of References: 5
Original Language: English
Classification Term(s): Visual detection and acuity, contrast sensitivity and visual field; SELECTION AND SCREENING
Classification Number(s): 02-01-01; 43-00-00
Application(s): Aircrew; Armed forces
Abstract:
Exceptional vision is needed to maintain high levels of aviation performance. Current standards for helicopter pilot training include superior visual acuity with minimal refractive error. Despite these demanding criteria, it is likely that visual ability varies among those who meet the standards for pilot training. A more complete knowledge of visual capabilities in these individuals will allow us to better correlate vision with performance

and to develop more incisive criteria for selection. The purpose of this study was to investigate an alternative test of visual resolution for aviation candidates using small letter contrast sensitivity (SLCS). Computer-generated letter charts were used to measure visual acuity (VA) and SLCS in 16 candidates who had satisfied military vision standards for pilot training. The acuity and contrast charts varied, by line, in equal log steps such that the letter recognition task was comparable for the two types of measurement. VA and SLCS were highly correlated in these subjects, indicating that the two tests measure similar aspects of visual resolution. Scores were distributed across two lines on the acuity chart, but across four lines on the contrast chart, suggesting that SLCS offers a more discriminating test of resolution. This assumption was confirmed in that SLCS was more highly correlated with small amounts of refractive error in the candidates tested. SLCS offers a sensitive, adjunctive measure of visual resolution which may be useful for identifying the unique visual abilities required for aviation.

Abstract Number: 141972
Title: Expanding the Envelope of Performance: Training Pilots to Use Helmet Mounted Displays
Author(s): SEAGULL, F.J.; GOPHER, D.
Source: People and Technology in Harmony. Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting, Nashville, Tennessee, October 24-28, 1994. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1994
Volume: -
Issue: -
Pages: 11-15
Number of References: 10
Original Language: English
Classification Term(s): Headup and projected displays; Attention, time sharing and resource allocation; Error, accuracy, reliability and frequency; Eye and head movements; Pedals; Three-dimensional graphics; TRAINING; Use of simulators
Classification Number(s): 22-05-00; 02-01-04; 02-11-03; 08-02-05; 21-10-00; 44-00-00; 63-02-00; 65-03-00
Application(s): Helicopters
Abstract:
Helmet Mounted flight Displays (HMDs) of a through-the-window field-of-view (FOV) are widely used in modern aircraft for night vision. Unfortunately, pilots using such displays are susceptible to spatial disorientation due to the limited field-of-view and its consequent lack of orientation cues. This problem is especially pronounced when pilots move their heads, though this is precisely the behaviour that enables them to counteract the limited FOV. The current experiment attempted to train pilots to move their heads without becoming disoriented. Twenty-five subjects participated in five treatment groups in a between-subjects design. Subjects piloted a simulated helicopter through a computer-generated winding canyon with either a single-eye HMD, or a binocular through-the-window 'screen' display. Three control groups were trained using either (1) a binocular screen-display without a secondary task, (2) an HMD view without a secondary task, or (3) an HMD view with a secondary task presented in the centre of the HMD FOV. The two remaining treatment conditions involved flying while carrying out a secondary task which required either (1) systematic head movement (displacement), or (2) systematic head-movement plus head re-orientation. Results indicate that after training, treatment groups completed significantly higher probability of surviving a given flight at any time. Treatment groups learned to increase their head movement, while control groups spontaneously reduced theirs. These findings indicate that spontaneous experience with an HMD does not lead to optimal performance. Development of attention control strategies focusing on the difficulties of HMDs increased considerably the ability of operators to cope with the problems.

Abstract Number: 142086
Title: Prevalence of Spatial Disorientation in Indian Air Force Aircrew
Author(s): NAVATHE, P.D.; SINGH, B.
Source: Aviation, Space, and Environmental Medicine
Year: 1994
Volume: 65
Issue: 12
Pages: 1082-1085
Number of References: 4
Original Language: English
Classification Term(s): Disorientation; Questionnaires and surveys
Classification Number(s): 35-05-00; 64-05-00
Application(s): Aircrew; Armed forces
Abstract:
The 1 Aero Medical Training Centre has surveyed aircrew of the Indian Air Force to determine the prevalence of Spatial Disorientation (SD), as related to aircraft stream, age, flying experience, geographical location and other operationally significant variables. The reported prevalence of SD is 75% among fighter aircrew, 64% in transport aircrew, and 55% in helicopter aircrew. Whereas the prevalence of SD does not appear to vary significantly with age and flying experience, it is higher in fully operational pilots and in pilots returning to flight duties after a ground tenure, as compared to ab-initio and type-converting pilots.

Abstract Number: 143092
Title: Using the Backward Transfer Paradigm to Validate the AH-64 Simulator Training Research Advanced Testbed for Aviation
Author(s): STEWART, J.E.

Source: People and Technology in Harmony. Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting, Nashville, Tennessee, October 24-28, 1994. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1994
Volume: -
Issue: -
Pages: 1238-1241
Number of References: 4
Original Language: English
Classification Term(s): Use of simulators; Laboratory versus field; Rating and ranking; TRAINING
Classification Number(s): 63-02-00; 44-00-00; 63-09-05; 64-06-00
Application(s): Aircrew
Abstract:
The Simulator Training Research Advanced Testbed for Aviation (STRATA) is a modular research simulator which in its current configuration represents the AH-64 helicopter. The backward transfer of training paradigm was employed to determine if AH-64 piloting skills transfer to STRATA. Ten AH-64 pilots participated in the experiment. They performed a mission scenario consisting of 13 Aircrew Training Manual (ATM) tasks. No orientation or practice was allowed. Most participants rated STRATA as highly similar to the AH-64 in handling. Real-time performance ratings indicated that of 130 task events, 88.5% were performed to ATM standards. After the experiment, four independent judges rank-ordered performance on the hover task using output from STRATA's performance measurement system. Rankings showed high concordance and a high correlation with real-time ratings.

Abstract Number: 145025
Title: Effects of Sensor Field Replication on Display Imagery
Author(s): VOLLMERHAUSEN, R.H.; BUI, T.H.
Source: 1995 SID International Symposium Digest of Technical Papers, Society for Information Display, Santa Ana, California
Year: 1995
Volume: -
Issue: -
Pages: 667-670
Number of References: 6
Original Language: English
Classification Term(s): Night vision devices; Display stability; Headup and projected displays
Classification Number(s): 22-01-06; 22-05-00; 25-02-04
Application(s): Helicopters
Abstract:
Some thermal imagers operate at a 30 Hertz frame rate without interlace; this minimizes bandwidth and optimizes the performance of digital processors. Flicker is avoided by displaying each image twice, thereby generating a 60 Hertz display update. This display technique leads to motion artifacts. Normal eye and head movement make the motion artifacts particularly annoying in night helicopter pilotage systems which use head tracked sensors and helmet mounted displays.

Abstract Number: 145592
Title: The Semantic Associations of Acoustic Parameters Commonly used in the Design of Auditory Information and Warning Signals
Author(s): EDWORTHY, J.; HELLIER, E.; HARDS, R.
Source: Ergonomics
Year: 1995
Volume: 38
Issue: 11
Pages: 2341-2361
Number of References: 15
Original Language: English
Classification Term(s): Auditory coding; Auditory processes; Decision making and risk assessment; Information and communication design for health and safety; Rating and ranking
Classification Number(s): 09-01-03; 02-02-00; 02-09-07; 51-05-00; 64-06-00
Application(s):
Abstract:
Two experiments are described in which the effects of acoustic parameters, and changes in those acoustic parameters, on the salience of 42 pre-selected adjectives are explored. In experiment 1 four sets of seven stimuli each varying only along one of the four acoustic parameters pitch, speed, inharmonicity and rhythm were scaled along the 42 adjectives. Parameter-adjective associations showing significant effects both in terms of consistency (Kendall's W') and in linear mapping (regression) numbered 7 for pitch, 3 for speed, 2 for inharmonicity and 1 for rhythm. Three of the four parameters produced significant levels of both consistency and linear mapping for the adjective 'urgent'. In the second experiment, the overall meaning of complete within-parameter stimulus sets were explored and many differences both within and between parameters and adjectives were found. The results were used to design five trend monitoring sounds for helicopter flight, three of which are described in detail in this paper.

Abstract Number: 146516
Title: Human Factors Issues in Night Airborne Mine Countermeasures Operations
Author(s): RUFFNER, J.W.; TULLOS, R.E.; MULDOON, R.C.

Source: Designing for the Global Village. Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, California, October 9-13, 1995. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 84-88
Number of References: 10
Original Language: English
Classification Term(s): System performance and evaluation; Dials, meters and gauges; Multifunction displays; Night vision devices; Team work; Visual perception of form, shape, angle, size and distance; Workload demands; WORKSTATION DESIGN
Classification Number(s): 37-10-00; 02-01-06; 22-01-06; 22-03-00; 22-06-00; 27-00-00; 41-02-03; 41-03-05
Application(s): Armed forces; Helicopters; Situational awareness
Abstract:
The U.S. Navy's Airborne Mine Countermeasures (AMCM) mission, performed by the MH-53E helicopter, is characterized by long duration flight at low altitudes and low airspeeds over the water while towing a variety of devices. This mission imposes substantial demands on the pilots and mission crew. Because of its complexity and potential hazards, the AMCM mission is currently performed only during the daytime. The Navy identified a requirement to perform AMCM operations at night and sponsored research to investigate the system and procedural modifications required to accomplish night AMCM operations safely and effectively. This paper discusses the human factors issues identified as part of this research effort and provides specific examples from the AMCM mission environment. A thorough understanding of these issues and how they will impact night AMCM operations is essential for a successful transition from day to night operations.

Abstract Number: 147214
Title: Using Operator Role Theory to Guide Function Allocation in System Development
Author(s): FOLDS, D.J.; MITTA, D.A.
Source: Designing for the Global Village. Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, California, October 9-13, 1995. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1995
Volume: -
Issue: -
Pages: 1155-1159
Number of References: 3
Original Language: English
Classification Term(s): Allocation of function; Systems analysis
Classification Number(s): 38-01-00; 63-05-00
Application(s): Automation; Helicopters; Traffic management
Abstract:
Operator role theory provides a conceptual framework for guiding function allocation during the system design process, and for analyzing the allocation of functions in an existing or proposed design. This paper describes the basic tenets of operator role theory and presents a method for using those tenets in the processes of system analysis and design. Operator role theory holds that there are four generic operator roles that are possible in a given function. These four roles (Direct Performer, Manual Controller, Supervisory Controller, and Executive Controller) describe different relationships between humans and automation. The concepts and methods have been used and proven useful in system analysis and design for two helicopter cockpit systems, a computer control system interface, and a traffic management centre.

Abstract Number: 147541
Title: Oculomotor Responses with Aviator Helmet-Mounted Displays and Their Relation to In-Flight Symptoms
Author(s): KOTULAK, J.C.; MORSE, S.E.
Source: Human Factors
Year: 1995
Volume: 37
Issue: 4
Pages: 699-710
Number of References: 29
Original Language: English
Classification Term(s): Visual accommodation and convergence; Eye and head movements; Headup and projected displays; Visual perception of form, shape, angle, size and distance
Classification Number(s): 02-01-03; 02-01-04; 02-01-06; 22-05-00
Application(s): Aircrew; Helicopters
Abstract:
Previous experiments have raised the possibility that abnormal oculomotor functioning could be the substrate for visual problems among aviators who use helmet-mounted displays. However, until the present investigation, no direct evidence linked the two. In these experiments, experienced Apache helicopter pilots, using the same helmet-mounted display that they use in flight, viewed Apache symbology and sensor imagery while their accommodation and vergence eye movements were measured in the laboratory. The authors found three circumstances that frequently occur in flight in which aviators with visual symptoms had different oculomotor responses than did asymptomatic aviators. Further work needs to be done to determine why symptomatic aviators respond differently from asymptomatic ones.

Abstract Number: 147862

Title: Performance Assessment of the V-22 Aircraft Crashworthy Crew Seat with Various Size and Gender Aircrew Using the Articulated Total Body (ATB) Computer Simulation Model
Author(s): RAPAPORT, M.B.; YEISER, C.W.; OSLON, M.B.
Source: Proceedings of the 33rd Annual Symposium of the SAFE Association, Reno, Nevada, October 23-25, 1995. SAFE Association, Cottage Grove, Oregon, USA
Year: 1995
Volume: -
Issue: -
Pages: 279-304
Number of References: 10
Original Language: English
Classification Term(s): Seating; Effects on the musculo-skeletal system; Evacuation procedures; Female; Male; Modelling human characteristics ; Static body measurements; Whole body acceleration and deceleration
Classification Number(s): 28-04-01; 03-04-01; 04-02-01; 04-02-02; 32-02-00; 50-12-00; 51-11-03; 63-01-01
Application(s): Air safety; Aircraft; Aircrew
Abstract:
The military services are encountering a number of new issues regarding recent expansions at the lower end of the aircrew population weight range. The potential for an increase in the risk of injury during a helicopter crash, specifically spinal injury, in operational crashworthy crew seats, is paramount. Computer simulations and analyses are performed in order to assess the potential for an increase in the risk of injury. Data trends between the existing and the expanded aircrew populations, invoking maximum pelvic accelerations, maximum spinal (T12/L1) compressive forces, and the Eiband criterion, are explored. Eiband criterion margin-of-success and margin-of-failure analyses are performed. A crew seat designed for the expanded population weight range is analyzed in order to assess the potential for a reduction in the risk of spinal injury.

Abstract Number: 148067
Title: Visual Performance Effects and User Acceptance of the M43A1 Aviation Protective Mask Frontserts
Author(s): WILDZUNAS, R.M.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 12
Pages: 1136-1143
Number of References: 24
Original Language: English
Classification Term(s): Headgear; Combined measures and indices; Display quality ; Equipment for altitude and depth; Human performance; Mental workload; Rating and ranking; Respiratory equipment; Use of simulators; Visual equipment
Classification Number(s): 51-09-01; 02-11-00; 07-01-00; 25-02-00; 51-10-01; 51-10-05; 51-10-07; 63-02-00; 64-06-00; 65-07-00
Application(s): Aircrew
Abstract:
The initial M43 aviation protective mask was fielded without provisions for optical corrective devices. Contact lenses, an interim solution, were not entirely acceptable since a small segment of the population could not be fitted adequately with contacts. This study evaluated visual performance effects and user acceptance of the M43A1 mask with frontsert correction modifications. The investigation was divided into three phases: 1) a helicopter simulator evaluation designed to experimentally test the suitability of the M43A1 fronserts, both in single vision and bifocal forms, for use in the aviation environment; 2) a static cockpit evaluation, designed to identify aircraft-specific problems with the frontsert system; and 3) an inflight evaluation to examine the stability and usability of the frontserts under actual flight conditions. The subjects were 30 U.S. Army aviators (28 men and 2 women). Objective data from flight simulation evaluations suggested there were no significant differences between flight performance with and without the mask, despite refractive status. Subjective data from static and flight evaluations reflected positive user acceptance of the new mask and frontserts. Problems may exist in smaller cockpits (OH-58 A/C, D), but evidence suggested that this may have been an artifact resulting from testing the mask while wearing protective body armour. Within the range of flight conditions and profiles examined, the M43A1 frontsert system meets U.S. Army aviation needs for optical correction when mission requirements dictate flying with chemical-biological protective masks.

Abstract Number: 149137
Title: The Design of Psychologically Appropriate Auditory Information Signals
Author(s): HELLIER, E.; EDWORTHY, J.
Source: Contemporary Ergonomics 1996, Edited by S.A. Robertson. Taylor & Francis, London
Year: 1996
Volume: -
Issue: -
Pages: 153-157
Number of References: 5
Original Language: English
Classification Term(s): Auditory coding; AUDITORY DISPLAYS; Auditory perception; Information and communication design for health and safety
Classification Number(s): 09-01-03; 02-02-02; 23-00-00; 51-05-00
Application(s): Helicopters

Abstract:
In previous research, changes in the acoustic parameters that are commonly used in the design of auditory warnings and information signals have been mapped to changes in semantic associations. In this paper, knowledge of how acoustic changes affect listeners' interpretations of sounds is used to design a set of trend monitoring sounds (trendsons) for the helicopter flight environment. Four trendsons that are psychologically appropriate for the situations that they monitor are proposed. For example, a trendson for Rotor Overspeed is proposed that increases in speed, fundamental frequency and regularity of rhythm. These acoustic changes have been shown to be associated with meanings that are psychologically appropriate to the condition of rotor overspeed. The potential advantages for the learning and retention of auditory information of designing by reference to psychological appropriateness is discussed.

Abstract Number: 149924
Title: Intelligent Information Presentation for a Helmet Mounted Display in a Synthetic Environment
Author(s): SHARKEY, T.J.; NEWMAN, R.L.; KENNEDY, D.P.; ZHANG, S.
Source: Proceedings of the Silicon Valley Ergonomics Conference and Exposition - ErgoCon'96, Palo Alto, California, May 12-15, 1996. Silicon Valley Ergonomics Institute, San Jose State University, San Jose, California, USA
Year: 1996
Volume: -
Issue: -
Pages: 209-217
Number of References: 9
Original Language: English
Classification Term(s): Virtual displays; Allocation of function; Charts and maps; Headup and projected displays; System adaptability and flexibility; Use of simulators
Classification Number(s): 22-05-01; 08-02-03; 22-05-00; 37-02-00; 38-01-00; 63-02-00
Application(s): Aircrew; Automation; Helicopters; Virtual reality
Abstract:
A Phase I Small Business Innovative Research (SBIR) programme was conducted to determine the feasibility of developing a system for intelligent control of symbology presented in a helmet mounted display (HMD). A demonstration of HMD mode control was conducted using a low-fidelity helicopter flight simulator. This paper shows that useful and acceptable display control logic can be developed and implemented.

Abstract Number: 150095
Title: Review of Psychomotor Skills in Pilot Selection Research of the U.S. Military Services
Author(s): GRIFFIN, G.R.; KOONCE, J.M.
Source: International Journal of Aviation Psychology
Year: 1996
Volume: 6
Issue: 2
Pages: 125-147
Number of References: 66
Original Language: English
Classification Term(s): SELECTION AND SCREENING; Ability; Application of test batteries; Mental ability; Physical ability
Classification Number(s): 43-00-00; 05-02-00; 05-02-01; 05-02-02; 64-07-00
Application(s): Aircrew; Armed forces; Computer based assessment
Abstract:
This review provides an historical perspective of the use of psychomotor, perceptual-cognitive paper-and-pencil, and automated tests for the selection of pilot trainees by the U.S. military services. Automated versions of vintage psychomotor tests (developed in the 1930s and 1940s) seem to be as predictive of military pilot/aviator performance today as in the past. The psychomotor tests receiving the most attention today are the Complex Coordination and Two-Hand Coordination tests originally developed by Mashburn and colleagues before World War II (Mashburn, 1934). These tests were significant predictors of Air Force and Navy pass-fail criteria in the past, and automated versions are similarly predictive today. The U.S. Army and Air Force are now using a combination of paper-and-pencil and automated psychomotor-cognitive tests for initial selection (Air Force) or helicopter assignment (Army). It appears that the Navy is considering the use of automated cognitive and psychomotor tests in a selection battery of the future.

Abstract Number: 151227
Title: Give Me Situation Awareness, or Give Me Death
Author(s): EIDELKIND, M.; MOFFETT, R.; ARENDT, D.; MCKEE, C.
Source: Experimental Analysis and Measurement of Situation Awareness, Edited by D.J. Garland and M.R. Endsley. Embry-Riddle Aeronautical University Press, Daytona Beach, Florida, USA
Year: 1995
Volume: -
Issue: -
Pages: 407-413
Number of References: 5
Original Language: English
Classification Term(s): Mental workload; Rating and ranking; Workload demands
Classification Number(s): 07-01-00; 41-03-05; 64-06-00
Application(s): Aircrew; Helicopters; Situational awareness
Abstract:
Combat aviation is an extremely dangerous discipline. In order to survive, aircrews must remain situationally aware, relying heavily on their cockpit displays. Even a moment's distraction could prove fatal. This paper presents situation awareness findings collected

through a methodology that blended performance results with subjective workload and priority assessments during an operational test of the recently developed Longbow Apache Attack helicopter. The Mission Assessment Technique, a new means for measuring aircrew workload and priority schemes, is introduced.

Abstract Number: 151935
Title: Analysing Stress in Offshore Survival Course Trainees
Author(s): HARRIS, R.A.; COLESHAW, S.R.K.; MACKENZIE, I.G.
Source: Health and Safety Executive, HSE Books, Sudbury, Suffolk, Publication No.OTH 94 446
Year: 1996
Volume: -
Issue: -
Pages: 127pp
Number of References:
Original Language: English
Classification Term(s): Fear, anxiety, mood and emotion; Elderly adults; Evacuation procedures; Middle aged adults; Questionnaires and surveys; Stress; TRAINING
Classification Number(s): 06-05-00; 04-01-03; 04-01-04; 07-03-00; 44-00-00; 51-11-03; 64-05-00
Application(s): Fire services; Helicopters; Offshore industries
Secondary Source: Safety and Health at Work. ILO-CIS Bulletin (CIS 96-1167)
Abstract:
Physiological and psychological measurements, chosen as indicators of stress, were made on individuals undergoing offshore survival training, concentrating on practical exercises. Their emotional reactions were assessed by various questionnaires filled in by the trainees themselves. Most of them were especially anxious at the start of the course: helicopter underwater escape training was perceived to be the most difficult exercise. Particular problems were found to be also associated with fire training. Possible means of alleviating these issues are discussed. Older refreshers were found to be less anxious, probably as a result of experience.

