



ATOP-R&D

Human Factors Newsletter # 05-21

October 30, 2005 – November 12, 2005

Articles in this newsletter:

- *FAA Executive Vacancy Announcement*
- *Flight Plan 2006-2010*
- *Technical Note: Human Factors Considerations for Passwords and Other User Identification Techniques, Part 1: Literature Review & Analysis*
- *Technical Note: Application of Draft Human Error and Safety Risk Analysis (HESRA) to the Voice Switching Control System (VSCS)*
- *Technical Note: Human Factors Evaluation of a Digital, Air-Ground Communications System with Pilots*
- *Weather Information Display*
- *ERIDS Benefits Study*
- *Performance Data Analysis and Reporting System*
- *Traffic Flow Management*
- *Excellence in Aviation Research Awards*
- *Flight Safety Foundation Award*
- *Calendar*

FAA Executive Vacancy Announcement – Program Director for Human Factors: The FAA is seeking applications for its Program Director for Human Factors position. The Program Director for Human Factors is responsible for leading the agency-wide human factors program. The incumbent provides executive direction and leadership as well as executive level advice and guidance in all human factors research and development programs for the FAA. The incumbent reports directly to the Director, Operations Planning, Research and Development on systems acquisition issues and human factors research. Areas include: human computer interface for air traffic control, controller aircrew interface, aircrew performance, cockpit resource management, flight training, maintenance training and procedures, medical certification of airmen, and procedures for security personnel. Applications must be received by November 29, 2005. **NOTE:** This is a re-advertisement of Vacancy Announcement # AWA-ATO-2005-1-10192. Applicants who applied for Vacancy Announcement # AWA-ATO-2005-1-10192 need not

reapply. For more information, point to <http://www.faa.gov/ahr/career/10207.htm> or contact Rebecca Korelec, 202-267-3084 or TTY number (202) 366-7630. Rebecca.Korelec@faa.gov

Flight Plan 2006-2010: The FAA Administrator has announced that the revised Flight Plan 2006-2010 is now available by pointing to the FAA's main Web site at <http://www.faa.gov/>

Technical Note: Report Title: *Human Factors Considerations for Passwords and Other User Identification Techniques, Part 1: Literature Review & Analysis*. DOT/FAA/CT-05/20. Kenneth Allendoerfer, NAS Human Factors Group, ATO-P, Shantanu Pai, L-3 Communications, Titan Corporation.

Link directly to the report: http://acb220.tc.faa.gov/technotes/dot_faa_ct_05_20.pdf

Abstract

All users need proper authorization before they can access National Airspace System (NAS) equipment. FAA systems employ a variety of user identification systems and techniques such as usernames, passwords, and smartcards. Current procedures and policies place a variety of sometimes contradictory requirements on the Technical Operations workforce. This report describes human factors and usability issues in the use of these identification techniques. Issues include the number of passwords a user must remember, the frequency by which the passwords must be changed, the complexity of the passwords, and social issues like trust and accountability. The report discusses human factors research literature examining these topics and provides recommendations for making passwords easier to use. It provides an analysis of ways in which NAS maintenance tasks and systems differ from the typical information technology environment studied in the literature. The report also discusses ways that these differences may affect decisions regarding passwords and other user identification technology. Finally, the report proposes a study in which information will be gathered from field personnel to provide a more specific, targeted analysis of how passwords and other user identification techniques can be made simpler and more usable in the NAS.

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems.

Point of Contact: E. Stein, WJHTC

Technical Note: Report title: *Application of Draft Human Error and Safety Risk Analysis (HESRA) to the Voice Switching Control System (VSCS)*. HumanCentric, LLC, Cary, NC 27513-3164

Abstract

One of the FAA goals is to reduce the likelihood of human error in air traffic operations and improve safety in the National Airspace System (NAS). One key to reducing human error is to design systems, processes, and procedures that are error resistant. Typically, error resistance is added by incorporating human factors research, design, and evaluation into the development process. This includes performing human error analysis on emerging designs. While there are many approaches to performing human error analysis, the FAA's focus is to perform an analysis

that predicts and prevents human errors before they occur, rather than waiting to investigate the consequences.

The FAA Air Traffic Organization-Operations Planning (ATO-P) Human Factors Research and Engineering Department requested that HumanCentric Research LLC (HCR) explore the feasibility of adapting HCR's predictive human error analysis method called the Human Error and Safety Risk Analysis (HESRA) for use in the Air Traffic Control (ATC) facilities maintenance domain. The intent is to provide a tool for FAA human factors staff to evaluate the risk of human error in ATC maintenance tasks. The hope is that HESRA can be applied to existing systems, those under development, and to changes to procedures or design. The overriding goal of the project is to enable FAA staff to proactively identify elements of maintenance procedures and system design that negatively influence human performance and safety. This will allow the FAA to field better and safer systems, as well as improve the ability of air traffic control system maintainers to successfully perform their jobs.

HCR has been working with FAA organizations and personnel to develop a better understanding of maintenance personnel, their tasks, and the context within which they perform their tasks. Based on this understanding, the HESRA methodology has been modified to better fit the needs of the FAA.

One of the goals of the current project was to apply the modified HESRA methodology to a representative ATC system in order to assess the method's efficacy and identify potential enhancements. Working with FAA staff from Technical Operations, HCR identified the Voice Switching Control System (VSCS) as the target for this application, which was performed during August 2005. This report documents the results of that application.

Link directly to the report: <http://www.hf.faa.gov/Portal/techrptdetails.aspx?id=1710>

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems.

Point of Contact: D. Piccione, ATO-P R&D

Technical Note: On November 2, 2005, Carolina Zingale from the William J. Hughes Technical Center's NAS Human Factors Group presented the following paper at the Digital Avionics Systems Conference (DASC) in Washington, DC. Zingale, C.M., McAnulty, D.M., & Kerns, K. (2005). *Human Factors Evaluation of a Digital, Air-Ground Communications System with Pilots*. In Proceedings of the 24th AIAA/IEEE Digital Avionics Systems Conference (DASC), Piscataway, NJ: IEEE.

Abstract

The FAA Next Generation Air-Ground Communications (NEXCOM) program has been developing a Very High Frequency (VHF) Digital Link Mode 3 (VDL3) system to replace the aging analog