Abstract Number: 152024
Title: Simulation Activity of a CAD Draftsman during a Design Task
Author(s): LEBAHAR, J.C.
Source: Travail Humain
Year: 1996
Volume: 59
Issue: 3
Pages: 253-275
Number of References: 14
Original Language: French
Original Title: L'Activite de Simulation d'un Dessinateur CAO dans une Tache de Conception
Classification Term(s): Knowledge engineering and acquisition; Design and development process; Job analysis and skills analysis; Protocol analysis
Classification Number(s): 17-05-00; 38-02-00; 63-05-02; 63-13-00
Application(s): Aircraft manufacturing; Helicopters
Abstract:
The purpose of this article is to describe the knowledge and metaknowledge of a CAD draftsman (CADD). He is in charge of modelling and evaluating cockpit design solutions developed by the specialised technical services (STS) of a helicopter manufacturing enterprise. In order to highlight knowledge and metaknowledge, an analysis of the CADD's global simulation task required the description of constraints arising from the collective STS organisation which controls design solutions for its simulation cycles. In this context, the effective task of the CADD is defined as an interaction complex between the CADD, his CAD system, the collective design organisation, and its geometric simulation models. The analysis of his activity furnishes the observable parameters which allow one to describe the expertise and the manner in which he organises his activity in order to adapt himself to the constraints of his task and to accomplish objectives. The wish to emphasise the underlying knowledge and metaknowledge used in this simulation activity arose from the fact that the knowledge used by the CADD exceeded simple technical drafting. Approximately thirty days were invested in the controlled observation of this activity using three sub-tasks pertaining to the global simulation task. One of them is described in detail in the article as well as the detailed analysis of the relevant CADD's activity. The analysis of this activity (modelling and evaluation of cockpit modifications) shows how the CADD evaluates the conditions of pilot visibility through different treatment conditions of simulation data; he uses stereogram software to establish his simulation objectives; he changes methods in order to adapt himself to the data and to the simulation objectives, and in order to control his diagnostics; he navigates between approximations and calculations when his diagnostics require exploration or precision. The analysis of the contents of his verbal reports complemented the observation of his screen work. The CADD's fields of competence (strategies, metaknowledge and multi-field knowledge) exhibit the entire extent of his specific experience of his capacity to accomplish these simulations. The dominant aspect of the control activity (control of STS solutions and auto-control of his own activity) shows to what point the operational environment of the CADD has influenced the genesis of his knowledge and metaknowledge. The contents of the CADD's mental simulations correctly show that his activity does not reduce himself to a simple draftsman's activity because when he decodes his own drawings, he refers to information which does not figure on these drawings.

Abstract Number: 152040
Title: Classification of Speech under Stress Using Target Driven Features
Author(s): WOMACK, B.D.; HANSEN, J.H.L.

Source: Speech Communication
Year: 1996
Volume: 20
Issue: 1-2
Pages: 131-150
Number of References: 32
Original Language: English
Classification Term(s): Voice input devices; Classification systems and taxonomies; Fear, anxiety, mood and emotion; Signal processing and spectral analysis; Speech; Stress
Classification Number(s): 21-21-00; 02-10-05; 06-05-00; 07-03-00; 63-10-02; 64-03-00
Application(s): Helicopters
Abstract:
Speech production variations due to perceptually induced stress contribute significantly to reduced speech processing performance. One approach for assessment of production variations due to stress is to formulate an objective classification of speaker stress based upon the acoustic speech signal. This study proposes an algorithm for estimation of the probability of perceptually induced stress. It is suggested that the resulting stress score could be integrated into robust speech processing algorithms to improve robustness in adverse conditions. First, results from a previous stress classification study are employed to motivate selection of a targeted set of speech features on a per phoneme and stress group level. Analysis of articulatory, excitation and cepstral based features is conducted using a previously established stressed speech database (Speech Under Simulated and Actual Stress (SUSAS)). Stress sensitive targeted feature sets are then selected across ten stress conditions (including Apache helicopter cockpit, Angry, Clear, Lombard effect, Loud, etc) and incorporated into a new targeted neural network stress classifier. Second, the targeted feature stress classification system is then evaluated and shown to achieve closed speaker, open token classification rates of 91.0%. Finally, the proposed stress classification algorithm is incorporated into a stress directed speech recognition system, where separate hidden Markov model recognizers are trained for each stress condition. An improvement of +10.1% and +15.4% over conventionally trained neutral and multi-style trained recognizers is demonstrated using the new stress directed recognition approach.

Abstract Number: 152283
Title: Stress Prevention in the Offshore Oil and Gas Exploration and Production Industry
Author(s): SUTHERLAND, V.J.; COOPER, C.L.
Source: International Labour Office, Geneva, Switzerland, Publication No.CONDI/T/WP.1/1996
Year: 1996
Volume: -
Issue: -
Pages: 38pp
Number of References: 25
Original Language: English
Classification Term(s): Education, training and safety programmes; FAMILY AND HOME LIFE; HOURS OF WORK; Stress; Work design and organisation for health and safety; Workload demands; Workplace and equipment design for health and safety
Classification Number(s): 51-02-00; 07-03-00; 39-00-00; 41-03-05; 51-07-00; 51-08-00; 60-00-00
Application(s): Gas industry; Manufacturing industry; Oil and petroleum industry
Secondary Source: Safety and Health at Work. ILO-CIS Bulletin (CIS 96-1524)
Abstract:
This publication describes the use of a stress audit to identify sources of stress among workers in the offshore oil and gas exploration and production industry. Measures are outlined for the prevention of stress related to understimulation, work overload, helicopter travel, physical working conditions, safety and security offshore, unpredictability of work patterns, career development, organizational structure and climate, and the home/work interface. Individual strategies for stress control include counselling, relaxation techniques, cognitive reappraisal, and stress education programmes.

Abstract Number: 152635
Title: Sustaining Female Helicopter Pilot Performance with Dexedrine during Sleep Deprivation
Author(s): CALDWELL, J.A.; CALDWELL, J.L.; CROWLEY, J.S.
Source: International Journal of Aviation Psychology
Year: 1997
Volume: 7
Issue: 1
Pages: 15-36
Number of References: 17
Original Language: English
Classification Term(s): Drugs; Brain function; Combined measures and indices; Fear, anxiety, mood and emotion; Female; Human performance; Physiological and psychophysiological recording ; Sleep loss; Use of simulators
Classification Number(s): 06-07-00; 02-11-00; 03-01-05; 04-02-02; 06-01-01; 06-05-00; 63-02-00; 63-07-00; 65-07-00
Application(s): Aircrew
Abstract:
To investigate the efficacy of Dexedrine for maintaining the performance of sleep deprived female aviators, six female UH-60 pilots were exposed to 2 40-hr sleep deprivation periods during which they alternately received Dexedrine (3 10-mg doses) or placebo. Dexedrine improved 6 of 9 flight simulator manoeuvres and enhanced general levels of alertness as measured by EEG and Profile of Mood States assessments. The results from a cognitive test were negligible and inconsistent, probably because of the short test

duration. Overall, it appeared that Dexedrine effectively sustained the performance, alertness, and mood of female UH-60 pilots despite short-term sleep loss. There were no problematic side effects.

Abstract Number: 152949
Title: A New Helicopter Passenger Suit System
Author(s): FARNWORTH, B.; PORTMAN, S.F.
Source: Proceedings of the 34th Annual Symposium of the SAFE Association, Reno, Nevada, October 21-23, 1996. SAFE Association, Nashville, Tennessee
Year: 1996
Volume: -
Issue: -
Pages: 159-163
Number of References:
Original Language: English
Classification Term(s): Clothing ensembles; Equipment for altitude and depth; Respiratory equipment
Classification Number(s): 51-09-05; 51-10-05; 51-10-07
Application(s): Aircrew; Helicopters; Offshore industries
Abstract:

Abstract Number: 154099
Title: The Effects of the AH-64A Pilot's Night Vision System on the Performance of Seven Simulated Maneuver Tasks
Author(s): STEWART, J.E.
Source: International Journal of Aviation Psychology
Year: 1997
Volume: 7
Issue: 3
Pages: 183-200
Number of References: 11
Original Language: English
Classification Term(s): Night vision devices; Headup and projected displays; Human performance; Rating and ranking; Size, magnification and viewing distance; Use of simulators
Classification Number(s): 22-01-06; 02-11-00; 22-05-00; 25-01-01; 63-02-00; 64-06-00
Application(s): Aircrew; Helicopters
Abstract:
The Pilot's Night Vision System (PNVS) allows the pilot of the AH-64A Apache helicopter to fly and navigate at night. The PNVS restricts field of view (FOV) and degrades visual acuity, two factors that should adversely affect pilot performance during night operations, especially for flight manoeuvres that rely on peripheral cues. Participants, all AH-64A instructor pilots, flew a mission profile in a high-fidelity simulation of the AH-64A. The profile consisted of seven routine manoeuvres that were flown first under daytime (baseline) conditions (using a rear projection display with a 174° FOV) then under night conditions (with a simulated PNVS display with a 40° FOV). Automated performance measures were the main dependent variables. It was expected that pilot performance degradation would be significant on hovering turns, takeoffs, and landings, and negligible on stationary hovering and hover taxiing. Significant performance degradations were found for all manoeuvre tasks. Applications of the findings to training and pilot workload standards are discussed.

Abstract Number: 144540
Title: Jet Pilot, Helicopter Pilot, and College Student: A Comparison of Central Vision
Author(s): TEMME, L.A.; STILL, D.L.; FATCHERIC, A.J.
Source: Aviation, Space, and Environmental Medicine
Year: 1995
Volume: 66
Issue: 4
Pages: 297-302
Number of References: 22
Original Language: English
Classification Term(s): SELECTION AND SCREENING; Ability; Application of test batteries; Disability glare; Human performance; Reaction time and speed of performance; Visual accommodation and convergence; Visual detection and acuity, contrast sensitivity and visual field
Classification Number(s): 43-00-00; 02-01-01; 02-01-03; 02-11-00; 02-11-01; 05-02-00; 29-03-02; 64-07-00
Application(s): Aircrew; Helicopters
Abstract:
Jet pilots (JP) (N = 44), helicopter pilots (HP) (N = 29), and college students (CS) (N = 41) were tested with a battery of vision tests designed to assess vision skills important for success as a naval aviator. Tests included measures of reaction time, high-contrast acuity, low-contrast acuity, spot detection, far-to-near gaze shift, near-to-far gaze shift, low-contrast acuity with glare, and dark focus. A Multivariate Analysis of Variance (MANOVA) compared the vision test performance of the three subject groups (JP, HP, and CS). Only with the Far-to-Near test was there no difference among the three groups. On all other tests, JP outperformed CS. The difference between HP and CS was less consistent and less dramatic than the difference between JP and CS. Only with the glare test were CS significantly better than HP. The results are interpreted as reflecting the influence of various selection factors, operational requirements, differential attrition, and age.

Abstract Number: 145856
Title: Noise Induced Hearing Loss in Military Helicopter Aircrew - a Review of the Evidence
Author(s): OWEN, J.P.
Source: Journal of the Royal Army Medical Corps
Year: 1995
Volume: 141
Issue: 2
Pages: 98-101
Number of References: 19
Original Language: English
Classification Term(s): Effects on the auditory system; Auditory equipment; Exposure to noise; Headgear; Reviews
Classification Number(s): 50-03-00; 01-04-00; 30-03-00; 51-09-01; 51-10-02
Application(s): Aircrew; Armed forces; Helicopters
Abstract:
Noise Induced Hearing Loss (NIHL) has been recognised for some time. In the military environment one group of personnel at risk are Army helicopter aircrew who are exposed to continuous noise levels of up to 100 dB(A) in flight. The evidence for the damaging effect of this occupational noise is reviewed and some of the difficulties in drawing conclusions are highlighted. The current protection offered for the Mk 4 helmet is discussed and the incorporation of Active Noise Reduction (ANR) is suggested as a likely way of ensuring that the in-flight noise exposure in Army aircrew is kept as low as possible.

Abstract Number: 148818
Title: A Correlative Investigation of Simulated Occupant Motion and Accident Report in a Helicopter Crash
Author(s): BEALE, D.G.; ALEM, N.M.; BUTLER, B.P.
Source: Aviation, Space, and Environmental Medicine
Year: 1996
Volume: 67
Issue: 1
Pages: 23-29
Number of References: 10
Original Language: English
Classification Term(s): Modelling and simulation; Biomechanics; Data collection and recording; Modelling human characteristics ; Modelling system characteristics; Surveys, statistics and analysis
Classification Number(s): 63-01-00; 03-04-00; 48-01-00; 48-02-00; 63-01-01; 63-01-02
Application(s): Helicopters
Abstract:
In the late 1980's, an Army Apache helicopter crashed during a training mission, resulting in fatal injuries to the rear seat pilot and survivable injuries to the front seat copilot. U.S. Army investigators assessed the aircraft damage and aircrew injuries, and examined the helmets, restraint systems, and crashworthy seats. Computer simulations that approximate an actual crash event can provide insightful output (human body motions and forces on the human body) that illuminates understanding of the injury dynamics and the effect of safety systems designed to minimize injury. Crash kinematics and vehicle accelerations were derived from the investigation and inferred from the aircraft damage, and input to a computer-based analytical simulation that calculated the dynamics and forces to which the crew were exposed. The authors treat the simulation like a looking glass into the event, revealing how and when safety devices could have responded during the crash, and the nature of injury-producing forces experienced by the occupants. Computer simulated whole-body and head-neck motion are graphically displayed, along with plots of joint forces, seat stroke, harness belt acceleration, and occupant accelerations. The calculated motions and forces indicated that injuries found in the accident were likely, hence the simulation may indeed by representative of the actual event.

Abstract Number: 152063
Title: The Effect of a Headset Leakage on Speech Intelligibility in Helicopter Noise
Author(s): WAGSTAFF, A.S.; TVETE, O.; LUDVIGSEN, B.
Source: Aviation, Space, and Environmental Medicine
Year: 1996
Volume: 67
Issue: 11
Pages: 1034-1038
Number of References: 9
Original Language: English
Classification Term(s): Voice output and speech synthesis; Auditory equipment; Communication and masking in noise; Eye pieces and glasses; Intelligibility; Voice input devices
Classification Number(s): 23-02-00; 09-01-02; 21-21-00; 22-01-03; 30-03-03; 51-10-02
Application(s): Aircrew; Helicopters
Abstract:
Speech intelligibility tests in recorded helicopter noise were performed on 10 subjects with normal hearing, using a Peltor aviation headset. The subjects acted as their own controls, a pair of sunglasses being the only variable factor. Noise levels were also measured at the tympanic membrane in one of the test subjects for 7 consecutive fittings of the headset, with and without glasses. Results showed a substantial decrease in speech intelligibility when wearing glasses, being most marked for critical signal-to-noise ratios and the most difficult speech material. Changes were statistically highly significant. Averaged speech intelligibility scores decreased from 68% to 29% for one-syllable words

when wearing glasses at critical signal-to-noise ratios. Noise measurements at the tympanic membrane in one subject showed a low-frequency leakage varying between consecutive fittings. The findings show that even small leakages due to fitting of the headset or helmet should be avoided, particularly in noisy aircraft with communication-demanding mission profiles.

Abstract Number: 152963
Title: Liferaft Evacuation from a Ditched Helicopter: Dry Shod vs. Swim Away Method
Author(s): BROOKS, C.J.; POTTER, P.L.; HOGNESTAD, B.; BARANSKI, J.
Source: Aviation, Space, and Environmental Medicine
Year: 1997
Volume: 68
Issue: 1
Pages: 35-40
Number of References: 28
Original Language: English
Classification Term(s): Evacuation procedures; Education, training and safety programmes; TRAINING; Use of simulators
Classification Number(s): 51-11-03; 44-00-00; 51-02-00; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
There were 23 male and 21 female subjects who conducted a series of evacuations from the NUTEC Super Puma helicopter simulator into an RFD heliraft in the Bergen Fjord. The dry shod and swim-away methods were compared both on the windward and leeward side. The dry shod method is the method of choice, although the swim-away method should be taught as an alternative in the event of imminent capsizing. Irrespective of method, evacuation wherever possible should be on the windward side. Because it is critical for the aircrew to make a split-second decision concerning which method to use, they should have special training in open water after traditional pool training.

Abstract Number: 156875
Title: The Effects of Heat Stress on UH-60 Helicopter Pilots
Author(s): REARDON, M.J.; KATZ, L.C.; FRASER, B.
Source: Proceedings of the 35th Annual Symposium of the SAFE Association, Phoenix, Arizona, September 8-10, 1997. SAFE Association, Nashville, Tennessee
Year: 1997
Volume: -
Issue: -
Pages: 39-45
Number of References: 2
Original Language: English
Classification Term(s): Thermal stress; Body temperature regulation; Clothing ensembles; Fear, anxiety, mood and emotion; High temperature; Modelling human characteristics ; Physiological and psychophysiological recording ; Questionnaires and surveys; Ratings and preferences; Self recording; Stress
Classification Number(s): 33-04-00; 03-02-04; 06-05-00; 07-03-00; 33-01-02; 51-09-05; 63-01-01; 63-07-00; 63-09-02; 64-05-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
A repeated measures study with 14 aviators flying simulated UH-60 helicopter mission profiles was recently performed at the U.S. Army Aeromedical Research Laboratory to evaluate the effects of standard (MOPP0) and encumbered (MOPP4) aviator ensembles in cool (70^oF) and hot (100^oF) conditions. Average crew endurance was reduced from the fully completed mission time of 309 minutes in the standard-cool condition to 107 minutes in the encumbered hot condition. This was due to rapid increases in core temperature, progressive physical discomfort and psychological stress, and adversely affected mood. Calculated total body heat storage for the encumbered-hot condition was 1445 watts compared to 627 watts for the standard-hot condition. Heavy sweat rates while in the encumbered-hot condition (1523 cc/hr compared to 92.2 cc/hr during the standard-cool condition) led to significantly greater amounts of dehydration (2.5 percent compared to 0.2 percent during the standard-cool condition) over shorter periods of time. The results of this evaluation suggest that encumbered protective aviator flight uniforms should be designed to be lightweight and porous to allow efficient evaporation of sweat. Microclimate cooling should be considered for preventing excessive core temperature elevation when aviators wear occlusive protective ensembles in hot weather conditions.

Abstract Number: 157061
Title: Effects of Chemical Protective Clothing and Heat Stress on Army Helicopter Pilot Performance
Author(s): CALDWELL, J.L.; CALDWELL, J.A.; SALTER, C.A.
Source: Military Psychology
Year: 1997
Volume: 9
Issue: 4
Pages: 315-328
Number of References: 12
Original Language: English
Classification Term(s): Clothing ensembles; Body temperature regulation; Chemical hazards; Drugs; Headgear; High temperature; Respiratory equipment; Thermal stress; Use of simulators
Classification Number(s): 51-09-05; 03-02-04; 06-07-00; 33-01-02; 33-04-00; 49-06-00; 51-09-01; 51-10-05; 63-02-00
Application(s): Aircrew; Armed forces; Helicopters

Abstract:
The U.S. Army Aeromedical Research Laboratory investigated performance of helicopter pilots flying in both temperate and hot weather, with and without various types of chemical protective clothing (CPC) and pilot cooling system. These studies were conducted in the field and in laboratory environments and evaluated aviator performance under conditions that increase thermal loading to explore heat stress in aviation operations. The investigations defined expected flying limits and examined flight performance under these conditions. The results of early studies prompted evaluations of personal cooling devices and their functional utility for aviators. These investigations provided critical information to the operational community about the effects of CPC and heat stress on aviators operating in varied environments, especially hot desert or tropical climates.

Abstract Number: 157835
Title: A Full Mission Simulation Success Story: RPA Simulation at CSRDF Yields Promising Results
Author(s): CASPER, P.A.
Source: Ancient Wisdom - Future Technology. Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting, Albuquerque, New Mexico, September 22-26, 1997. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 95-99
Number of References: 5
Original Language: English
Classification Term(s): Use of simulators; DISPLAY AND CONTROL CHARACTERISTICS; Human performance; Mental workload; Rating and ranking
Classification Number(s): 63-02-00; 02-11-00; 07-01-00; 25-00-00; 64-06-00
Application(s): Aircrew; Armed forces; Helicopters; Situational awareness
Abstract:
In support of the US Army's Rotorcraft Pilot's Associate Advanced Technology Demonstration Program, the Crew Station Research and Development Branch (CSRDB) at NASA's Research Center has recently completed a full mission simulation experiment testing two alternative mission equipment packages (MEPs). Four crews of Army helicopter pilots flew 64 trials, performing representative combat helicopter tasks. Objective and subjective performance metrics provided statistically significant data supporting a priori hypotheses about performance differences between the two systems. Crews flying the advanced MEP killed more targets more efficiently, and were killed fewer times than when flying the baseline MEP. In addition, their workload was lower, and subjectively assessed situation awareness was higher with the advanced system. These results are encouraging for full mission simulation research, and suggest that a standard empirical model may in fact be applicable to full mission simulation.

Abstract Number: 161534
Title: The Effect of Scene Content on Speed, Time and Distance Perception
Author(s): AWE, C.A.; JOHNSON, W.W.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 1
Year: 1993
Volume: -
Issue: -
Pages: 281-285
Number of References: 5
Original Language: English
Classification Term(s): Visual perception of texture and movement; Time perception; Trained versus untrained; Visual perception of form, shape, angle, size and distance
Classification Number(s): 02-01-07; 02-01-06; 02-08-00; 04-05-00
Application(s): Aircrew; Helicopters
Abstract:
Helicopter flights performed at low-levels place high demands on pilots; they must simultaneously control the vehicle, avoid obstacles, and navigate. Therefore, pilots must correlate cues viewed in the external scene with information on a map in order to maintain their geographical orientation. This is a particularly difficult task when helicopter pilots fly through visually unfamiliar terrain without highly detailed maps. As a result, the pilot must often use estimates of elapsed time, distance travelled, and/or average speed in order to maintain a flight path indicated on a map during flight segments when these cues are absent. Therefore the current study is concerned with the perception of speed, time and distance, which the authors assume underlies the ability to orient oneself during these types of flight segment.

Abstract Number: 161809
Title: Flight Crew Fatigue III: North Sea Helicopter Air Transport Operations
Author(s): GANDER, P.H.; BARNES, R.M.; GREGORY, K.B.; GRAEBER, R.C.; CONNELL, L.J.; ROSEKIND, M.R.
Source: Aviation, Space, and Environmental Medicine
Year: 1998
Volume: 69
Issue: 9 Pt.2
Pages: B16-B25
Number of References: 17
Original Language: English

Classification Term(s): Fatigue; Drugs; Fear, anxiety, mood and emotion; Mental workload; Nutrition and diet; Rating and ranking; Self recording; Sleep; Sleep loss; Sleep pattern; Workload demands
Classification Number(s): 06-04-00; 06-01-00; 06-01-01; 06-01-02; 06-05-00; 06-06-00; 06-07-00; 07-01-00; 41-03-05; 63-09-02; 64-06-00
Application(s): Aircrew; Helicopters
Abstract:
The authors studied 32 helicopter pilots before, during, and after 4-5 d trips from Aberdeen, Scotland, to service North Sea oil rigs. On duty days, subjects awoke 1.5 h earlier than pretrip or posttrip, after having slept nearly an hour less. Subjective fatigue was greater posttrip than pretrip. By the end of trip days, fatigue was greater and mood more negative than by the end of pretrip days. During trips, daily caffeine consumption increased 42%, reports of headache doubled, reports of back pain increased 12-fold, and reports of burning eyes quadrupled. In the cockpits studied, thermal discomfort and high vibration levels were common. Subjective workload during preflight, taxi, climb and cruise was related to the crewmembers' ratings of the quality of the aircraft systems. During descent and approach, workload was affected by weather at the landing site. During landing, it was influenced by the quality of the landing site and air traffic control. Beginning duty later, and greater attention to aircraft comfort and maintenance, should reduce fatigue in these operations.

Abstract Number: 162266
Title: Strategies for Army Helicopter Pilots during Rapid Transitions to Nocturnal Work Schedules
Author(s): COMPERATORE, C.A.; PEARSON, J.Y.; CHIARAMONTE, J.A.; STONE, L.W.; BOLEY, K.O.; HESS, G.L.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 634-638
Number of References: 4
Original Language: English
Classification Term(s): Shift work; Experience and practice; Instrument recording; Sleep loss; Sleep pattern
Classification Number(s): 39-01-00; 04-04-00; 06-01-01; 06-01-02; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
The overall objective of this study was to determine the efficiency of a shift-lag prevention plan that merged mission demands and crew rest requirements of Army helicopter pilots undergoing 2 consecutive weeks of flying with night vision goggles (NVG).

Abstract Number: 162442
Title: EMS Helicopter Incidents Reported to the NASA Aviation Safety Reporting System
Author(s): CONNELL, L.J.; REYNARD, W.D.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 1001-1008
Number of References: 8
Original Language: English
Classification Term(s): Data collection and recording; Critical incident technique; Errors, accuracy and reliability
Classification Number(s): 48-02-00; 02-11-02; 64-09-00
Application(s): Aircrew; Helicopters
Abstract:
The objectives of this evaluation were to: (1) identify the types of safety-related incident reported to the Aviation Safety Reporting System (ASRS) in Emergency Medical Service (EMS) helicopter operations; (2) describe the operational conditions surrounding these incidents, such as the weather, airspace, flight phase, time of day; and (3) assess the contribution of these incidents of selected human factors considerations, such as communication, distraction, time pressure, workload, and flight/duty impact.

Abstract Number: 163162
Title: The Sustainment of Helicopter Pilot Performance with Dexedrine during Continuous Operations
Author(s): CALDWELL, J.A.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 2
Year: 1995
Volume: -
Issue: -
Pages: 920-925
Number of References: 11
Original Language: English
Classification Term(s): Drugs; Arousal; Brain function; Circadian rhythms; Fatigue; Fear, anxiety, mood and emotion; Human performance; Physiological and psychophysiological recording ; Signal processing and spectral analysis; Sleep loss; Use of simulators
Classification Number(s): 06-07-00; 02-11-00; 03-01-05; 06-01-01; 06-02-01; 06-03-00; 06-04-00; 06-05-00; 63-02-00; 63-07-00; 63-10-02
Application(s): Aircrew; Helicopters

Abstract:
Dexedrine (3, 10-mg doses) or placebo was administered to 6 male helicopter pilots (at 2400, 0400 and 0800 hours) during 2 separate sleep deprivation periods. Performance effects were assessed through the night and during the subsequent day at 0100, 0500, 0900, 1300 and 1700 hours. During each session, subjects flew a standardised profile in a UH-60 simulator and completed a variety of other tests including resting electroencephalograms and mood assessments. Dexedrine improved aviator control on every flight manoeuvre with the exception of the hovering turns and the formation flight. Performance on the stationary hovers, the low-level navigation, the climbs and descents, straight-and-level segments, standard-rate turns, and the left-descending turn all manifested at least one Dexedrine-related enhancement. The times of day at which Dexedrine facilitated flight performance most noticeably were 0500, 0900 and 1700 hours. Analyses of the EEG and mood data showed that alertness was sustained signficantly by Dexedrine.

Abstract Number: 164545
Title: Subjective Measurement Assessment in a Full Mission Scout-Attack Helicopter Simulation
Author(s): HEERS, S.T.; CASPER, P.A.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1998
Volume: -
Issue: -
Pages: 26-30
Number of References: 8
Original Language: English
Classification Term(s): Mental workload; Rating and ranking; System facilities; Team work; Use of simulators; Workload demands
Classification Number(s): 07-01-00; 37-03-00; 41-02-03; 41-03-05; 63-02-00; 64-06-00
Application(s): Aircrew; Armed forces; Helicopters; Situational awareness
Abstract:
A full mission helicopter simulation was conducted in support of the US Army's Rotocraft Pilot's Associate Advanced Technology Demonstration. Four crew flew four doctrinally correct scenarios under two mission equipment package conditions. The Advanced Mission Equipment Package (AMEP) contained additional equipment and longer sensor ranges than the Baseline Mission Equipment Package (BMEP). Following each run, pilots filled out the NASA Task Load Index (TLX) workload scales and a perceived situation awareness (SA) scale. TLX ratings were lower for the AMEP, while SA ratings were higher for the AMEP. A similar inverse relationship was found in the scenario effects. A stepwise multiple regression found a significant relationship between SA ratings and three of the component TLX subscale ratings. Both perceived workload and situation awareness ratings indicate a benefit from the advanced technologies available on the AMEP. These measures were also sensitive to the varying demands of the scenarios and pilot responsibilities.

Abstract Number: 166270
Title: A Comprehensive Noise Survey of the S-70A-9 Black Hawk Helicopter
Author(s): KING, R.B.; SALIBA, A.J.; BROCK, J.R.
Source: Aviation, Space, and Environmental Medicine
Year: 1999
Volume: 70
Issue: 2
Pages: 107-116
Number of References: 18
Original Language: English
Classification Term(s): Noise levels; Auditory equipment; Exposure to noise; Instrument recording
Classification Number(s): 30-01-00; 30-03-00; 51-10-02; 63-09-03
Application(s): Aircrew; Armed forces; Helicopters; Maintenance
Abstract:
This paper reports the results of a comprehensive noise survey of the Sikorsky S-70A-9 Black Hawk helicopter environment and provides an assessment of the hearing protection devices worn by Australian Army personnel exposed to that environment. At-ear noise levels were measured at 4 positions in the cabin of the Black Hawk under various ground running conditions using the Head Acoustic Measurement System (Head, GmbH). The attenuation properties of the hearing protection devices (HPDs) normally worn by aircrew and maintenance crews (the ALPHA helmet and the Roanwell MX-2507 Communications headset) were also assessed. At-ear sound pressure levels that would be experienced by personnel wearing their normal HPDs were determined at the positions they would normally occupy in and around the aircraft. Results indicate that HPDs do not provide adequate hearing protection to meet current hearing conservation regulations which allow a permissible noise exposure of 85 dB(A) for an 8-h day.

Abstract Number: 170471
Title: Direct Voice versus Manual Input Technology for Aircraft CDU Operations
Author(s): FARRELL, P.S.E.; CAIN, B.; SARKAR, P.; EBBERS, R.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999

Volume: -
Issue: -
Pages: 210-215
Number of References: 4
Original Language: English
Classification Term(s): Voice input devices; Attention, time sharing and resource allocation; CHOICE OF COMMUNICATION MEDIA; Mental workload; Ratings and preferences
Classification Number(s): 21-21-00; 02-11-03; 07-01-00; 10-00-00; 65-08-01
Application(s): Aircrew; Helicopters
Abstract:
Direct voice input (DVI) is often regarded as a replacement technology for keyboard entry activities in the cockpit. DVI may reduce workload and increase performance by exploiting verbal psychomotor resources. For this study it was assumed that DVI and manual input (MI) operations might interfere with other flying activities because these tasks require some combination of four limited resources (visual, auditory, cognitive, and psychomotor; VACP). The experiment was performed in a helicopter simulation environment. A mission scenario was developed wherein Canadian Forces Griffon helicopter pilots were asked to set radio frequencies (or radio links) using a control display unit (CDU) either with MI or DVI, and to perform flying tasks that manipulated the demand on the individual VACP resources. The radio link completion times and errors were recorded along with flight, subjective workload, and video data. An analysis of variance was performed on a small subset of data, and the results suggested that DVI was superior to manual input during the psychomotor and visual phases due to the increased heads up time afforded by DVI (as reported in the literature). However, high psychomotor activity reduced the frequency of verbalization. Interestingly, MI was superior to DVI during the cognitive phase. Unexpectedly, performance did not differ between MI and DVI during the audio phase. The study showed that DVI did not outperform MI under all conditions. The implication of this study is that DVI should be utilized to augment rather than replace manual input activities in the cockpit.

Abstract Number: 101906
Title: Applicability of Using the CAR-II Model in Design and Evaluation of Multioperator Workstations with Shared Controls
Author(s): MORRISSEY, S.J.; HERRING, B.E.; GENNETTI, M.G.
Source: Progress for People. Proceedings of the Human Factors Society 29th Annual Meeting, Baltimore, Maryland, September 29-October 3, 1985, Edited by R.W. Swezey. The Human Factors Society, Santa Monica, California, Volume 2
Year: 1985
Volume: -
Issue: -
Pages: 698-701
Number of References:
Original Language: English
Classification Term(s): Reach; Modelling and simulation
Classification Number(s): 27-01-01; 63-01-00
Application(s): Computer-aided design; Helicopters
Abstract:
This study was done to show how a computerized workstation design program could be used to design and evaluate workstations having multiple operators with shared or common controls. To do this the Computerized Assessment of Reach program (CAR) was used to evaluate the cockpit of the OH-58A (Huey) helicopter. This same program was then used to demonstrate methods of cockpit redesign.

Abstract Number: 102781
Title: Retrofit Energy-Absorbing Crewseat for the SH-3 (S-61 Series) Sea King Helicopter
Author(s): ZIMMERMANN, R.E.
Source: Proceedings of the 23rd Annual Symposium of the SAFE Association, Las Vegas, Nevada, December 1-5, 1985. SAFE Association, Van Nuys, California, USA
Year: 1985
Volume: -
Issue: -
Pages: 76-80
Number of References:
Original Language: English
Classification Term(s): Seating; Equipment for altitude and depth; Whole body acceleration and deceleration
Classification Number(s): 28-04-01; 32-02-00; 51-10-07
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 102976
Title: Evaluation of the Crash Environment and Injury-Causing Hazards in U.S. Navy Helicopters
Author(s): COLTMAN, J.W.; ARNDT, S.; DOMZALSKI, L.
Source: Proceedings of the 23rd Annual Symposium of the SAFE Association, Las Vegas, Nevada, December 1-5, 1985. SAFE Association, Van Nuys, California, USA
Year: 1986
Volume: -
Issue: -
Pages: 309-314
Number of References:
Original Language: English

Classification Term(s): Surveys, statistics and analysis
Classification Number(s): 48-01-00
Application(s): Air safety; Aircrew; Helicopters
Abstract:
A survey of the crash environment for U.S. Navy helicopters was undertaken to quantify the impact parameters and identify hazards causing major injury. 186 Flight Mishaps were reviewed for the 10-year period of January 1972 to December 1981. Out of the 186 mishaps reviewed, 154 were judged to be survivable. Accident reconstruction was used to determine the impact parameters for the survivable accidents. Statistical distribution of the important impact parameters, such as pitch, roll, and yaw angle and vertical, horizontal and lateral velocity change, were developed. Also, a hazard analysis was conducted to correlate the major and fatal injuries to the injury-causing mechanisms. Sixteen specific injury-causing hazards were identified. The data developed in this study provides the basis for improving the crashworthiness of the existing helicopter fleet and of future navy aircraft.

Abstract Number: 103044
Title: Improvements and Modifications to Naval Helicopter Helmets
Author(s): HAY, R.P.; NICOLO, D.M.; GDOWIK, C.
Source: Proceedings of the 23rd Annual Symposium of the SAFE Association, Las Vegas, Nevada, December 1-5, 1985. SAFE Association, Van Nuys, California, USA
Year: 1986
Volume: -
Issue: -
Pages: 265-267
Number of References:
Original Language: English
Classification Term(s): Headgear; Visual equipment
Classification Number(s): 51-09-01; 51-10-01
Application(s): Aircrew; Helicopters
Abstract:

Abstract Number: 103462
Title: Selecting Colour Codes for a Computer-Generated Topographic Map Based on Perception Experiments and Functional Requirements
Author(s): SPIKER, A.; ROGERS, S.P.; CICINELLI, J.
Source: Ergonomics
Year: 1986
Volume: 29
Issue: 11
Pages: 1313-1328
Number of References:
Original Language: English
Classification Term(s): Coding by colour; Charts and maps; Language communication and comprehension
Classification Number(s): 08-03-05; 02-09-10; 08-02-03
Application(s): Armed forces; Cartography; Situational awareness
Abstract:
This paper describes a series of human factors analyses that guided the selection of chromaticities and luminances for a computer-generated topographic map. By virtue of its impressive computational capabilities, this CRT-displayed digital map will greatly facilitate the navigational accuracy and situational awareness of army helicopter aviators during low level and nap-of-the-earth flight. Colour codes were assigned to the digital map's point, linear and area features according to guidelines derived from four colour naming and two symbol search experiments. The design of each study was structured around the map's functional requirements: the five linear feature colours should have high luminance and support absolute colour identification; the three point symbol colours should be identifiable at small sizes; and the four area colours should minimize colour distortions, with the two terrain colours luminance-shaded to depict elevation information. Within these constraints, the results of the colour naming studies yielded an initial set of map colour codes by identifying the most frequently occurring colour confusions arising from the perceptual distortions of brightness contrast, colour contrast and Gaussian spread. The symbol search studies further refined colour selection by identifying the specific foreground/background colour combinations that hinder search, and by quantifying the conditions under which a colour or monochrome map facilitates symbol search.

Abstract Number: 104054
Title: Men and Materials Handling in Offshore Operations
Author(s): OPBROEK, H.A.
Source: Proceedings of the International Symposium on Safety and Health in the Oil and Gas Extractive Industries, Luxembourg, 19-20 April 1983. Graham & Trotman Ltd, London
Year: 1983
Volume: -
Issue: -
Pages: 314-322
Number of References:
Original Language: English
Classification Term(s): Work design and organisation for health and safety; Body equipment; Workplace and equipment design for health and safety
Classification Number(s): 51-08-00; 51-07-00; 51-10-06
Application(s): Cranes; Gas industry; Helicopters; Mechanical materials handling; Oil and petroleum industry; Ships
Abstract:

To transport men and materials for offshore operations in the hostile North Sea environment almost exclusively helicopters and supply boats are used. Although the safety records for these ways of transport are quite good there is a constant drive for improvement. The North Sea water temperature necessitates the use of survival suits during helicopter transport to prevent hypothermia in case of a crash landing. To improve the fire fighting possibilities and to overcome snow and ice problems during wintertime an improved helideck construction has recently been introduced. In materials handling from supply boats the cranes on the platforms play a vital role. These cranes are sometimes used for transport of men by crew baskets or during diving activities. For this reason special safety precautions have to be included in the construction. Offloading materials and men from supply vessels in a heavy swell is always hazardous. It requires a quite exceptional level of coordination between the boat skipper and the platform crane driver. For both men and cargo handling motion compensating systems are developed which can give considerable improvements in safety.

Abstract Number: 104060
Title: An Improved Method for Determining Clothing Microenvironment Volume
Author(s): SULLIVAN, P.J.; MEKJAVIC, I.B.; KAKITSUBA, N.
Source: Proceedings of the Human Factors Association of Canada, 18th Annual Meeting, Hull, Quebec, 27-28 September 1985. HFAC, Rexdale, Ontario
Year: 1985
Volume: -
Issue: -
Pages: 67-70
Number of References:
Original Language: English
Classification Term(s): Clothing ensembles; Instrument recording; Thermal comfort; Thermal equipment; Thermal stress
Classification Number(s): 51-09-05; 33-04-00; 33-07-00; 51-10-03; 63-09-03
Application(s): Aircrew; Helicopters
Abstract:
In the present study an improved approach has been developed for determining the microenvironment volume of protective clothing assemblies. Subjects wearing a variety of helicopter pilot suits were enclosed in an impermeable polyvinyl outer suit. Air from within the enclosed environment was evacuated with a constant vacuum source until the internal pressure decreased exponentially to -30cm H₂O with respect to ambient pressure. During the evacuation of air from the microenvironment continuous recordings were made of the flow rate and internal pressure. Volume was derived by integration of the exhaust flow rate. Total microenvironment volume was calculated as the total volume evacuated from the clothing assembly minus the total volume calculated for shorts. In this way possible overestimation of microenvironment volume due to the inherent compliance of the outersuit is corrected for. It is concluded that the present method allows more objective determination of the microenvironment volume compared to the original method proposed by Birnbaum and Crockford (1978). The variation in microenvironment volume observed for different subjects wearing identical suits reflects the different body sizes of the subjects which would subsequently give rise to individual microenvironment volumes.

Abstract Number: 104081
Title: The Safe Evacuation of Men during Emergency Abandonment of Offshore Oil and Gas Installations - Survival while Awaiting Rescue
Author(s): CROSS, J.H.; FEATHER, J.M.
Source: Proceedings of the International Symposium on Safety and Health in the Oil and Gas Extractive Industries, Luxembourg, 19-20 April 1983. Graham & Trotman Ltd, London
Year: 1983
Volume: -
Issue: -
Pages: 291-305
Number of References:
Original Language: English
Classification Term(s): Evacuation procedures; Body equipment; Education, training and safety programmes; Emergency services; Personal equipment
Classification Number(s): 51-11-03; 51-02-00; 51-10-00; 51-10-06; 51-11-00
Application(s): Gas industry; Oil and petroleum industry
Abstract:
The introduction to the paper provides a description of the hazards faced by men when abandoning an offshore installation. There follows an outline of the history of training for survival in a maritime environment, with tables showing North Sea abandonment and helicopter ditching fatalities. Current national training guidelines and/or legislations are outlined. The present position with regard to abandonment exercises and the use of personal survival equipment (with especial reference to survival suits) is discussed. Descriptions are given of the major evacuation systems in use (liferafts, and totally enclosed lifeboats of various types), and systems under development are listed. The final section deals with survivors' actions to be taken while awaiting rescue after an abandonment; these are, principally, how to attempt to combat hypothermia and the ideal behaviour to be followed in the survival craft.

Abstract Number: 104480
Title: On the Selection and Evaluation of Visual Display Symbology: Factors Influencing Search and Identification Times
Author(s): REMINGTON, R.; WILLIAMS, D.
Source: Human Factors
Year: 1986
Volume: 28

Issue: 4
Pages: 407-420
Number of References:
Original Language: English
Classification Term(s): Pictorial symbols; CRTs ; Search; Visual perception of form, shape, angle, size and distance
Classification Number(s): 08-02-01; 02-01-06; 02-09-01; 22-04-01
Application(s): Helicopters
Abstract:
Three single-target visual search tasks were used to evaluate a set of cathode-ray tube (CRT) symbols for a helicopter situation display. The search tasks were representative of the information extraction required in practice, and reaction time was used to measure the efficiency with which symbols could be located and identified. Familiar numeric symbols were responded to more quickly than graphic symbols. The addition of modifier symbols, such as a nearly flashing dot or surrounding square, had a greater disruptive effect on the graphic symbols than did the numeric characters. The results suggest that a symbol set is, in some respects, like a list that must be learned. Factors that affect the time to identify items in a memory task, such as familiarity and visual discriminability, also affect the time to identify symbols. This analogy has broad implications for the design of symbol sets. An attempt was made to model information access with this class of display.

Abstract Number: 174402
Title: Vertical Navigation Displays: Pilot Performance and Workload during Simulated Constant Angle of Descent GPS Approaches
Author(s): OMAN, C.M.; KENDRA, A.J.; HAYASHI, M.; STEARNS, M.J.; BURKI-COHEN, J.
Source: International Journal of Aviation Psychology
Year: 2001
Volume: 11
Issue: 1
Pages: 15-31
Number of References: 25
Original Language: English
Classification Term(s): Mental workload; Charts and maps; Coding of information; Error, accuracy, reliability and frequency; Multifunction displays; Ratings and preferences
Classification Number(s): 07-01-00; 08-02-03; 08-03-00; 22-06-00; 65-03-00; 65-08-01
Application(s): Aircraft; Aircrew
Abstract:
This study compared the effect of alternative graphic or numeric vertical navigation aircraft cockpit displays on horizontal and vertical flight technical error, workload, and subjective preference. Displays included (a) a moving map with altitude range arc; (b) the same format, supplemented with a push-to-see profile view, including a vector flight-path predictor; (c) an equivalent numeric display; and (d) a numeric nonvertical navigation display. Sixteen pilots each flew 4 different approaches with each format in a Frasca 242 simulator. The vertical navigation displays reduced vertical flight technical error by as much as a factor of 2 without increasing workload. Relative advantages of the graphics formats are discussed.

Abstract Number: 148378
Title: Experimental Study of Vertical Flight Path Mode Awareness
Author(s): JOHNSON, E.N.; PRITCHETT, A.R.
Source: Analysis, Design and Evaluation of Man-Machine Systems 1995, Edited by T.B. Sheridan. Pergamon, Oxford, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 153-158
Number of References:
Original Language: English
Classification Term(s): Supervisory control; Allocation of function; Charts and maps; CHOICE OF COMMUNICATION MEDIA; ERROR PREVENTION AND RECOVERY; Headup and projected displays; Reaction time and speed of performance; System reliability; Use of simulators
Classification Number(s): 02-11-06; 02-11-01; 08-02-03; 10-00-00; 13-00-00; 22-05-00; 37-07-00; 38-01-00; 63-02-00
Application(s): Aircraft; Aircrew; Automation; Situational awareness
Abstract:
An experimental simulator study was run to test pilot detection of an error in autopilot mode selection. Active airline aircrew were asked to fly landing approaches by commanding the flight path angle model while monitoring the approach with both a head up display and head down displays. During one approach, the Vertical Speed mode was intentionally triggered by an experimenter, causing a high rate of descent below the intended glide path. Of the 12 pilots, 10 did not act to decrease the high descent rate prior to significant glide path deviation.

Abstract Number: 150299
Title: Evaluation of a Natural Control System and the Role of Redundant Sources of Visual Information
Author(s): OWEN, D.H.
Source: SimTecT 96 Proceedings, Edited by S. Sestito, P. Beckett, G. Tudor and T. Triggs. SimTecT Organising Committee, Melbourne, Australia
Year: 1996
Volume: -
Issue: -
Pages: 383-387

Number of References: 7
Original Language: English
Classification Term(s): Usage; Design of graphics; Display layout; Manual control; Use of simulators; USER CONTROL FEATURES
Classification Number(s): 65-09-00; 02-11-05; 08-02-00; 15-00-00; 25-03-00; 63-02-00
Application(s): Aircrew; Helicopters
Abstract:
A natural control system would allow an operator direct control of the information ordinarily used to detect deviations from a goal state when technology is not involved, as when a human or a bird visually guides its locomotion. To evaluate candidate systems, real-time interactive control of movement through a simulated environment can support simultaneous investigation of modes of control and the sources of information perceived and controlled. The research described compares two control modes, direct and indirect, for vertical flight in a variety of environments constructed to determine the role of multiple, but redundant, sources of information during hover and descent to touchdown. For visually guided performance, the transforming optic array is the relevant domain of analysis for both issues. The approach has application to optimization of control systems and environments, both virtual and actual, for research, training and assessment.

Abstract Number: 165143
Title: Evaluation of a Formal Methodology for Developing Aircraft Vertical Flight Guidance Training Material
Author(s): FEARY, M.; SHERRY, L.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1998
Volume: -
Issue: -
Pages: 72-76
Number of References: 11
Original Language: English
Classification Term(s): TRAINING; Allocation of function; Multifunction displays
Classification Number(s): 44-00-00; 22-06-00; 38-01-00
Application(s): Aircraft; Aircrew; Automation; Computer-aided learning
Abstract:
Aircraft automation, particularly the automation surrounding vertical navigation, has been cited as an area of training difficulty and a source of confusion during operation. A number of incidents have been attributed to a lack of crew understanding of what the automation is doing. This paper describes the translation of information from a formal methodology used in design of an automated vertical guidance system to a training package, and an experiment that tested the new training. This study is part of a larger project to improve the recognition and understanding of the 'objectives and behaviours' of automated systems through a formal methodology. The formal method, referred to as the operational procedures methodology, integrates the design of the system with the design of the training and display information requirements for that system. The study utilized a training package designed to teach the vertical guidance portion of the Flight Mode Annunciator (FMA), as seen in normal operations of the Boeing MD-11. The results of the study showed that this type of training can be successfully delivered via a computer based training device. Additionally, a study in a full cockpit simulator showed that the training, coupled with the new display, provided significantly less errors on a simulated flight, although the training alone did not provide significantly better performance.

Abstract Number: 158841
Title: Assessing the Capacity of Europe's Airspace: The Issues, Experience and a Method Using a Controller Workload
Author(s): MAJUMDAR, A.
Source: Contemporary Ergonomics 1998, Edited by M.A. Hanson. Taylor & Francis, London
Year: 1998
Volume: -
Issue: -
Pages: 414-418
Number of References: 6
Original Language: English
Classification Term(s): Mental workload; Task complexity; Use of simulators
Classification Number(s): 07-01-00; 07-09-00; 63-02-00
Application(s): Air traffic control
Abstract:
European airspace often operates at or beyond capacity, leading to substantial delays and inefficiencies. The design, planning and management of European airspace is a highly complex task, involving many issues. Prime amongst these issues is the level of the workload of the air traffic controllers. This paper considers the issues involved in airspace capacity determination and its relation to the controller's workload capacity. The impact of the sector and air traffic features on the controller's workload is described, whilst the last session outlines ongoing research work at Imperial College to estimate airspace capacity given the various factors involved.

Abstract Number: 101404
Title: Setting Acceptable Levels of Safety for the National Airspace System
Author(s): BUSCH, A.C.; COLAMOSCA, B.F.

Source: Progress for People. Proceedings of the Human Factors Society 29th Annual Meeting, Baltimore, Maryland, September 29-October 3, 1985, Edited by R.W. Swezey. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1985
Volume: -
Issue: -
Pages: 52-56
Number of References:
Original Language: English
Classification Term(s): Human reliability and system reliability; System reliability
Classification Number(s): 63-06-00; 37-07-00
Application(s): Air safety; Air traffic control
Abstract:
The FAA is engaged in a major effort to safely reduce the vertical separation standard to 1,000 feet between aircraft flying above 29,000 feet and to develop system performance requirements which, if met, will ensure safe operation of the National Airspace System. To accomplish this the authors are proposing an overall program structure of defining risk/safety criteria, a risk assessment program, and a risk management program. Included in this effort is an extensive in situ data collection effort. Hopefully, the conclusion of this effort will result in providing to management the quantitative decision tools and information necessary to (1) make the decision for the safe reduction of the vertical separation standard and (2) to implement changes to the National Airspace System to support new separation procedures.

Abstract Number: 151117
Title: Pilot Actions during Traffic Situations in a Free-Flight Airspace Structure
Author(s): SCALLEN, S.F.; SMITH, K.; HANCOCK, P.A.
Source: Human Centered Technology - Key to the Future. Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting, Philadelphia, Pennsylvania, September 2-6, 1996. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1996
Volume: -
Issue: -
Pages: 111-115
Number of References: 5
Original Language: English
Classification Term(s): Decision making and risk assessment; Charts and maps; Combined measures and indices; Critical incident technique; Performance strategies; Use of simulators
Classification Number(s): 02-09-07; 02-11-04; 08-02-03; 63-02-00; 64-09-00; 65-07-00
Application(s): Aircrew
Abstract:
One facet of the proposed restructuring of the National Airspace System currently generating much interest is called 'Free Flight'. At the heart of the Free Flight system is an increased flexibility in pilot decision making and responsibility for the definition and maintenance of separation, of preferred routes and speeds, and the conduct of manoeuvres in response to potential conflicts and other emergencies in the airspace. Here, the authors describe a simulation experiment where fifteen commercial pilots were presented with traffic conflict situations in the en route environment. Within the scenarios they manipulated density, type of conflict, and relative bearing of conflict aircraft. Pilots were required to navigate a simulated 757 aircraft to destination airport, avoiding all possible traffic conflicts. Their ability to maintain separation was the principal dependent measure. Results indicated that density and bearing did not appear to have any substantive effect on pilot response. However, overtaking conflicts produced a higher frequency of operational errors than crossing or converging conflicts. Further analysis of individual pilot responses revealed different strategies. Analysis of individual overtaking scenarios revealed patterns of pilot action associated with efficient and often creative conflict resolutions. An example of an inefficient conflict resolution was also identified.

Abstract Number: 160021
Title: The Future of Air Traffic Control: Human Operators and Automation
Author(s): WICKENS, C.D.; MAVOR, A.S.; PARASURAMAN, R.; MCGEE, J.P.; EDS
Source: National Academy Press, Washington, D.C.
Year: 1998
Volume: -
Issue: -
Pages: 319pp
Number of References: 398
Original Language: English
Classification Term(s): Reviews; Allocation of function; Charts and maps; Decision making and risk assessment; Errors, accuracy and reliability; Human reliability and system reliability; Information and communication design for health and safety; Information systems and communication; Mental workload; Multifunction displays; Skill demands; System friendliness, usability and acceptability; System reliability; Task analysis; Team work; TRAINING; USE OF SUPPORT; User's model, mental models and cognitive maps; Vigilance
Classification Number(s): 01-04-00; 02-09-07; 02-11-02; 05-10-00; 07-01-00; 07-05-00; 08-02-03; 22-06-00; 37-01-00; 37-07-00; 38-01-00; 41-02-03; 41-03-04; 44-00-00; 46-00-00; 51-05-00; 56-05-00; 63-05-01; 63-06-00
Application(s): Air traffic control; Automation; Control rooms; Decision support systems; Maintenance; Radar and sonar; Situational awareness
Abstract:

Automation in air traffic control may increase efficiency, but it also raises questions about adequate human involvement. Following on the panel's first volume on air traffic control automation, Flight to the Future, this book focuses on the interaction of air traffic controllers and pilots with a growing network of automated functions in the airspace system. The panel offers recommendations for development of human-centred automation, addressing key areas such as providing levels of automation that are appropriate to levels of risk, examining procedures for recovery from emergencies, free flight versus ground-based authority, and more. The book explores ways in which technology can build on human strengths and compensate for human vulnerabilities, minimizing both mistrust of automation and complacency about its abilities. The panel presents an overview of emerging technologies and trends toward automation in the natural airspace system - in areas such as global positioning and other aspects of surveillance, flight information provided to pilots and controllers, collision avoidance, strategic long-term planning, and systems for training and maintenance. The book also examines how to achieve better integration of research and development, including the importance of user involvement in air traffic control, and discusses how to harmonize the wide range of functions in the national airspace system, with a detailed review of the free flight initiative.

Abstract Number: 166851
Title: Modeling Airspace Collision Risk
Author(s): KNECHT, W.R.; HANCOCK, P.A.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L. Rakovan, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 1335-1340
Number of References: 5
Original Language: English
Classification Term(s): Modelling and simulation; Decision making and risk assessment; Risk taking
Classification Number(s): 63-01-00; 02-09-07; 48-03-02
Application(s): Air safety; Aircraft; Aircrew
Abstract:
This work addresses the evaluation of midair collision risk in the National Airspace System (NAS). Two non-linear mathematical functions are proposed to model the most significant features of airspace collision risk. The first estimates probability of collision as a function of time to contact, the second as a function of separation distance. Each function considers a set of risk factors. These include extrinsic factors, such as aircraft performance and situational difficulty. Also considered are intrinsic factors, such as inattention and reaction to stress, which represent information-processing limitations of the operator. It is argued that risk factors combine to yield an S-shaped performance curve (psychometric function) for collision avoidance. This non-linear modelling approach is evaluated, both logically and by curve fitting to flight simulator data taken from commercial airline pilots in simulated conflict scenarios. Analysis of these data gives support for one of two proposed psychometric functions. Time to contact is empirically supported as an important predictor of collision risk. The other predictor, separation distance, is only supported logically, due to the nature of the data employed. Properly parameterized, a similar function, or family of functions, could be future-projected to estimate the probability of operational error associated with a planned aircraft manoeuvre. This is similar to the idea of the 'conflict probe' being currently explored by the aviation community in its effort to institute free flight in the NAS.

Abstract Number: 170289
Title: An Airspace Visualization Tool for Collaborative Decision Making
Author(s): KROZEL, J.; SCHLEICHER, D.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 476-482
Number of References: 21
Original Language: English
Classification Term(s): Charts and maps; Decision making and risk assessment; Information systems and communication; Team work; Three-dimensional graphics
Classification Number(s): 08-02-03; 02-09-07; 08-02-05; 41-02-03; 56-05-00
Application(s): Air traffic control
Abstract:
This paper discusses design considerations of an airspace visualization tool to support collaborative decision making (CDM) between dispatchers at airline operations centres (AOCs) and air traffic management (ATM) personnel. Collaboration may include two or more users discussing a problem on the telephone and viewing the situation on a computer with a common airspace visualization tool. The tool includes: different colour pointers for each user, notepads and audio notes for message passing, and other shared artifacts, and assists in tracking aircraft, observing weather systems and constraints, and making decisions based on these data.

Abstract Number: 170847
Title: Flight Crew Factors for CTAS/FMS Integration in the Terminal Airspace
Author(s): CRANE, B.; PREVOT, T.; PALMER, E.

Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 2
Year: 1999
Volume: -
Issue: -
Pages: 815-820
Number of References: 4
Original Language: English
Classification Term(s): Resistance to and effects of change; Critical incident technique; Information systems and communication; Job analysis and skills analysis; Mental workload; Rating and ranking; Use of simulators; USE OF SUPPORT; Use of work procedures
Classification Number(s): 47-01-00; 07-01-00; 46-00-00; 46-05-00; 56-05-00; 63-02-00; 63-05-02; 64-06-00; 64-09-00
Application(s): Air traffic control; Aircraft; Aircrew; Automation
Abstract:
Terminal airspace controller decision aiding tools such as the Center TRACON Automation System (CTAS) benefit from more precise and predictable navigation performance from aircraft. This has motivated a research effort toward CTAS/FMS integration. On the flightdeck, this implies crews flying coupled in highly automated flight management system (FMS) modes (i.e. VNAV (Vertical Navigation) and LNAV (Lateral Navigation)) from top of descent to the final approach phase of flight. Pilots may also have to make FMS route edits and respond to datalink clearances in the Terminal Radar Approach Control (TRACON) airspace. The full mission simulator study described in this paper explores how the introduction of these proposed descent procedures affects crew activities, workload, and performance. Twelve crews flew seven descents using current day, FMS, and CTAS/FMS procedures. Results indicate decreases in crew activity counts and workload in baseline scenarios of FMS procedures as compared to baseline current day procedures. However, in complex scenarios, activity counts increased in FMS procedures beyond current day levels but no current day vs. FMS workload differences were found in more complex descents. In compliance measures, during FMS procedures 56% of crews maintained descent speeds less precisely than in current day procedures. Heads down time for TRACON route modification tasks was assessed for the three interface enhancements used in the CTAS/FMS procedures.

Abstract Number: 171027
Title: The Impact of CTAS Information on Airline Operational Control
Author(s): ZELENKA, R.E.; QUINN, C.; BEATTY, R.; HEERE, K.
Source: Air Traffic Control Quarterly
Year: 2000
Volume: 8
Issue: 1
Pages: 33-62
Number of References: 19
Original Language: English
Classification Term(s): Information systems and communication; Charts and maps; Resistance to and effects of change; USE OF SUPPORT; USER CONTROL FEATURES
Classification Number(s): 56-05-00; 08-02-03; 15-00-00; 46-00-00; 47-01-00
Application(s): Air traffic control; Production planning and control
Abstract:
The continued growth of air traffic, together with increased air carrier economic pressures, have created a need for greater flexibility and collaboration in air traffic management. The ability of airspace users to select their own routes through so-called 'free-flight', and the ability to more actively manage their fleet operations for maximum economic advantage are both receiving great attention. A first step toward greater airspace user and service provider collaboration is information sharing. In this work, arrival scheduling and airspace management data generated by the NASA/FAA Center/Terminal Radar Approach CONtrol (TRACON) Automation System (CTAS) and used by the FAA service provider is shared with an airline with extensive 'hub' operations within the CTAS operational domain. The design and development of a specialized airline-CTAS information exchange system is described, as well as the results of the impact and benefits of this information on the air carrier's operations. FAA controller per-aircraft scheduling information, such as that provided by CTAS, has never before been shared in real-time with an airline. Results show that CTAS information sharing leads to improved predicted time of arrival accuracy, improved strategic fleet arrival planning, and improved divert/no divert decisions of aircraft to alternative airports when faced with uncertain airborne delays. No adverse impact on FAA air traffic control operations was found to have resulted from this experimental data exchange.

Abstract Number: 107918
Title: ACES: Air Combat Expert Simulation
Author(s): GOLDSMITH, T.E.; SCHVANEVELDT, R.W.
Source: New Mexico State University, Computing Research Laboratory, Las Cruces, New Mexico, USA, Memorandum No. MCCS-85-34
Year: 1985
Volume: -
Issue: -
Pages: 16pp
Number of References:
Original Language: English
Classification Term(s): Modelling human characteristics ; Knowledge base and rule base
Classification Number(s): 63-01-01; 17-03-00
Application(s): Aircrew; Armed forces; Expert systems
Abstract:

This report covers activities in the first year of a two year effort toward a system that simulates decision making by expert fighter pilots in air-to-air combat. The work builds on the previous work on conceptual structures by using those structures to model the underlying processes involved in flying high-speed tactical aircraft. The Air Combat Expert Simulation (ACES) system currently incorporates selection rules to determine which basic fighter manoeuvre to execute given a description of an airspace with two competing aircraft (T-38's). The aircraft are displayed in three-dimensional graphics. The selected manoeuvres are mapped into inputs to dynamic flight equations that update the airspace as manoeuvres are executed. Manoeuvres may be selected for either aircraft by either a user or ACES. The selection of manoeuvres by ACES compares favourably with the selections made by expert fighter pilots. Applications in fighter lead-in training and future directions are discussed.

Abstract Number: 116965
Title: Geographic Disorientation: Approaching and Landing at the Wrong Airport
Author(s): ANTUNANO, M.J.; MOHLER, S.R.; GOSBEE, J.W.
Source: Aviation, Space, and Environmental Medicine
Year: 1989
Volume: 60
Issue: 10 Pt.1
Pages: 996-1004
Number of References: 9
Original Language: English
Classification Term(s): Disorientation; Data collection and recording; Errors, accuracy and reliability; ETIOLOGY; Experience and practice; Illumination at night; INJURIES AND ILLNESSES; Surveys, statistics and analysis
Classification Number(s): 35-05-00; 02-11-02; 04-04-00; 29-01-01; 48-01-00; 48-02-00; 49-00-00; 50-00-00
Application(s): Aircrew; Airports
Abstract:
Geographic disorientation in aviation operations results from the failure of an aircrew to recognize and/or maintain the desired position relative to the external ground and airspace environment. Becoming lost during flight, intruding inadvertently into unauthorized airspace, selecting a wrong airway, landing on the wrong runway, and approaching the wrong airport - with or without actual landing - are some examples of inflight geographical disorientation. This is a relatively common phenomenon that can be experienced by any pilot, regardless of experience level and the type of pilot certification. This paper analyzes 75 cases of geographic disorientation that occurred among air carrier pilots plus 16 cases among general aviation pilots between 1982 and 1987. Inflight geographic disorientation can result from a variety of aeromedical and human factors (aircrew, operational, environmental) which, interacting with each other, create the ideal conditions for the occurrence of this phenomenon. The adverse consequences of geographic disorientation for the aircrew, passengers and aircraft are delineated along with specific preventive measures.

Abstract Number: 117903
Title: Data Link Communications in the National Airspace System
Author(s): LEE, A.T.
Source: Perspectives. Proceedings of the Human Factors Society 33rd Annual Meeting, Denver, Colorado, October 16-20, 1989. The Human Factors Society, Santa Monica, California, Volume 1
Year: 1989
Volume: -
Issue: -
Pages: 57-60
Number of References: 8
Original Language: English
Classification Term(s): Information systems and communication
Classification Number(s): 56-05-00
Application(s): Air traffic control; Aircrew
Abstract:
In the near future, conventional radio communications, currently the primary medium for the transfer of information between aircraft and ground stations, will be replaced by digital data link. This paper briefly describes this technology and summarizes what are believed to be the principal human factor issues associated with data link implementation in the airspace system. Integration of data link communications with existing systems on the flight deck and in the air traffic control system is discussed with regard for both near term implementation and longer term operational issues.

Abstract Number: 150538
Title: The Role of Information Fusion in Air Traffic Control Applications
Author(s): STEINKE, W.
Source: Advances in Human-Computer Interaction: Human Comfort and Security, Edited by S. Pfleger, J. Goncalves and K. Varghese. Springer, Berlin
Year: 1995
Volume: -
Issue: -
Pages: 74-84
Number of References: 9
Original Language: English
Classification Term(s): Display layout; Multifunction displays; Task analysis
Classification Number(s): 25-03-00; 22-06-00; 63-05-01
Application(s): Air traffic control
Abstract:

In a world with increasing mobility the air traffic situation becomes an important ecological and economical factor. More and more delayed flights are the result of the high traffic volume in the airspace as well as on the ground. The efficient, orderly and safe handling of the air traffic flow regarding traffic volume, airspace and airport structures, meteorological conditions and the complexity of operations will be a key topic for years to come. To perform these tasks, support is needed. The application of state-of-the-art technologies to the process of monitoring and control of the air traffic will be a precondition for improving the existing situation and facing the requirements of future air traffic control systems. This paper outlines the role of information fusion, the process of condensing data on varying levels of information applied to the air traffic control domain. Various sources of information have to be processed with regard to the specific tasks of the air traffic controller. Multi-sensor systems, links to other air traffic control systems and background data build the scenario in which the controller has to provide the monitoring and control services. The context in which information fusion takes place and how information fusion supports the fundamental monitoring tasks are described.

Abstract Number: 156718
Title: Cognitive Complexity in Management by Exception: Deriving Early Human Factors Requirements for an Envisioned Air Traffic Management World
Author(s): DEKKER, S.W.A.
Source: Engineering Psychology and Cognitive Ergonomics. Volume One: Transportation Systems, Edited by D. Harris. Ashgate Publishing, Aldershot, Hampshire
Year: 1997
Volume: -
Issue: -
Pages: 201-209
Number of References: 6
Original Language: English
Classification Term(s): Task complexity; Resistance to and effects of change
Classification Number(s): 07-09-00; 47-01-00
Application(s): Air traffic control
Abstract:
Human factors enjoys the greatest leverage for useful design contributions early on in system development, when no large pools of resources have yet been committed to concrete prototypes or designs. But the methodological challenge of anticipating the cognitive reverberations of technology change early on is considerable. The author attempted to evaluate the impact of new technology and procedures on cognitive work early on in the context of proposals for a future air traffic management world. Of particular interest was the vision that the future airspace would be 'managed by exception', where operators choose optimal flight paths in real time, and controllers are exception monitors/managers. Technology independent difficulties and timeless airspace constraints were wedded to proposed technologies and procedures to create 'future incident' scenarios. Expert practitioners were taken on cognitive walkthroughs of these incidents, and anchored in the details of coordination and decision making necessary to handle the situation. Thus, some of the cognitive complexity of management by exception was exposed. Refinements could be made to previous human factors requirements while new ones emerged.

Abstract Number: 157655
Title: Controller Situation Awareness in Free Flight
Author(s): ENDSLEY, M.R.; MOGFORD, R.H.; STEIN, E.
Source: Ancient Wisdom - Future Technology. Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting, Albuquerque, New Mexico, September 22-26, 1997. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 4-8
Number of References: 7
Original Language: English
Classification Term(s): Job autonomy and user control; Error, accuracy, reliability and frequency; Information systems and communication; Mental workload; Rating and ranking; USER CONTROL FEATURES
Classification Number(s): 41-03-03; 07-01-00; 15-00-00; 56-05-00; 64-06-00; 65-03-00
Application(s): Air traffic control; Situational awareness
Abstract:
Free flight represents a major change in the way that aircraft are handled in the National Airspace System. It has the potential to significantly increase airspace utilization and, by doing so, improve aircraft throughput. The degree to which these objectives can be met without compromising aircraft safey will depend on appropriate changes in the air traffic control system. This study provides an objective evaluation of some of the possible effects of free flight on controllers' ability to maintain an accurate and complete picture of the traffic situation. This picture or mental representation is essential for monitoring and separation functions. The study revealed that, using current technology, some aspects of free flight might adversely influence the situation awareness and performance of controllers. The results of this study provided information for better defining how free flight should be implemented and for determining needed design and procedural modifications to support the concept.

Abstract Number: 161878
Title: The Effect of Pseudo Three-Dimensional Displays on the Type and Quality of General Aviation Pilots' Maneuvering Decisions
Author(s): WISE, J.A.; GARLAND, D.J.; GUIDE, P.C.

Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 1
Year: 1993
Volume: -
Issue: -
Pages: 54-57
Number of References: 10
Original Language: English
Classification Term(s): Three-dimensional graphics; AUDITORY DISPLAYS; Charts and maps; Use of simulators
Classification Number(s): 08-02-05; 08-02-03; 23-00-00; 63-02-00
Application(s): Aircraft; Aircrew
Abstract:
The availability of 3-D data bases for aerial navigation and the low cost of relevant display technology has made the display of 3-D navigation data to the pilot a near term probability. This paper looks at one basic issue associated with the application of such technology in the cockpit; how 3-D display of navigation data affects pilot decision making. This paper looks specifically at the impact that a pseudo three-dimensional display of airspace restrictions will have on the quality and types of decision made by general aviation pilots when trying to manoeuvre through controlled airspace.

Abstract Number: 162921
Title: The Risk Space Representation of Commercial Airspace
Author(s): SMITH, K.; HANCOCK, P.A.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 2
Year: 1995
Volume: -
Issue: -
Pages: 752-757
Number of References: 8
Original Language: English
Classification Term(s): Decision making and risk assessment; Mental ability; Person-to-person communication; Protocol analysis; Risk taking
Classification Number(s): 02-09-07; 05-02-01; 09-01-01; 48-03-02; 63-13-00
Application(s): Air traffic control; Aircrew; Situational awareness
Abstract:
Situation awareness (SA) is defined as adaptive, externally-directed consciousness that has as its products knowledge about a dynamic task environment and directed action within that environment. To have SA, to have the 'right stuff', an agent requires a representation of the invariant structure of its environment. Such a representation facilitates sampling task-relevant information and associating information with appropriate action. In this paper the authors present the risk space, their hypothesis for the invariant structure of the aircraft-airspace system that guides skilled performance on the flight deck. Their current research is directed at quantifying the risk space for commercial aviation in the en-route environment. Results from an experiment with professional air traffic controllers as subjects illustrate the explanatory power of the risk space as a representation of situation awareness in commercial aviation.

Abstract Number: 162978
Title: ATC Decision Making in the Resolution of Traffic Conflict Situations in the Absence of Radar Display
Author(s): SCALLEN, S.F.; SMITH, K.; BRIGGS, A.; KNECHT, B.; HANCOCK, P.A.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 426-431
Number of References: 7
Original Language: English
Classification Term(s): Performance strategies; Combined measures and indices; Decision making and risk assessment; Protocol analysis; Task complexity; Textual analysis and parsing
Classification Number(s): 02-11-04; 02-09-07; 07-09-00; 63-10-04; 63-13-00; 65-07-00
Application(s): Air traffic control
Abstract:
This paper details one of a series of studies which examines alternative allocation structures in the National Airspace System. The purpose of this study was to establish base levels of performance for decision making by air traffic controllers. A secondary purpose was to evaluate associated methods employed to describe the process and effectiveness of decision making, controller actions and airspace dynamics. Specifically, the work evaluated the decision making of controllers in the face of en-route traffic conflicts in the absence of radar display.

Abstract Number: 163705
Title: The Effect of Advanced ATC Automation on Mental Workload and Monitoring Performance: An Empirical Investigation in Dutch Airspace
Author(s): HILBURN, B.; JORNA, P.G.A.M.; PARASURAMAN, R.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1995
Volume: -
Issue: -

Pages: 387-391
Number of References: 8
Original Language: English
Classification Term(s): USE OF SUPPORT; Cardiac processes; Decision making and risk assessment; Error, accuracy, reliability and frequency; Eye and head movements; Mental workload; Rating and ranking; Use of simulators
Classification Number(s): 46-00-00; 02-01-04; 02-09-07; 03-02-01; 07-01-00; 63-02-00; 64-06-00; 65-03-00
Application(s): Air traffic control; Automation; Decision support systems
Abstract:
The advent of advanced decision aiding automation for air traffic control (ATC) raises a number of human performance issues. An empirical investigation was conducted to compare the effectiveness of various levels of strategic ATC decision aiding automation. Conflict detection and resolution advisory systems were compared to a baseline (traffic display) en route ATC system. The study used high fidelity ATC simulations based on the Netherlands airspace, and subjects were experienced en route air traffic controllers. The study collected a variety of measures, including data on eye gaze, heart rate variability (HRV), and monitoring performance as well as ATC system performance measures. Preliminary data analysis has focused on measures of mental workload and monitoring efficiency. Monitoring performance (in terms of response time to system irregularities) was enhanced by automation. Both subjective instruments and HRV measurement distinguished differences in traffic load. HRV data suggest that mental workload can be eased by this type of decision aiding automation.

Abstract Number: 165410
Title: Cognitive Performance for Multiple Operators in Complex Dynamic Airspace Systems: Computational Representation and Empirical Analyses
Author(s): CORKER, K.M.; PISANICH, G.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1998
Volume: -
Issue: -
Pages: 341-345
Number of References: 12
Original Language: English
Classification Term(s): Modelling human characteristics ; Charts and maps; Cognitive processes
Classification Number(s): 63-01-01; 02-09-00; 08-02-03
Application(s): Air traffic control; Aircrew; Automation
Abstract:
This paper presents a set of studies in full mission simulation and the development of a predictive computational model of human performance in control of complex airspace operations. NASA and the FAA have initiated programmes of research and development to provide flight crew, airline operations and air traffic managers with automation aids to increase capacity in enroute and terminal area to support the goals of safe, flexible, predictable and efficient operations. In support of these developments, the authors present a computational model to aid design that includes representation of multiple cognitive agents (both human operators and intelligent aiding systems). The demands of air traffic management require representation of many intelligent agents sharing world-models, coordinating action/intention, and scheduling goals and actions in a potentially unpredictable world of operations. The operator-model structure includes attention functions, action priority, and situation assessment. The cognitive model has been expanded to include working memory operations including retrieval from long-term store, and interference. The operator's activity structures have been developed to provide for anticipation through knowledge of the intention and action of remote operators. System stability and operator actions can be predicted by using the model. The model's predictive accuracy was verified using the full-mission simulation data of commercial flight deck operations with advanced air traffic management techniques.

Abstract Number: 165749
Title: Cognitive Complexity in Management by Exception
Author(s): DEKKER, S.W.A.; WOODS, D.D.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L. Rakovan, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 1470-1475
Number of References: 8
Original Language: English
Classification Term(s): Decision making and risk assessment; Critical incident technique; Person-to-person communication; Use of expert opinion
Classification Number(s): 02-09-07; 09-01-01; 63-12-00; 64-09-00
Application(s): Air traffic control; Aircrew
Abstract:
In this paper, the authors report on several studies that assess the impact of novel air traffic management concepts on human performance. Fundamental changes to the way in which air traffic is managed have been suggested to respond to ever increasing demands for capacity and throughput in the American (and international) airspace. One proposal is to 'manage the airspace by exception'. In 'free flight', as air traffic management by exception is sometimes called, pilots will have greater flexibility to employ their advanced airplanes and technologies in pursuit of airlines' direct operating goals. Supported by satellite navigation, automatic dependent surveillance and collision avoidance

technologies, the operators can choose their optimal flight paths in real time. Controllers are envisioned to receive the role of exception managers, who intervene in an aircraft's path only when necessary. The studies reported here are aimed specifically at revealing some of the cognitive complexity that underlies management of air traffic by exception, and aimed in general at identifying the cognitive nature of a management by exception task.

Abstract Number: 166217
Title: Tactical Displays for Combat Awareness: An Examination of Dimensionality and Frame of Reference Concepts, and the Application of Cognitive Engineering
Author(s): OLMOS, O.; WICKENS, C.D.; CHUDY, A.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L. Rakovan, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 1442-1447
Number of References: 18
Original Language: English
Classification Term(s): Display-control relationships; Error, accuracy, reliability and frequency; Multifunction displays; Three-dimensional graphics; Time and speed
Classification Number(s): 25-06-00; 08-02-05; 22-06-00; 65-02-00; 65-03-00
Application(s): Aircraft; Aircrew; Armed forces; Situational awareness
Abstract:
Three prototype displays are contrasted for aircraft navigation and tactical hazard awareness: a conventional 2D coplanar display, an exocentric (God's eye') 3D display, and an immersed ('pilot's eye') 3D display. Strengths and weaknesses of each display type are discussed. In implementing these for Experiment 1, the immersed display was coupled with a global exocentric view of the airspace. In Experiment 1, eight pilots flew with each of the displays around an airspace populated by waypoints, hazards and traffic. Performance measures revealed the anticipated costs and benefits of each display type. In Experiment 2, cognitive engineering was applied to remediate the weaknesses of each display type. Analysis of performance of 27 additional subjects in flight path tracking and hazard awareness measures revealed success in application of the cognitive engineering principles.

Abstract Number: 169965
Title: Manipulation of Pilot Intent under Free Flight: A Prelude to Not-So-Free Flight
Author(s): CASTANO, D.; PARASURAMAN, R.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 170-176
Number of References: 13
Original Language: English
Classification Term(s): Decision making and risk assessment; Charts and maps; Error, accuracy, reliability and frequency; Human performance; Information systems and communication; Job autonomy and user control; Mental workload; Rating and ranking; Task complexity; USER CONTROL FEATURES
Classification Number(s): 02-09-07; 02-11-00; 07-01-00; 07-09-00; 08-02-03; 15-00-00; 41-03-03; 56-05-00; 64-06-00; 65-03-00
Application(s): Air traffic control
Abstract:
This study examined how the lack of information about the pilot's intent in unstructured airspace affects the performance and workload of air traffic controllers (ATCos) under high traffic in a simulated free flight (FF) environment. Three levels of intent (high, middle and low) were designed by manipulating the presence of flight progress strips (FPSs), route display, and structure components like airways and waypoints. Twelve full performance level (FPL) ATCos controlled a generic sector of airspace under the three intent conditions at both low and high traffic load, indicating when they detected possible conflicts and issuing clearances to prevent them. Performance measures included the number of operational errors (OEs) or losses of separation, the number of clearances issued, differences in reaction time between the time of conflict detection and the time of clearance issuance, and subjective and objective workload. Results suggest significant performance decrements and increased workload caused by reduction of pilot intent information, increased traffic, and conflict geometry.

Abstract Number: 170330
Title: Expertise and Aging in Pilot Communication: The Role of Environmental Support
Author(s): MORROW, D.G.; MENARD, W.E.; STINE-MORROW, E.A.L.
Source: Houston... We Have a Solution! Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting, Houston, Texas, September 27-October 1, 1999. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 113-117
Number of References: 20

Original Language: English
Classification Term(s): Person-to-person communication; Age; Elderly adults; Experience and practice; Information systems and communication; Middle aged adults; Short term memory and working memory; USE OF SUPPORT; Young adults
Classification Number(s): 09-01-01; 02-09-03; 04-01-00; 04-01-02; 04-01-03; 04-01-04; 04-04-00; 46-00-00; 56-05-00
Application(s): Air traffic control; Aircrew
Abstract:
The authors examined whether expertise reduced aged differences on a pilot communication task. Young, middle-aged, and older pilots, and nonpilots of similar age and general cognitive ability, listened to recorded ATC messages that described a route through an airspace, while referring to a map of the airspace. They read back the ATC instructions (e.g., to change heading) and then answered a probe question about the aircraft's position. Morrow et al. (1999) used a similar procedure and did not find that expertise reduced age differences in readback accuracy. In this study, participants were also allowed to take notes while listening to the messages. Contrary to the earlier study, pilots' readbacks were virtually perfect regardless of age, while readback accuracy declined with age for nonpilots. Note-taking may have provided environmental support that reduced working memory demands imposed by the communication task, which differentially benefitted older pilots. This suggests that cognitive aids such as note-taking are an important part of pilots' expertise.

Abstract Number: 170956
Title: A Pilot-Centered Turbulence Assessment and Monitoring System (TAMS)
Author(s): JONES, W.M.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 51-56
Number of References: 6
Original Language: English
Classification Term(s): Information and communication design for health and safety; Combined environments; Humidity; Information systems and communication
Classification Number(s): 51-05-00; 33-02-00; 36-02-00; 56-05-00
Application(s): Air passengers; Aircrew
Abstract:
Airborne encounters with clear air turbulence (CAT) continue to significantly affect the safety and efficiency of commercial aviation. Fatalities, injuries and the additional costs associated with both encountering and avoiding turbulence are serious problems. Turbulence-induced injuries are airlines' most frequent source of insurance and workers' compensation claims. This paper discusses the preliminary results of a NASA sponsored Phase 2 SBIR contract to develop a system to improve the detection, assessment, categorization and reporting of in-flight encounters with clear air turbulence. Additionally, the design for an aircraft-based system that will inform both aircraft operators and airspace managers in a timely and appropriate manner of the location and severity of various forms of turbulence is presented. The goal of this research is to give flight crews, air traffic controllers, flight planning/dispatch organizations and weather forecasters more timely and accurate information on the extent and severity of turbulence that may impact their operations. TAMS (Turbulence Assessment and Monitoring System) uses an innovative approach to the problem. The merits and challenges of developing a standardized, human-centred scale to accurately quantify the energy state of the atmosphere are discussed. By integrating data already available from the flight deck avionics with potentially new software and/or hardware designs, the goal of this research is to develop a standardized rating system of turbulence that would provide meaningful information to all users of the airspace, allowing better short-term operational decisions and improved longer-term forecasting models.

Abstract Number: 171024
Title: The Influence of Aging and Expertise on Pilot Communication
Author(s): MORROW, D.G.; MENARD, W.E.; STINE-MORROW, E.A.L.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 2
Year: 1999
Volume: -
Issue: -
Pages: 1337-1342
Number of References: 20
Original Language: English
Classification Term(s): Information systems and communication; Age; Elderly adults; Experience and practice; Mental ability; Middle aged adults; Person-to-person communication; Young adults
Classification Number(s): 56-05-00; 04-01-00; 04-01-02; 04-01-03; 04-01-04; 04-04-00; 05-02-01; 09-01-01
Application(s): Aircrew
Abstract:
The authors examined the effects of age and expertise on a laboratory pilot communication task. Young (25-45 yrs), middle-aged (50-60) and older (60-80) pilots and nonpilots listened to ATC messages that described a route through an airspace, while referring to a map of the airspace. After each message, they read back the instructions and then answered a question about the aircraft's route. An earlier study found that expertise reduced age differences in readback accuracy, but did not reduce differences

for tasks that were less related to piloting. In this study, pilots and younger participants read back messages more accurately, but expertise did not reduce age differences for this measure. Pilots and younger participants also answered questions more accurately, and there was some evidence that age had less impact on pilots than on nonpilots for question accuracy.

Abstract Number: 160868
Title: Skill Factors Affecting Team Performance in Simulated Radar Air Traffic Control
Author(s): HERSCHLER, D.A.; GILSON, R.D.
Source: Proceedings of the Sixth International Symposium on Aviation Psychology, April 29 - May 2, 1991, Edited by R.S. Jensen, Volume I
Year: 1991
Volume: -
Issue: -
Pages: 526-531
Number of References: 12
Original Language: English
Classification Term(s): Mental ability; Critical incident technique; Information systems and communication; Team work; Use of simulators; User's model, mental models and cognitive maps
Classification Number(s): 05-02-01; 05-10-00; 41-02-03; 56-05-00; 63-02-00; 64-09-00
Application(s): Air traffic control; Radar and sonar
Abstract:
According to the FAA Office of Aviation Safety, over 4,900 operational errors occurred between 1985 and 1988 in the National Airspace System (NAS), and over half of the errors were the results of inadequate communication and coordination among controllers and between controllers and pilots. A review of NTSB data for the same period identified several incidents which involved controller coordination problems. These incidents occurred at various ATC facilities and involved commercial, military, and private aircraft. Although no one type of aircraft or control facility was disproportionately represented in the NTSB data, certain contributing factors were frequently involved. Problems with role ambiguity, supervision, situational awareness, and workload were frequently cited, and in more than one case, the experience level of a pilot or controller may have been partly to blame. These data suggest that coordination and communication in the NAS are inadequate, and that these problems may be exacerbated to an unacceptable degree when controllers and pilots are less than fully proficient.

Abstract Number: 161438
Title: Flight to the Future: Human Factors in Air Traffic Control
Author(s): WICKENS, C.D.; MAVOR, A.S.; MCGEE, J.P.; EDS
Source: National Academy Press, Washington, D.C.
Year: 1997
Volume: -
Issue: -
Pages: 368pp
Number of References: 786
Original Language: English
Classification Term(s): Reviews; Charts and maps; Design and development process; DISPLAY AND CONTROL CHARACTERISTICS; Human performance; Information systems and communication; Mental workload; Skill demands; System adaptability and flexibility; System friendliness, usability and acceptability; System reliability; USE OF SUPPORT
Classification Number(s): 01-04-00; 02-11-00; 07-01-00; 08-02-03; 25-00-00; 37-01-00; 37-02-00; 37-07-00; 38-02-00; 41-03-04; 46-00-00; 56-05-00
Application(s): Air traffic control; Automation; Radar and sonar
Abstract:
This report is the work of the Panel on Human Factors in Air Traffic Control Automation, which was established in fall 1994 at the request of the Federal Aviation Administration (FAA). The panel was appointed to conduct a two-phase study of the human factors aspects of the nation's air traffic control system, of the national airspace system of which it is a part, and of proposed future automation issues in terms of the human's role in the system. The primary focus of the study is the relationship between the human and the tools provided to assist in accomplishment of system tasks. This report provides the results of the panel's deliberations during the first phase. The first part of the report presents a baseline description of the air traffic control system, the selection, training, and assessment of controllers, and the operations associated with keeping the systems and equipment functioning. The second part of the report discusses current knowledge about human factors principles and findings concerning the cognitive and workload characteristics of the job of the controller, working both as an individual and as part of a team. Then the authors examine system management, human factors considerations in Airway Facilities, and the integration of human factors research and development into the organization. Finally, the discussion of automation issues serves as a bridge to the work in the second phase. The panel's recommendations concerning human factors considerations appear in the executive summary.

Abstract Number: 161696
Title: Tracking the Visual Scan of Air Traffic Controllers
Author(s): STEIN, E.S.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 812-815

Number of References: 13
Original Language: English
Classification Term(s): Performance strategies; Experience and practice; Eye and head movements
Classification Number(s): 02-11-04; 02-01-04; 04-04-00
Application(s): Air traffic control; Radar and sonar
Abstract:
Air traffic control is a visually intensive effort requiring a great deal of concentration. A controller must scan, detect, plan, decide and communicate. All these activities are simultaneous. When controllers make mistakes, one of the most common post-incident statements they make is: 'I didn't see it'. There is currently no mandated strategy for scanning radar displays and each controller develops his/her own. The purpose of this study was to explore the possibility that scanning patterns were somehow related to experience. Ten controllers were recruited from a busy terminal radar approach control facility. Of these, six were fully trained and four were in the process of becoming facility qualified. They each worked simulated traffic in a radar environment. Eye movements were measured using an oculometer (an eye tracker) that functioned by reflecting infrared light off the pupil of the controller's right eye. Results indicated that both groups changed their scanning patterns as the traffic built up over time, with final patterns being very much driven by the flow of traffic. Once the traffic pattern was established, there were very few scans outside the pattern. This might provide a clue as to why traffic could be missed beyond the common approach paths. Further, the newer controllers scanned less frequently and fixated longer, which indicates basically that they covered less airspace. They also had a higher frequency of conflicts between their sectors and those adjacent to them. This could have resulted from less scanning on the peripheral portions of the radar display.

Abstract Number: 162237
Title: Airborne Air Traffic Control: An Application of Distributed Processing in the Air Traffic Control Environment
Author(s): DOWNS, J.L.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 1049-1057
Number of References: 12
Original Language: English
Classification Term(s): Allocation of function; Information systems and communication
Classification Number(s): 38-01-00; 56-05-00
Application(s): Air traffic control; Automation
Abstract:
In this paper, the author discusses an application of distributed processing in the air traffic control environment as a means for providing multiple redundant error checking and processing support that will fit in nicely with the new Advanced Automation System (AAS). To meet the growing demand on the U.S. National Airspace System (NAS), its designers have turned to automation in their AAS concepts. Although tens of billions of dollars have been spent or are slated to be spent renovating the NAS, very little of this rare fortune has been spent on discovering the kinds of information air traffic control specialists really need to do their jobs effectively. Only with a thorough understanding of the behavioural dynamics and perceptual and cognitive processes of the users of an environment can designers safely and effectively apply their wares. Given that those in charge of the FAA have placed the 'cart before the horse', the author introduces an example of an integrated flight environment that could provide an added measure of fault correction and failure protection for the new system. Although the ultimate configuration of the system he outlines in this paper is a bit utopian, the idea of integrating air traffic control with the flight environment by using a distributed processing architecture has and should continue to be closely evaluated.

Abstract Number: 162442
Title: EMS Helicopter Incidents Reported to the NASA Aviation Safety Reporting System
Author(s): CONNELL, L.J.; REYNARD, W.D.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 1001-1008
Number of References: 8
Original Language: English
Classification Term(s): Data collection and recording; Critical incident technique; Errors, accuracy and reliability
Classification Number(s): 48-02-00; 02-11-02; 64-09-00
Application(s): Aircrew; Helicopters
Abstract:
The objectives of this evaluation were to: (1) identify the types of safety-related incident reported to the Aviation Safety Reporting System (ASRS) in Emergency Medical Service (EMS) helicopter operations; (2) describe the operational conditions surrounding these incidents, such as the weather, airspace, flight phase, time of day; and (3) assess the contribution of these incidents of selected human factors considerations, such as communication, distraction, time pressure, workload, and flight/duty impact.

Abstract Number: 162627

Title: Integrated Voice and Data Communications for Air Traffic Service Applications
Author(s): JENKINS, M.D.
Source: Proceedings of the Seventh International Symposium on Aviation Psychology, April 22-29, 1993, Edited by R.S. Jensen and D. Neumeister, Volume 1
Year: 1993
Volume: -
Issue: -
Pages: 431-346
Number of References: 4
Original Language: English
Classification Term(s): Information systems and communication
Classification Number(s): 56-05-00
Application(s): Air traffic control; Aircrew
Abstract:
This paper has been prepared in support of a Federal Aviation Administration (FAA) sponsored Mission Oriented Investigation and Experimentation (MOIE) project. The main purpose of the project was twofold. First, to demonstrate the operational benefits of integrated digital voice and data applications that will enhance air traffic control (ATC) and air traffic services (ATS). Second, to demonstrate the operational benefits of discrete addressing and call queuing - capabilities provided by a future VHF digital air/ground radio concept. The project included establishing a testbed and assessing the technical impact of introducing enhanced features into the next generation National Airspace System (NAS) communications system. Simulated airborne aircraft scenarios were developed to highlight the benefits of these features. Benefits demonstrated included enhancement of ATC voice and data call management capabilities, enhancement of communications with rescue coordination centres, added support provided by a national data base, and reduction of channel contention problems. Preliminary work included having human factors experts and pilot teams assess the new operational capabilities. Future work includes obtaining feedback from additional controller and pilot teams.

Abstract Number: 163708
Title: Improved Navigational Technology and Air Traffic Control: A Description of Controller Coordination and Workload
Author(s): LEE, K.K.; PAWLAK, W.S.; SANFORD, B.D.; SLATTERY, R.A.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 444-449
Number of References: 8
Original Language: English
Classification Term(s): USE OF SUPPORT; Information systems and communication; Mental workload; Questionnaires and surveys; Rating and ranking; Team work; Textual analysis and parsing
Classification Number(s): 46-00-00; 07-01-00; 41-02-03; 56-05-00; 63-10-04; 64-05-00; 64-06-00
Application(s): Air traffic control; Automation
Abstract:
Improved navigational technology, such as microwave landing systems (MLS) or global positioning systems (GPS), installed in today's commercial aircraft enable the air traffic control (ATC) system to better utilise its airspace. This increased efficiency is essential if the ATC system is to meet its growing demand. Another approach to help increase airport capacity is to direct arrival traffic to final approaches with reduced lateral separations between parallel runways. Currently, efforts are already underway to increase airport capacity and efficiency by providing advanced automation to the ATC system. Research into ATC automation by NASA Ames Research Center in cooperation with the Federal Aviation Administration (FAA) has led to the development of the Center TRACON Automation System (CTAS). CTAS is intended to provide better traffic management and planning information for the ATC environment to reduce delay and increase air traffic control efficiency for both the TRACON and the ARTCC (Center). The TRACON component of CTAS is known as the Final Approach Spacing Tool (FAST). The purpose of this study is to examine the effects of aircraft equipped with improved navigational technology upon controller coordination and workload under precision approaches to closely-spaced parallel runways within the CTAS environment.

Abstract Number: 163976
Title: Assessment of TCAS Resolution Advisory Information for Air Traffic Controllers via Data Link
Author(s): HOFFMAN, R.B.; KAYE, R.D.; SACHER, B.H.; CARLSON, L.S.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 122-127
Number of References: 3
Original Language: English
Classification Term(s): Information systems and communication; Person-to-person communication; USE OF SUPPORT
Classification Number(s): 56-05-00; 09-01-01; 46-00-00
Application(s): Air traffic control; Situational awareness
Abstract:
The operational usability and suitability of the provision of Traffic Alert and Collision Avoidance System (TCAS) Resolution Advisory (RA) information for the terminal air traffic

controller via data link were assessed. The assessment consisted of a medium fidelity interactive simulation of RA and Conflict Alert (CA) events in BWI approach control airspace, employing TCAS II 6.04a logic in non-coordinated encounters. Each of 10 current radar controllers participated in 12 interactive scenarios at MITRE's I-lab. The structured interviews and observations confirmed an earlier finding that the minimum display information required by controllers to improve their situation awareness during TCAS events consists of the RA indication and the RA sense, presented on the CA line of the flight data block as a blinking display. Operational acceptability and other impacts are discussed, including the findings that the display was helpful in cases of contiguously occurring RA and CA events and of variable pilot response. A field test of this display capability is scheduled for the near future.

Abstract Number: 163980
Title: Cockpit Data Link Technology and Flight Crew Communication Procedures
Author(s): LOGSDON, E.W.; INFIELD, S.E.; LOZITO, S.; MACKINTOSH, M.A.; MCGANN, A.; POSSOLO, A.
Source: Proceedings of the Eighth International Symposium on Aviation Psychology, April 24-27, 1995, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1995
Volume: -
Issue: -
Pages: 324-329
Number of References: 3
Original Language: English
Classification Term(s): Information systems and communication; Time and speed; Use of simulators
Classification Number(s): 56-05-00; 63-02-00; 65-02-00
Application(s): Air traffic control; Aircraft
Abstract:
While data link technology in the National Airspace System (NAS) will alleviate some of the problems that occur in the current voice environment, it will also have a profound and diverse impact on current air-ground communication policies. This research examines communication issues associated with data link communications on the flight deck. Two separate but similar full-mission experiments were conducted in which comparisons were made between voice and data link air-ground communications. Participants were 50 current glass-cockpit pilots (25 crews) from major United States air carriers. Crews flew either the Boeing 747-400 Engineering Simulator or the Advanced Concepts Flight Simulator, a generic 'glass cockpit' simulator at NASA Ames. Each crew flew an experimental scenario in which data characterizing communication timing and procedures were collected. Participant crews flew the scenario and were assigned to groups using either data link or voice as the medium for air-ground communications. There were two cockpit devices used for the interface with the data link communications: the Flight Management Computer Control Display Unit (FMC-CDU) and the CDU located aft-throttle. The interface differences between these two implementations are discussed. This paper examines the differences between the voice and data link groups for communication transaction times. The impact of data link on communication procedures is discussed, and topics for future research are suggested.

Abstract Number: 164582
Title: Information Manager for Determining Data Presentation Preferences in Future Enroute Air Traffic Management
Author(s): DULEY, J.A.; GALSTER, S.M.; PARASURAMAN, R.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1998
Volume: -
Issue: -
Pages: 47-51
Number of References: 16
Original Language: English
Classification Term(s): Design of graphics; Allocation of function; Knowledge engineering and acquisition; Ratings and preferences; System adaptability and flexibility; System design and interface engineering; Task analysis
Classification Number(s): 08-02-00; 17-05-00; 37-02-00; 37-11-00; 38-01-00; 63-05-01; 65-08-01
Application(s): Air traffic control; Automation
Abstract:
One proposed vision of the future National Airspace System (NAS) involves a change in philosophy from that of air traffic control to one of air traffic management, i.e. Free Flight. In order to accommodate this philosophy change, new technologies will be implemented to assist the air traffic manager (today's air traffic controller) in decision making. When enhancing the system we must also consider the interface between the air traffic manager and this new system and its corresponding new philosophy. To better determine the design of such an interface we must first understand the information needs of the air traffic manager. This study investigated the information requirements of 58 enroute air traffic controllers. The controllers provided their preferences in presentation frequency as well as the importance of the information to be displayed. The results reveal the potential for adaptive automation as a form of information management.

Abstract Number: 165381
Title: CRT Text vs. VHF Voice: Effects of Communication Modality in Single-Pilot Cockpits

Author(s): STOKES, A.F.; DOWNS, J.
Source: Human-System Interaction: The Sky's No Limit. Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, Chicago, Illinois, October 5-9, 1998. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1998
Volume: -
Issue: -
Pages: 414-418
Number of References: 5
Original Language: English
Classification Term(s): Information systems and communication; CHOICE OF COMMUNICATION MEDIA; Error, accuracy, reliability and frequency; Experience and practice; Person-to-person communication; Textual analysis and parsing; Time and speed; Use of simulators
Classification Number(s): 56-05-00; 04-04-00; 09-01-01; 10-00-00; 63-02-00; 63-10-04; 65-02-00; 65-03-00
Application(s): Air traffic control; Aircrew
Abstract:
Communications datalink, the transmission of messages as screen-displayed text between cockpits and ground stations, appears to offer both advantages and disadvantages compared to conventional VHF voice communications. The study reported here examines both the communication and performance of integrated communications datalink in single pilot instrument flight operations. Sixteen pilots flew two cross-country instrument flights in an AST complex-aircraft flight simulator with a moving map, traffic, and datalinked message display. In the conventional voice condition experimenters played the role of ATC controllers speaking over the radio. In the datalinked condition, controllers operated a computerized 'ground station', sending and receiving text messages on screen. Pilot communications, control and performance data were monitored for each phase of flight, as well as the interaction of pilot expertise and workload. The results suggest that communications datalink may widen the performance gap between experienced and inexperienced aviators, and that delayed responses are such that operational difficulties could occur, not least in busy airspace.

Abstract Number: 165397
Title: The Estimation of Airspace Capacity Using a Model of Air Traffic Controller Workload
Author(s): MAJUMDAR, A.
Source: Contemporary Ergonomics 1999, Edited by M.A. Hanson, E.J. Lovesey and S.A. Robertson. Taylor & Francis, London
Year: 1999
Volume: -
Issue: -
Pages: 2-6
Number of References: 6
Original Language: English
Classification Term(s): Modelling and simulation; Mental workload; Modelling human characteristics
Classification Number(s): 63-01-00; 07-01-00; 63-01-01
Application(s): Air traffic control
Abstract:

Abstract Number: 165754
Title: Impact Analysis of New Air Traffic Management System Designs
Author(s): LACHER, A.R.; MOCH-MOONEY, D.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L. Rakovan, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 1492-1496
Number of References: 16
Original Language: English
Classification Term(s): Decision making and risk assessment; Problem solving and reasoning
Classification Number(s): 02-09-07; 02-09-08
Application(s): Air traffic control
Abstract:
The Federal Aviation Administration (FAA), airlines, and other users of the National Airspace System (NAS) are in the process of redefining the operational paradigm for the air traffic management (ATM) system. This new paradigm will emphasize collaboration and information exchange between users and the FAA in an effort to improve operational efficiency and give users more flexibility and control over operations. The new paradigm will involve system designs that (1) increase the information flow among and available to decision makers; and (2) redistribute decision-making authority. In times of limited Federal budgets and industry resources available to implement system changes, it is important to select initiatives that are likely to have significant operational benefit while increasing or preserving the same level of safety. Stakeholders must be assured that system designs and changes being initiated will have the effects desired and are feasible to implement. They must also have confidence in the analyses being performed. As with any complex command and control system, it is difficult to fully assess the effects of system changes involving new information flows, new policies, new decision support systems, and the redistribution of decisions. The use of several methods to mitigate risks associated with system changes and new initiatives are discussed.

Abstract Number: 165913
Title: Current FAA Controller Workforce Demographics, Future Requirements, and Research Questions
Author(s): SCHROEDER, D.J.; BROACH, D.; FARMER, W.L.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 135-141
Number of References: 21
Original Language: English
Classification Term(s): Age; SELECTION AND SCREENING; TRAINING
Classification Number(s): 04-01-00; 43-00-00; 44-00-00
Application(s): Air traffic control
Abstract:
Earlier papers in this panel have focused on the consequences of the air traffic controller strike of 1981, the subsequent loss of approximately 11,500 controllers, and efforts to recruit and train new personnel over the next decade. In this paper, attention is focused on several personnel-related research/operational questions the Federal Aviation Administration (FAA) will face over the next two decades. Specifically, the authors identify issues associated with (a) ageing of the Air Traffic Control Specialist (ATCS) workforce; (b) employee training for the advanced National Airspace System (NAS) ATC system technologies; and (c) the recruitment and selection of personnel to operate the more automated ATC system of the future.

Abstract Number: 165990
Title: Free Flight and Air Traffic Controller Mental Workload
Author(s): HILBURN, B.G.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L. Rakovan, Volume 2
Year: 1997
Volume: -
Issue: -
Pages: 906-910
Number of References: 5
Original Language: English
Classification Term(s): Mental workload; Allocation of function; Cardiac processes; Eye and head movements; Physiological and psychophysiological recording ; Signal processing and spectral analysis; Workload demands
Classification Number(s): 07-01-00; 02-01-04; 03-02-01; 38-01-00; 41-03-05; 63-07-00; 63-10-02
Application(s): Air traffic control; Automation
Abstract:
Free Flight (FF), an operational concept currently under development, has been proposed as a way to both handle ever-increasing air traffic demands, and to provide economic benefits to airspace users. Under FF, aircraft outside of terminal areas would generally be free to fly their preferred routes, with minimal intervention by air traffic control (ATC). Although technological advances (in communication, navigation, and surveillance) have made the FF concept feasible, a number of human factors questions remain with regard to the impact that such a drastic change in air traffic services would have on the air traffic controller (ATCo). One of the most fundamental of these issues is the workload demands FF might impose on the ATCo, especially under forced reversion-to-controlled flight situations. This article describes two experiments carried out using the same basic en route ATC simulation. The first (baseline) experiment validated the use of a battery of objective workload metrics (heart rate variability (HRV), pupil diameter, and eye scan randomness). All measures were sensitive to changes in traffic load. An overview of the second (ongoing) study is provided. This experiment is focusing on the effect of FF traffic scenarios on ATCo mental workload, under both normal and abnormal situations.

Abstract Number: 165997
Title: Measuring Air Traffic Controller Visual Scanning
Author(s): STEIN, E.S.; WILLEMS, B.
Source: Proceedings of the Ninth International Symposium on Aviation Psychology, April 27-May 1, 1997, Edited by R.S. Jensen and L.A. Rakovan, Volume 1
Year: 1997
Volume: -
Issue: -
Pages: 107-112
Number of References: 11
Original Language: English
Classification Term(s): Mental workload; Eye and head movements; Instrument recording; Rating and ranking; Search
Classification Number(s): 07-01-00; 02-01-04; 02-09-01; 63-09-03; 64-06-00
Application(s): Air traffic control; Radar and sonar
Abstract:
Air traffic control (ATC) is a complex system that requires constant monitoring by highly experienced people who have achieved the title of Controller. This is very visually demanding work with the potential for human error always present. This research used real time ATC simulation of a Terminal Radar Approach Facility (TRACON). Twelve current air traffic controllers were randomly assigned to two groups. One received flight progress strips that indicated expected arrival times of the aircraft over a fix just outside the airspace, and the other received expected time of arrival at the airport. Other independent variables included taskload (traffic volume), the presence of visual noise (en route aircraft not under control), the introduction of unscheduled incursions. Results

demonstrated that taskload had a significant effect on general visual scanning, but visual noise in the form of en route aircraft did not. These results have potential implications for display design and the training of controllers.

Abstract Number: 168564
Title: A Simulation Study of Adaptation in Traffic Management Decision Making under Free Scheduling Flight Operations
Author(s): KLEIN, G.L.; ANTON, P.S.
Source: Air Traffic Control Quarterly
Year: 1999
Volume: 7
Issue: 2
Pages: 77-108
Number of References: 6
Original Language: English
Classification Term(s): Decision making and risk assessment; Modelling and simulation; Modelling human characteristics ; System adaptability and flexibility; USER CONTROL FEATURES
Classification Number(s): 02-09-07; 15-00-00; 37-02-00; 63-01-00; 63-01-01
Application(s): Air traffic control
Abstract:
This research describes an investigation into the potential impact of alternative management control policies on air traffic flow. An experiment was conducted that analyzed the effect of four different arrival management conditions under two different goal conditions on computer-simulated traffic management decision making and on simulated performance. In the condition representing the least level of central arrival management, there was no central arrival management decision maker at all. Two of the arrival management conditions resembled 'free scheduling' operations: in both, a central arrival manager provided information to support independent departure decisions by air carriers, but the two conditions differed on the type of information provided. The fourth condition represented a centrally controlled arrival management operation, where the arrival manager directly limited the number of departures the air carriers could make. Each arrival management condition was simulated under two different goal conditions. A baseline condition was simulated, where all decision makers (air carriers and central) altruistically tried to maximize the same system arrival performance relative to a common utility function. This baseline condition was contrasted with an experimental condition, where each decision maker tried to maximize his own individual performance relative to his own utility functions. The results showed that when all decision makers were working to maximize the same system performance, there were no performance differences attributable to the arrival management conditions. However, when each decision maker was working to maximize his own individual performance, the best performance (both system and individual) occurred in the two 'free scheduling' conditions, with worse performance under central management on one extreme and no management on the other. The results also showed that with simulated decision makers a 'free-market' allocation of airspace resources can result in decisions that yield a dynamic equilibrium that is close to optimum. In addition, these simulated decision makers were able to evolve synchronized operations with no direct inter-user communication. Finally, the results also suggest that some sources of information may be important for such synchronized operations to evolve, but are not needed for maintaining that synchrony.

Abstract Number: 168637
Title: To Intervene or Not To Intervene: The Dilemma of Management by Exception
Author(s): DEKKER, S.W.A.; WOODS, D.D.
Source: Cognition, Technology & Work
Year: 1999
Volume: 1
Issue: 2
Pages: 86-96
Number of References: 63
Original Language: English
Classification Term(s): Supervisory control; Critical incident technique; Protocol analysis; USE OF SUPPORT
Classification Number(s): 02-11-06; 46-00-00; 63-13-00; 64-09-00
Application(s): Air traffic control; Automation
Abstract:
Future air traffic management architectures propose to give aircraft more flight path autonomy and turn the air traffic controller into a manager of exceptions. This article reports on one experiment in a series of studies that empirically explored the cognitive work underlying management by exception in air traffic control. Active practitioners (controllers, pilots, dispatchers) were prepared on the rules of the envisioned system and presented with a series of future incidents, each of which they were required to jointly resolve. Management by exception turns out to trap human controllers in a double bind, where intervening early seems appealing but is difficult to justify (airspace throughput) and carry out (controller workload problems). Late interventions are just as difficult, since controllers will have to take over in the middle of a potentially challenging or deteriorating situation. Computerised decision support that flags exceptions migrates the decision criterion into a device, creating a threshold crossing that is typically set either too early or too late. This article lays out the intertwined trade-offs and dilemmas for the exception manager, and makes recommendations for cooperative human-machine architectures in future air traffic management.

Abstract Number: 170083
Title: Air Traffic Controller Radar Scanning under Current and Proposed Free Flight Conditions

Author(s): STEIN, E.S.; WILLEMS, B.; TRUITT, T.
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 2
Year: 1999
Volume: -
Issue: -
Pages: 702-706
Number of References: 8
Original Language: English
Classification Term(s): Performance strategies; Eye and head movements; Instrument recording; Mental workload; Ratings and preferences; Use of simulators
Classification Number(s): 02-11-04; 02-01-04; 07-01-00; 63-02-00; 63-09-03; 65-08-01
Application(s): Air traffic control; Radar and sonar; Situational awareness
Abstract:
Using a high fidelity air traffic control simulation and a specially constructed generic en route airspace sector, researchers evaluated air traffic control specialist (ATCS) performance and visual scanning behaviour under two control conditions. These included current methods and conditions where ATCSs monitored traffic and intervened with advisories only when necessary. Results indicated that, regardless of condition, controllers spent most available scanning time looking at aircraft representations on the radar. However, measures of situational awareness (SA) declined sharply under high taskload when the controllers were in the passive-monitoring mode. Active involvement is apparently an SA enhancer. Controllers changed their scanning patterns between the active control and passive monitoring conditions. These conditions reflected the worst case scenarios. Future free flight implementation will likely include technological support and controllers in more active roles.

Abstract Number: 170284
Title: Air-Ground Integration Issues in a Self-Separation Environment
Author(s): DUNBAR, M.; ET AL
Source: Proceedings of the Tenth International Symposium on Aviation Psychology, May 3-6, 1999, Edited by R.S. Jensen, B. Cox, J.D. Callister and R. Lavis, Volume 1
Year: 1999
Volume: -
Issue: -
Pages: 183-189
Number of References: 7
Original Language: English
Classification Term(s): Charts and maps; Decision making and risk assessment; Information systems and communication; Job autonomy and user control; Mental workload; Person-to-person communication; Task complexity; Time and speed; USE OF SUPPORT; USER CONTROL FEATURES
Classification Number(s): 08-02-03; 02-09-07; 07-01-00; 07-09-00; 09-01-01; 15-00-00; 41-03-03; 46-00-00; 56-05-00; 65-02-00
Application(s): Air traffic control; Aircrew
Abstract:
The concept of 'free flight' is intended to emphasize more flexibility for operators in the National Airspace system by providing more opportunities for aircraft self-separation. The purpose of this simulation was to begin examining some of the communication and procedural issues associated with self-separation in an integrated air-ground environment. The effects of traffic density (high and low) and different convergence angles (obtuse, acute, and right) on conflict detection times and crew manoeuvring procedures were assessed. Additionally, communication events are summarized. Finally, a discussion of future research issues is provided.

Abstract Number: 171625
Title: Tactical Displays for Combat Awareness: An Examination of Dimensionality and Frame of Reference Concepts and the Application of Cognitive Engineering
Author(s): OLMOS, O.; WICKENS, C.D.; CHUDY, A.
Source: International Journal of Aviation Psychology
Year: 2000
Volume: 10
Issue: 3
Pages: 247-271
Number of References: 42
Original Language: English
Classification Term(s): Charts and maps; Display-control relationships; Stimulus-response compatibility; Task analysis; Three-dimensional graphics; Time and speed; Windowing, scrolling and paging
Classification Number(s): 08-02-03; 08-02-05; 08-06-00; 25-06-00; 25-06-01; 63-05-01; 65-02-00
Application(s): Aircraft; Aircrew; Armed forces
Abstract:
Three prototype displays are contrasted for aircraft navigation and tactical hazard awareness: a conventional 2-D coplanar display, an exocentric (God's eye) 3-D display, and an immersed (pilot's eye) 3-D display coupled with a small scale global display. Strengths and weaknesses of each display type are discussed, related particularly to the ambiguity of perspective displays and to attention allocation problems with dual-display suites. In Experiment 1, 8 pilots flew with each of the displays around an airspace populated by waypoints, hazards, and traffic. Performance measures revealed the anticipated costs and benefits of each display type. In Experiment 2, cognitive engineering techniques of performance and cognitive task analysis were applied to remediate the

weaknesses of each display type. Emphasis was placed on display enhancements to resolve 3-D ambiguity and visual momentum and cueing techniques to facilitate attention allocation and switching. Analysis of performance of 27 additional participants in flight path tracking and hazard awareness measures revealed success in application of the cognitive engineering principles, greatly attenuating the weaknesses of each display.

Abstract Number: 171633
Title: Visuospatial Task Performance as a Function of Two- and Three-Dimensional Display Presentation Techniques
Author(s): VAN ORDEN, K.F.; BROYLES, J.W.
Source: Displays
Year: 2000
Volume: 21
Issue: 1
Pages: 17-24
Number of References: 12
Original Language: English
Classification Term(s): Three-dimensional graphics; Charts and maps; Error, accuracy, reliability and frequency; Time and speed
Classification Number(s): 08-02-05; 08-02-03; 65-02-00; 65-03-00
Application(s): Air traffic control
Abstract:
Three-dimensional (3D) displays are becoming more widely available and are being applied to a greater variety of human-computer interface domains. Previous research has shown that 3D display of objects and information often is more appealing to the users, but for many tasks it is less useful than the two-dimensional (2D) displays. New display techniques must be assessed for their ability to improve human operator performance. The purpose of this research was to compare human performance on several 2D and 3D display formats across four visuospatial tasks. Qualified military and civilian air traffic controllers completed altitude and speed judgement tasks, a vectoring task, and a collision avoidance task on 2D top-down (plan-view), 3D perspective, 3D stereo, and laser-based 3D volumetric display systems. Each subject's speed and accuracy were measured on each task. Results indicated that the 2D plan or side-view displays yielded performance as good or better than any other display system for speed and altitude judgement tasks. Data presentation on the 3D volumetric display was superior to 3D perspective, 3D stereoscopic, and 2D displays only for the collision avoidance task. These results support previous research suggesting that 3D displays are useful in very specific tasks. The results from the collision avoidance experiment suggest that tasks requiring operators to view and predict future locations of multiple display symbols traversing a confined space (such as relationships between aircraft within the airspace around an airport) appear to be well suited for 3D rendering. Compared to 3D stereoscopic and perspective displays, the veridical display of localized spatial information within a volumetric display may provide high fidelity stereoscopic and parallax cues, improving human performance for some tasks.

Abstract Number: 172744
Title: Visual Search in Complex Displays: Factors Affecting Conflict Detection by Air Traffic Controllers
Author(s): REMINGTON, R.W.; JOHNSTON, J.C.; RUTHRUFF, E.; GOLD, M.; ROMERA, M.
Source: Human Factors
Year: 2000
Volume: 42
Issue: 3
Pages: 349-366
Number of References: 26
Original Language: English
Classification Term(s): Search; Charts and maps; Coding by colour; Task complexity; Time and speed
Classification Number(s): 02-09-01; 07-09-00; 08-02-03; 08-03-05; 65-02-00
Application(s): Air traffic control
Abstract:
Recent free flight proposals to relax airspace constraints and give greater autonomy to aircraft have raised concerns about their impact on controller performance. Relaxing route and altitude restrictions would reduce the regularity of traffic through individual sectors, possibly impairing controller situation awareness. The authors examined the impact of this reduced regularity in four visual search experiments that tested controllers' detection of traffic conflicts in the four conditions created by factorial manipulation of fixed routes (present vs. absent) and altitude restrictions (present vs. absent). These four conditions were tested under varying levels of traffic load and conflict geometry (conflict time and conflict angle). Traffic load and conflict geometry showed strong and consistent effects in all experiments. Colour coding altitude also substantially improved detection times. In contrast, removing altitude restrictions had only a small negative impact, and removing route restrictions had virtually no negative impact. In some cases conflict detection was actually better without fixed routes. The implications and limitations of these results for the feasibility of free flight are discussed. Actual or potential applications include providing guidance in the selection of free flight operational concepts.

Abstract Number: 174187
Title: Air Traffic Controller Performance and Workload under Mature Free Flight: Conflict Detection and Resolution of Aircraft Self-Separation
Author(s): GALSTER, S.M.; DULEY, J.A.; MASALONIS, A.J.; PARASURAMAN, R.
Source: International Journal of Aviation Psychology

Year: 2001
Volume: 11
Issue: 1
Pages: 71-93
Number of References: 34
Original Language: English
Classification Term(s): Decision making and risk assessment; Attention, time sharing and resource allocation; Information and communication design for health and safety; Information systems and communication; Mental workload; Multifunction displays; Ratings and preferences; Task complexity; USER CONTROL FEATURES
Classification Number(s): 02-09-07; 02-11-03; 07-01-00; 07-09-00; 15-00-00; 22-06-00; 51-05-00; 56-05-00; 65-08-01
Application(s): Air traffic control; Automation
Abstract:
The effects of conflict detection and self-separating aircraft resolution on the mental workload and performance of en-route air traffic controllers were examined. An air traffic control simulator was used to manipulate traffic loads and traffic complexity. A mature stage of free flight was simulated by having controllers monitor self-separating aircraft. Four 30-min scenarios were created to combine moderate (11 aircraft) and heavy traffic loads (17 aircraft) in a 50-mile radius sector with the presence or absence of self-separating and conflicting aircraft. Conflicts (defined as a loss of separation of 5 nm laterally and 1,000 ft vertically) were indicated to the controller by the appearance of a red circle around each of the aircraft involved. A self-separation event was defined as an evasive manoeuvre (either altitude or speed change) made by 1 aircraft to avoid a potential conflict with another aircraft. Performance and workload measurements indicated that controllers had difficulty both in detecting conflicts and in recognizing self-separating events in a timely manner in saturated airspace. Controller mental workload also increased, as indexed both by subjective and secondary task measures. Implications for the design of automated tools to support controllers under free flight environments are discussed.

Abstract Number: 175268
Title: Cognitive Models and Control: Human and System Dynamics in Advanced Airspace Operations
Author(s): CORKER, K.M.
Source: Cognitive Engineering in the Aviation Domain, Edited by N.B. Sarter and R. Amalberti. Lawrence Erlbaum Associates, Mahwah, New Jersey
Year: 2000
Volume: -
Issue: -
Pages: 13-42
Number of References: 36
Original Language: English
Classification Term(s): Modelling human characteristics ; Cognitive processes; Critical incident technique; Decision making and risk assessment; Information systems and communication; Modelling and simulation; Modelling system characteristics
Classification Number(s): 63-01-01; 02-09-00; 02-09-07; 56-05-00; 63-01-00; 63-01-02; 64-09-00
Application(s): Air traffic control
Abstract:
NASA (National Aeronautics and Space Administration), the FAA (Federal Aviation Administration), and Eurocontrol have initiated programmes of research and development to provide flight crew, airline operations, and air traffic managers with automation aids to increase capacity in enroute and terminal area operations. These are to support the goals of free flight for safe, flexible, predictable, and efficient operations. To support the development of those aiding systems, human performance in automated aiding has been examined in empirical and computational analytic studies. This chapter presents a set of those studies in full-mission simulation and the development of a predictive computational model of human performance.

Abstract Number: 173834
Title: Human Performance Modeling: Identification of Critical Variables for National Airspace Safety
Author(s): GORE, B.F.; CORKER, K.M.
Source: Ergonomics for the New Millennium. Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and 44th Annual Meeting of the Human Factors and Ergonomics Society, San Diego, California, USA, July 29-August 4, 2000. Human Factors and Ergonomics Society, Santa Monica, California, USA, Volume 1
Year: 2000
Volume: -
Issue: -
Pages: 725-728
Number of References: 26
Original Language: English
Classification Term(s): Modelling human characteristics ; Human performance; Mental workload
Classification Number(s): 63-01-01; 02-11-00; 07-01-00
Application(s): Air traffic control
Abstract:
Computational human performance modelling tools have been under development for over 50 years to generate human performance predictions for studying complex human behaviours that possess high costs associated with failures. A common measure for analysis from the digital human modelling tools is operator workload. One complex behavioural environment that is being explored by international regulatory and airline operations groups and is likely to reflect workload differences is known as 'free flight'.

'Free flight' in the United States is a Federal Aviation Administration (FAA) strategic goal for system capacity and for air traffic services to improve accessibility, flexibility, and predictability in the natural airspace in order to reduce flight times, crew resources, maintenance, and fuel costs. The experimental scenarios used to explore 'free flight' are based on the full 'free flight' concepts anticipated by Requirements and Technical Concepts for Aviation (RTCA) in the year 2025. These concepts explore the farthest out parameters of the aviation system.

Abstract Number: 100386
Title: Automation in Air Traffic Management
Author(s): RATCLIFFE, S.
Source: Journal of Navigation
Year: 1985
Volume: 38
Issue: 3
Pages: 405-412
Number of References:
Original Language: English
Classification Term(s): GENERAL SYSTEM FEATURES; Decision making and risk assessment; GENERAL HEALTH AND SAFETY; Mental workload; Modelling system characteristics; Problem solving and reasoning; Supervisory control; TOTAL SYSTEM DESIGN AND EVALUATION
Classification Number(s): 37-00-00; 02-09-07; 02-09-08; 02-11-06; 07-01-00; 38-00-00; 48-00-00; 63-01-02
Application(s): Air traffic control
Abstract:
By Air Traffic Management or ATM is meant the totality of the processes used, in the air and on the ground, to ensure safe and expeditious movement of all air traffic using controlled airspace. Computers are used on a large scale to support human planners in the management processes. Flight management computers in the aircraft, together with radar and flight-plan data processors on the ground, are conspicuous examples. Decision processes remain tasks for human controllers, although off-line computer models of traffic flow provide a background for the longer-term management decisions.

Abstract Number: 119103
Title: Automation in Civil Aviation: Developments, Promises and Problems
Author(s): ABBINK, F.
Source: Man-Machine Interface Aspects in Civil Aviation. Het Avionica Dispuut, Delft, The Netherlands
Year: 1989
Volume: -
Issue: -
Pages: 9-102
Number of References: 35
Original Language: English
Classification Term(s): Display layout; Charts and maps; Control layout; DISPLAY AND CONTROL CHARACTERISTICS; Information and communication design for health and safety; Multifunction displays; Team work; Workload demands; WORKSTATION DESIGN
Classification Number(s): 25-03-00; 08-02-03; 22-06-00; 25-00-00; 25-05-00; 27-00-00; 41-02-03; 41-03-05; 51-05-00
Application(s): Air traffic control; Aircraft; Aircrew; Automation
Abstract:
The safe, orderly and expeditious operation of commercial air transport is becoming more and more dependent on electronic automatic systems, in the aircraft as well as on the ground. Pilots and air-traffic controllers have to operate these automatic systems and monitor their correct functioning. In case of a malfunction the pilot or air-traffic controller has to take over and ensure the safe continuation of the flight. The expected doubling of air transport in the next decade will require a more efficient use of airspace and airports than the present Air Traffic Control system allows. This report gives an overview of the development of the electronic systems that are used for communication, navigation, identification, flight control and engine control, measurement and presentation of flight and systems data and for Air Traffic Control. These developments were enabled by the developments in micro-electronics, computer technology and display technology. Finally new developments in satellite communication and navigation and the new Microwave Landing System, and their promises and problems with respect to further developments in the economy of commercial air transport are discussed.

Abstract Number: 124664
Title: Human Factors and Information Transfer
Author(s): LEE, A.T.
Source: Human Error Avoidance Techniques: Proceedings of the Second Conference, Society of Automotive Engineers, Warrendale, Pennsylvania, Publication No. P-229
Year: 1989
Volume: -
Issue: -
Pages: 43-47
Number of References: 4
Original Language: English
Classification Term(s): Information systems and communication; Combined environments; Errors, accuracy and reliability; Information and communication design for health and safety
Classification Number(s): 56-05-00; 02-11-02; 36-02-00; 51-05-00
Application(s): Aircrew; Information systems

Abstract:
The management and transfer of information in the National Airspace System is essential to safe and efficient air transportation. This paper identifies key problem areas in the management and transfer of information which, it is proposed, contribute to human error. Operational incidents which exemplify design-induced error are provided and their relationship to problems of human information processing are discussed. Recommendations in the areas of communications procedures and technology development are provided which may minimize such errors.

Abstract Number: 124700
Title: Analyzing Controller Tasks to Define Air Traffic Control System Automation Requirements
Author(s): PHILLIPS, M.D.; MELVILLE, B.E.
Source: Human Error Avoidance Techniques Conference Proceedings. Society of Automotive Engineers, Warrendale, Pennsylvania, Publication No. P-204
Year: 1988
Volume: -
Issue: -
Pages: 37-44
Number of References: 9
Original Language: English
Classification Term(s): Task analysis; Allocation of function; Charts and maps; System performance and evaluation
Classification Number(s): 63-05-01; 08-02-03; 37-10-00; 38-01-00
Application(s): Air traffic control
Abstract:
This paper describes a task analysis-based methodology developed to support the requirements specification, design, and operational suitability evaluation of the next generation air traffic control (ATC) system. A sample ATC scenario is used to show the relationship between task analysis methodology, system-level function allocations, and user-system interface (USI) design. Task networks and characterizations based on an aircraft-to-airspace conflict situation under two different function allocation schemes are described. Methods of using the task analysis to guide USI design decisions are presented, along with several candidate USI designs developed using these criteria.

Abstract Number: 125002
Title: Effects of Monitoring under High and Low Taskload on Detection of Flashing and Coloured Radar Targets
Author(s): THACKRAY, R.I.; TOUCHSTONE, R.M.
Source: Ergonomics
Year: 1991
Volume: 34
Issue: 8
Pages: 1065-1081
Number of References: 26
Original Language: English
Classification Term(s): Coding by blinking; Attention, time sharing and resource allocation; Coding by colour; Error, accuracy, reliability and frequency; Information and communication design for health and safety; Mental workload; Ratings and preferences; Time and speed; Vigilance
Classification Number(s): 08-03-04; 02-11-03; 07-01-00; 07-05-00; 08-03-05; 51-05-00; 65-02-00; 65-03-00; 65-08-01
Application(s): Air traffic control; Radar and sonar
Abstract:
While midair collisions between aircraft are extremely rare occurrences, 'near midair' incidents are more common. The present study sought to evaluate the gains in conspicuity that might be realized if flashing or colour were added as redundant cues to indicate the presence of unexpected non-tracked aircraft entering controlled airspace, and to examine the extent to which increased taskload and fatigue might influence the expected gains. Sixty-four subjects monitored a simulated air traffic control task over a 2 h period for possible conflict situations (their primary task) under either high or low primary taskload conditions. They also monitored for occasional intrusions by light aircraft identifiable on the basis of target shape alone or with colour and/or flashing added as redundant cues. Flashing as a redundant cue was found to be superior to colour in all aspects tested; unlike colour, detection of flashing targets was unaffected by screen location and by changes in primary taskload. Flashing was also least affected by monitoring fatigue. It was concluded that the superiority of flashing over colour in attracting attention to objects in a display must be weighed against its possible potential for distraction. A practical means of accomplishing this in operational situations is through the use of touch sensitive displays to both acknowledge/confirm target location and to deactivate flashing.

Abstract Number: 126549
Title: Data-Link Communication between Controllers and Pilots: A Review and Synthesis of the Simulation Literature
Author(s): KERNS, K.
Source: International Journal of Aviation Psychology
Year: 1991
Volume: 1
Issue: 3
Pages: 181-204
Number of References: 24
Original Language: English
Classification Term(s): Person-to-person communication; CHOICE OF COMMUNICATION MEDIA; Information systems and communication; Mental workload;

Modelling system characteristics; Rating and ranking; Reviews; System design and interface engineering; Workload demands
Classification Number(s): 09-01-01; 01-04-00; 07-01-00; 10-00-00; 37-11-00; 41-03-05; 56-05-00; 63-01-02; 64-06-00
Application(s): Air traffic control; Aircrew; Automation
Abstract:
Under its National Airspace System Modernization Plan, the Federal Aviation Administration intends to introduce digital data communication as a means of exchanging information between aircraft and ground-based facilities. Research on operational use of data-link technology has been underway for well over 10 years. From this work, potentially useful data exist that remain largely unexploited for purposes of operational development. This article reviews the simulation literature on data-link communication between controllers and pilots to synthesize a base of useful, generalizable knowledge. General effects of the data-link technology on the volume, speed, and timing of air traffic control communications are analyzed for their operational significance. The analytic framework depicts data-link effectiveness as interdependent with operational context, procedures and applications, and human-interface design. Current research leaves many questions unanswered but consistently indicates that the combination of voice and data-link communication outperforms each medium used by itself. Issues are raised for research and implementation.

Abstract Number: 132732
Title: Spatial Judgments with Monoscopic and Stereoscopic Presentation of Perspective Displays
Author(s): YEH, Y.Y.; SILVERSTEIN, L.D.
Source: Human Factors
Year: 1992
Volume: 34
Issue: 5
Pages: 583-600
Number of References: 26
Original Language: English
Classification Term(s): Three-dimensional graphics; Experience and practice; Monocular versus binocular vision; Size, magnification and viewing distance; Visual perception of form, shape, angle, size and distance
Classification Number(s): 08-02-05; 02-01-06; 02-01-10; 04-04-00; 25-01-01
Application(s):
Abstract:
Spatial judgements with monoscopic and stereoscopic presentation of perspective displays were investigated in this study. The stimulus configuration emulated a visual scene consisting of a volume of airspace above a ground reference plane. Two target symbols were situated at various positions in the space, and observers were instructed to identify the relative depth or altitude of the two symbols. Three viewing orientations (15, 45, or 90 deg. elevation angle) were implemented in the perspective projection. In the monoscopic view, depth cues in size, brightness, occlusion, and linear perspective were provided in the format. In the stereoscopic view, binocular disparity was added along the line of sight from the centre of projection to reinforce the relative depth in the visual scene. Results revealed that spatial judgements were affected by manipulation of the relative spatial positions of the two target symbols and by the interaction between relative position and viewing orientation. The addition of binocular disparity improved judgements of three-dimensional spatial relationships, and the enhancement was greater when monocular depth cues were less effective and/or ambiguous in recovering the three-dimensional spatial characteristics.

Abstract Number: 135901
Title: Knowledge Based Cockpit Assistant for Controlled Airspace Flight Operation
Author(s): WITTIG, T.; ONKEN, R.
Source: Analysis, Design and Evaluation of Man-Machine Systems 1992, Edited by H.G. Stassen. Pergamon Press, Oxford
Year: 1993
Volume: -
Issue: -
Pages: 195-200
Number of References: 10
Original Language: English
Classification Term(s): Decision making and risk assessment; Errors, accuracy and reliability; System design and interface engineering; System friendliness, usability and acceptability; Voice input devices
Classification Number(s): 02-09-07; 02-11-02; 21-21-00; 37-01-00; 37-11-00
Application(s): Air traffic control; Aircraft; Decision support systems
Abstract:
A knowledge based cockpit assistant for flight operation under Instrument Flight Rules (IFR) is presented. The system is aimed at improvement of situation assessment including monitoring of the pilot crew activities and performance increase by computer aids for flight planning and plan execution. The modular system structure is described as well as the individual system modules. A first prototype of this Cockpit Assistant was tested about two years ago in a flight simulator at the University of the German Armed Forces in Munich by professional pilots under realistic IFR-scenarios. The results of these test runs proving enhancements in overall system performance are presented.

Abstract Number: 138176
Title: A Methodology and Encoding Scheme for Evaluating the Usability of Graphical, Direct Manipulation Style Interfaces
Author(s): CUOMO, D.L.

Source: Designing for Diversity. Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, Seattle, Washington, October 11-15, 1993. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1993
Volume: -
Issue: -
Pages: 1137-1141
Number of References: 11
Original Language: English
Classification Term(s): Protocol analysis; Approaches to equipment testing; Data analysis and processing methods; Graphic dialogue; System friendliness, usability and acceptability; System performance and evaluation; Task analysis
Classification Number(s): 63-13-00; 11-08-00; 37-01-00; 37-10-00; 63-05-01; 63-10-00; 63-14-00
Application(s):
Abstract:
A model-based method for assessing the usability of graphical, direct manipulation style interfaces was developed and applied to a military airspace scheduling system. The method involves collecting and integrating verbal protocol data and mouse/keystroke files, and having an analyst familiar with the task, the data, and Norman's (1986) user activity model review the data and make determinations on what the data mean in terms of the model. A hierarchical encoding scheme based on the model is then applied to the integrated data to structure the human-computer interaction (HCI) process at a detailed interaction level. Meaningful patterns can be identified, frequency of events per task, and number of actions per intention can be calculated at various levels, in the hierarchical breakdown, highlighting potential usability problems or instances of indirectness. Repetitious sequences, for example, could imply a missing high-level task domain object or an inability to group objects for application of a single action. Detailed model-based error encodings reflect user-system interface difficulties not only in the execution stage of HCI but in the psychological stages as well. The types of usability problem identified and the advantages of the method are discussed. Based on these results, the author has begun developing a multi-media tool to support application of the method.

Abstract Number: 140765
Title: A Method for Assessing the Usability of Graphical Direct-Manipulation Style Interfaces
Author(s): CUOMO, D.L.
Source: International Journal of Human-Computer Interaction
Year: 1994
Volume: 6
Issue: 3
Pages: 275-297
Number of References: 12
Original Language: English
Classification Term(s): Protocol analysis; Approaches to equipment testing; Graphic dialogue; System friendliness, usability and acceptability; System performance and evaluation; Task analysis
Classification Number(s): 63-13-00; 11-08-00; 37-01-00; 37-10-00; 63-05-01; 63-14-00
Application(s):
Abstract:
A model-based method for assessing the usability of graphical, direct-manipulation style interfaces was developed. The method involves collecting and integrating verbal protocol data, history logs, and videotapes of the system display. Then, an analyst familiar with the task, the data, and Norman's (1986) user activity model reviews the data and makes determinations on what they mean in terms of the model. An encoding scheme is next applied to the integrated data, to structure the human computer interaction (HCI) process at a detailed interaction level. The structured data now support the application of quantitative methods and the identification of meaningful patterns and frequencies that highlight potential usability problems or instances of indirectness. Error encodings reflect user-system interface difficulties not only in the execution stage but also in the psychological stages. The method was used to evaluate the usability of a military airspace scheduling system; the types of usability problems identified and the advantages of the method are discussed.

Abstract Number: 141881
Title: The Implications of Data-Link for Representing Pilot Request Information on 2D and 3D Air Traffic Control Displays
Author(s): WICKENS, C.D.; MILLER, S.; THAM, M.
Source: People and Technology in Harmony. Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting, Nashville, Tennessee, October 24-28, 1994. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1
Year: 1994
Volume: -
Issue: -
Pages: 61-65
Number of References: 8
Original Language: English
Classification Term(s): Charts and maps; Coding by position and configuration; Information and communication design for health and safety; Three-dimensional graphics; Time and speed
Classification Number(s): 08-02-03; 08-02-05; 08-03-07; 51-05-00; 65-02-00
Application(s): Air traffic control; Aircrew
Abstract:
Twenty-four subjects (seven ATC specialists and 17 pilots trained in fundamental ATC skills), performed a simulation in which they were required to evaluate pilot requests for

flight plan changes, issued by aircraft depicted on their display. Some requests could be safely granted, whereas others would bring about a mid-air conflict with other aircraft. Subjects evaluated the requests in the context of an airspace depicted on either a conventional 2D planar display or a 3D perspective display. Requests were presented either as voice messages or were displayed visually, as if relayed via data-link, either printed at the bottom of the display or represented as vectors, emanating in the requested direction from the requesting aircraft. The results indicate that performance is generally equivalent with the 2D and the 3D display and is best with the auditory-verbal request mode. It is considerably slower with the print mode, presumably because of the greater scanning required. The spatial vector mode offers performance that is faster than print, but considerably less accurate. Particular deficiencies were noticed with the vector mode when it was used to present complex 3-dimensional requests in the context of the 3-dimemsional display.

Abstract Number: 143213
Title: Human Factors in Aviation Operations: Proceedings of the 21st Conference of the European Association for Aviation Psychology (EAAP), Volume 3
Author(s): FULLER, R.; JOHNSTON, N.; MCDONALD, N.
Source: Avebury Aviation, Ashgate Publishing, Aldershot, Hants
Year: 1995
Volume: -
Issue: -
Pages: 324pp
Number of References:
Original Language: English
Classification Term(s): Reviews; Mental workload; TRAINING
Classification Number(s): 01-04-00; 07-01-00; 44-00-00
Application(s): Aircraft; Aircrew
Abstract:
The selected contributions reflect a range of current human factors issues in aviation, including the effects of new technology on human performance and its implications for the role of the human operator. This applies in particular to the introduction of automated cockpits, flight management systems and ATC datalink implementations. Reflecting the more cognitive thrust of the current Zeitgeist, much of this work involves the development and evaluation of models of human cognitive performance. Developments in technology impact on the management of airspace and of aircraft by ATC and flight crew; the human component needs optimal integration with the technically-driven, automated and intelligent systems components; and both 'traditional' human factors such as stress and the more recently recognised post-traumatic stress syndrome affect performance. Broad themes such as these underscore the importance of this work to a wide range of applied psychologists, not only those in aviation, as well as to trainers and operational aviation personnel at all levels.

Abstract Number: 144080
Title: Situation Awareness Is Adaptive, Externally Directed Consciousness
Author(s): SMITH, K.; HANCOCK, P.A.
Source: Human Factors
Year: 1995
Volume: 37
Issue: 1
Pages: 137-148
Number of References: 29
Original Language: English
Classification Term(s): Decision making and risk assessment; Charts and maps; Graphs; User's model, mental models and cognitive maps
Classification Number(s): 02-09-07; 05-10-00; 08-02-02; 08-02-03
Application(s): Air traffic control; Aircrew; Situational awareness
Abstract:
The authors define situation awareness (SA) as adaptive, externally directed consciousness. This definition dispels the artificial and contentious division evident in the literature, according to which SA is either exclusively knowledge or exclusively process. This misdirected rivalry has more to do with general perspectives on the study of human behaviour than with SA itself. Through defining SA as an aspect of consciousness, it is hoped to clarify two key issues. (1) The source of goals with respect to SA is a normative arbiter in the task environment; that is, the behaviour that SA generates must be directed at an external goal. (2) SA is the invariant at the core of the agent's perception-action cycle that supports skilled performance; that is, relationships among factors or dimensions in the environment determine what the agent must know and do to achieve the goals specified by the external arbiter. The authors introduce a construct they call the risk space to represent the invariant relations in the environment that enable the agent to adapt to novel situations and to attain prespecified goals. They articulate this concept of a risk space through use of a specific example in commercial aircraft operations. The risk space structures information about the physical airspace in a manner that captures the momentary knowledge that drives action and that satisfies the goals and performance criteria for safe and efficent flight. The authors note that the risk space may be generalized to many different means of navigation.

Abstract Number: 146344
Title: Three-Dimensional Display for Terrain and Weather Awareness in the National Airspace System
Author(s): BOYER, B.; CAMPBELL, M.; MAY, P.; MERWIN, D.; WICKENS, C.D.
Source: Designing for the Global Village. Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, California, October 9-13, 1995. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 1

Year: 1995
Volume: -
Issue: -
Pages: 6-10
Number of References: 16
Original Language: English
Classification Term(s): Three-dimensional graphics
Classification Number(s): 08-02-05
Application(s): Air traffic control; Aircrew; Meteorology
Abstract:
Three experiments are reported in which participants (air traffic controllers, Experiments 1 and 2; pilots, Experiment 3) were required to guide an aircraft around the hazards of terrain (Experiment 1) and weather (Experiments 2 and 3), using either 2D (planar) or 3D (perspective) displays. In Experiment 2, air traffic controllers, but not pilots, were less accurate in projecting tracks around terrain with the 3D display than with the 2D display. In Experiment 2, there was little difference between display formats in their ability to support safe vectoring around weather. In Experiment 3, pilots took slightly longer to plan a route around weather with the 3D display, and did so with equivalent accuracy to the 2D display. In all three experiments, the 3D display supported creation of paths that were slightly longer, and skirted the hazard by a wider margin than did the 2D display.

Abstract Number: 146963
Title: Vigilance Latencies to Aircraft Detection among NORAD Surveillance Operators
Author(s): PIGEAU, R.A.; ANGUS, R.G.; O'NEILL, P.; MACK, I.
Source: Human Factors
Year: 1995
Volume: 37
Issue: 3
Pages: 622-634
Number of References: 26
Original Language: English
Classification Term(s): Vigilance; Reaction time and speed of performance; Shift work; Time and speed
Classification Number(s): 07-05-00; 02-11-01; 39-01-00; 65-02-00
Application(s): Armed forces; Radar and sonar
Abstract:
A function of North American Aerospace Defence (NORAD) in North Bay, Ontario, is to identify all aircraft entering Canadian airspace. The first step in performing this task is to detect visually the presence of aircraft from either radar or transponder information presented on display consoles. This challenging, real-world vigilance task was used to investigate factors affecting detection latencies. The experiment revealed that performance varied as a function of geographic area of coverage, the midnight shift was particularly sensitive to vigilance decrements, and a vigilance decrement effect can occur in a real-world task, but this effect is not as strong as those reported in laboratory studies.

Abstract Number: 146973
Title: Development of a Navigation/Situation Display to Improve Aerial Fire Fighting Safety and Efficiency
Author(s): BATTISTE, V.; DOWNS, M.
Source: Designing for the Global Village. Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, California, October 9-13, 1995. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1995
Volume: -
Issue: -
Pages: 1175-1179
Number of References: 4
Original Language: English
Classification Term(s): Charts and maps; Emergency services; Information systems and communication; Multifunction displays; Textual analysis and parsing
Classification Number(s): 08-02-03; 22-06-00; 51-11-00; 56-05-00; 63-10-04
Application(s): Cartography; Fire services; Situational awareness
Abstract:
Aerial fire fighting is a high-risk, high-cost aviation environment. Normal aviation risks are magnified, sometimes significantly, by a number of factors. Over the years a number of accidents (mid-air collisions and controlled flight into terrain), near mid-air collisions, and other serious incidents involving fire fighting aircraft have occurred. The causes of these accidents or incidents have been primarily attributed to loss of situational awareness in the relatively unstructured aerial environment surrounding wildland fires. In an effort to improve safety and efficiency, researchers at NASA Ames Research Center are working with aerial fire fighters to develop a standard phraseology, air space structure, and a navigation/situation display. This paper focuses on the results of an initial communication analysis, and presents a prototype airspace structure, and the preliminary design and evaluation of the navigation/situation display.

Abstract Number: 149112
Title: The Crisis in European Air Traffic Control: An Assessment of Controller Workload Modelling Techniques
Author(s): MAJUMDAR, A.
Source: Contemporary Ergonomics 1996, Edited by S.A. Robertson. Taylor & Francis, London
Year: 1996
Volume: -
Issue: -

Pages: 570-575
Number of References: 10
Original Language: English
Classification Term(s): Mental workload; Attention, time sharing and resource allocation; Workload demands
Classification Number(s): 07-01-00; 02-11-03; 41-03-05
Application(s): Air traffic control
Abstract:
The design, planning and management of European airspace is a highly complex task, involving numerous issues. After briefly noting the current problems of air traffic control (ATC) in Europe, the central role of controller workload and the difficulties in its understanding, the author examines the salient features of several controller workload models. Featured are those used by ATC authorities in the UK, i.e. the DORATASK and PUMA; by Eurocontrol, i.e. EAM and RAMS; and also the SDAT model of the USA.

Abstract Number: 149842
Title: The Implications of Data-Link for Representing Pilot Request Information on 2D and 3D Air Traffic Control Displays
Author(s): WICKENS, C.D.; MILLER, S.; THAM, M.
Source: International Journal of Industrial Ergonomics
Year: 1996
Volume: 18
Issue: 4
Pages: 283-293
Number of References: 15
Original Language: English
Classification Term(s): Three-dimensional graphics; CHOICE OF COMMUNICATION MEDIA; Error, accuracy, reliability and frequency; Information systems and communication; Multifunction displays; Time and speed; Voice output and speech synthesis
Classification Number(s): 08-02-05; 10-00-00; 22-06-00; 23-02-00; 56-05-00; 65-02-00; 65-03-00
Application(s): Air traffic control; Aircrew
Abstract:
Twenty-three participants (six air traffic control specialists, and 17 pilots trained in fundamental ATC skills) performed a simulation in which they were required to evaluate pilot requests for flight plan changes, issued by aircraft depicted on their display. Some requests could be safely granted, whereas others would bring about a mid-air conflict with other aircraft. Participants evaluated the requests in the context of an airspace depicted on either a conventional 2D planar display or a 3D perspective display. Requests were presented either as voice messages or were displayed visually. Visual requests were either printed at the bottom of the display or represented as vectors, emanating in the requested direction from the requesting aircraft. The results indicated that controllers performed more accurately than pilots, and that performance was generally equivalent with the 2D and 3D display. Overall performance was best with the auditory-verbal request mode. It was considerably slower with the print mode, presumably because of the greater visual scanning required. The spatial vector mode offered performance that was faster than print, but considerably less accurate. Particular deficiencies were noticed with the vector mode when it was used to present complex 3-dimensional requests in the context of the 3-dimensional display. The results are discussed within the context of their relevance for data-link technology and advanced ATC display concepts. First, the National Aerospace Industry is undergoing revolutionary changes in the way pilots communicate with air traffic controllers (increasingly via computers), and this study examines some implications of that change. Second, all industries are potentially enjoying advances in graphics display technology, particularly the use of 3D graphics. This paper examines the costs and benefits of those graphics in the ATC context.

Abstract Number: 150042
Title: Preliminary Identification of Factors Causing Pilots to Disconnect the Flight Management Systems in Glass Cockpits
Author(s): GALANTE, G.T.
Source: Public-Sector Aviation Issues: Graduate Research Award Papers 1993-1994 by the Transportation Research Board, National Research Council, Washington, D.C. National Academy Press, Washington, D.C., Transportation Research Record No.1480
Year: 1995
Volume: -
Issue: -
Pages: 17-24
Number of References: 24
Original Language: English
Classification Term(s): Allocation of function; Data collection and recording; Experience and practice; Interviews; Knowledge of results and feedback; Mental workload; Questionnaires and surveys; Surveys, statistics and analysis
Classification Number(s): 38-01-00; 04-04-00; 07-01-00; 41-03-06; 48-01-00; 48-02-00; 64-04-00; 64-05-00
Application(s): Aircrew; Automation; Situational awareness
Abstract:
Research in cockpit automation has indicated that pilots sometimes have difficulty understanding and operating cockpit automation systems. Problems with operating automated systems or the need to reprogram systems has the potential to keep pilots looking inside the cockpit during critical phases of flight when, in fact, they should be looking outside the cockpit. An alternative to reprogramming the automation, particularly the flight management system, is either to turn the automation completely off or to reduce the level of automation to the basic autopilot. Observations indicate, however, that pilots often do not turn off the automation when lengthy reprogramming is required. The

identification of specific conditions under which pilots disconnect cockpit automation was made to determine whether they disconnect it when it is appropriate to do so. Examination and analysis of a field study of automation use from a major air carrier data base containing observational activities of crews were conducted. Second, the National Aeronautics and Space Administration's Aviation Safety Reporting System data base was queried. Thirdly, pilots from major air carriers were surveyed to ascertain their decisions to disconnect the automated systems during flight and the circumstances affecting those decisions. Several common factors were found to affect pilots' decisions to disconnect automated systems. These multiple factors were pilot experience, work load, rapid air traffic control-issued changes, automation performance, weather, equipment failures, and congested airspace. These factors support prior automation research findings by others investigating various automation issues.

Abstract Number: 151978
Title: Advanced Taxi Map Display Design for Low-Visibility Operations
Author(s): BATTISTE, V.; DOWNS, M.; MCCANN, R.S.
Source: Human Centered Technology - Key to the Future. Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting, Philadelphia, Pennsylvania, September 2-6, 1996. The Human Factors and Ergonomics Society, Santa Monica, California, Volume 2
Year: 1996
Volume: -
Issue: -
Pages: 997-1001
Number of References: 7
Original Language: English
Classification Term(s): Charts and maps; Error, accuracy, reliability and frequency; Eye and head movements; Paper versus screen; Time and speed
Classification Number(s): 08-02-03; 02-01-04; 25-07-00; 65-02-00; 65-03-00
Application(s): Aircraft; Aircrew
Abstract:
Conducting gate to gate operations during reduced visibility conditions is a major impediment to scheduled and unscheduled flight operations in the National Airspace System (NAS). Takeoff and landing minima are predicted on aircraft equipage and airport visibility (e.g., at some major airports, operations are terminated when visibility is below 700 ft runway visual range (RVP)). Although some aircraft can land with zero-zero visibility, there are no ground or flight deck systems that allow them to taxi under low visibility conditions. A map display system designed to support low visibility taxi was evaluated by 12 B-747 flight crews in NASA's Crew Vehicle System Research Facility (CVSRF). Three taxi-map conditions were compared: paper map only, basic moving map, and advanced moving map. Crews landed and taxied along 24 different taxi routes under three visibility conditions: unlimited visibility, 700 ft RVR, and 300 ft RVR. Taxi time, errors and workload were collected for each taxi operation. Video tape recordings captured crew interactions and head-up and head-down times. Taxi times and errors were significantly better for crews with electronic maps than for crews with a paper map. Although crews with the advanced map experienced significantly more head-down time, the head down interval was significantly less than with the paper map and crew workload was significantly less. During the post-flight design review, pilots identified improvements in procedures and formatting that might enhance performance. They developed a procedure for safety switching from the NAV display to the map; and in general their comments were very favourable.

Abstract Number: 153503
Title: Reliability Performance in GPS Receivers and the Nature of Their Failures: Planning to Live with Realistic Failure Rates in Satellite Navigation System Receivers
Author(s): SHARKEY, S.; JOHANNESSEN, R.
Source: Journal of Navigation
Year: 1997
Volume: 50
Issue: 2
Pages: 172-182
Number of References: 3
Original Language: English
Classification Term(s): System reliability; Human reliability and system reliability; Information systems and communication
Classification Number(s): 37-07-00; 56-05-00; 63-06-00
Application(s): Air traffic control
Abstract:
The National Air Traffic Services (NATS) in London require data on the performance likely to be achieved by the navigation system on board aircraft flying in UK airspace. To that end the performance of three different GPS receiver types (all designed for aviation use) has been examined. This paper details the result of that work. The achieved Mean Time Between Failures (referred to here as 'Outages') is presented along with the nature of some of the failures that have been encountered. The paper concludes with the operational implication of the findings.

Abstract Number: 156682
Title: Mental Models and Situation Awareness in Air Traffic Control
Author(s): MOGFORD, R.H.
Source: International Journal of Aviation Psychology
Year: 1997
Volume: 7
Issue: 4
Pages: 331-341

Number of References: 15
Original Language: English
Classification Term(s): User's model, mental models and cognitive maps; Error, accuracy, reliability and frequency; Long term memory and semantic memory; TRAINING; Use of simulators
Classification Number(s): 05-10-00; 02-09-04; 44-00-00; 63-02-00; 65-03-00
Application(s): Air traffic control; Situational awareness
Abstract:
Air traffic controllers report that they form a mental picture of aircraft in airspace to assist in their work. In this study, the relationship of the picture to the concepts of mental models and situation awareness (SA) is discussed. A definition of SA is proposed that suggests it is the transient contents of awareness, as structured and supported by an underlying mental model. Research on SA in air traffic control is reviewed, and it appears that insufficient work has been done to demonstrate the importance of SA for successful task performance. An experiment with air traffic control trainees is described that relates their recall of basic aircraft data during a simulation to their scores in a final exam. The results showed that students prioritized aircraft information. Those who had accurate recall of aircraft altitude and heading had better outcomes. It is suggested that trainees, in retaining information about aircraft altitude and direction of flight, maintain a minimum but adequate set of data to help anticipate impending aircraft conflicts. It is recommended that further SA research be conducted to determine its salient components for a given task.

Abstract Number: 156801
Title: Design and Evaluation of a 4D Navigation Display with Direct Manipulation
Author(s): VERHOEVEN, R.; VAN HOUTEN, Y.; NIBBELKE, R.
Source: Engineering Psychology and Cognitive Ergonomics. Volume One: Transportation Systems, Edited by D. Harris. Ashgate Publishing, Aldershot, Hampshire
Year: 1997
Volume: -
Issue: -
Pages: 93-99
Number of References: 10
Original Language: English
Classification Term(s): Multifunction displays; Charts and maps; System facilities; Three-dimensional graphics; Tracker ball and mouse
Classification Number(s): 22-06-00; 08-02-03; 08-02-05; 21-14-00; 37-03-00
Application(s): Aircraft; Aircrew
Abstract:
The main priority of 4D ATM, as defined within PHARE, is the increase in airspace capacity, subject to the overriding requirement for system safety. An airborne flight management system could be an important source of accurate, timely information on aircraft intentions for ATC. This study designed and evaluated a prototype FMS interface, based on the navigation display and incorporating enhanced functionality. The interface allows graphically-presented routes to be modified directly on the display using a trackball as a cursor control device. Pilots judged this direct manipulation to be a very intuitive method. The trackball was rated suitable, even under turbulent conditions. When modifying a route, a pencil analogy was preferred to a rubber band analogy.

Abstract Number: 159965
Title: An Index of Dynamic Density
Author(s): SMITH, K.; SCALLEN, S.F.; KNECHT, W.; HANCOCK, P.A.
Source: Human Factors
Year: 1998
Volume: 40
Issue: 1
Pages: 69-78
Number of References: 7
Original Language: English
Classification Term(s): Human reliability and system reliability; Combined measures and indices; Information density, clutter and spaciousness
Classification Number(s): 63-06-00; 08-04-02; 65-07-00
Application(s): Aircraft
Abstract:
The risk of a collision between aircraft is rising as the density of commercial air traffic increases. This trend, together with the overwhelming need to upgrade the National Airspace System, has motivated the Federal Aviation Administration to sponsor the development of metrics to evaluate 'dynamic density' - a proxy for the likelihood of collision risk. Here the authors propose and evaluate a mathematical index of dynamic density, D, that describes collision risk. Although the domain of investigation is aviation, the logic of D is applicable whenever objects move in limited spaces. A series of sensitivity analyses illustrates how D responds to frequently encountered air traffic conflict situations. The authors illustrate a use of D that characterizes pilot performance and efficiency in experimental simulations of free flight and suggest other human factors applications. This research could be applied immediately by the traffic management units of en-route air traffic control centres to reformulate the criterion for the critical capacity of sectors.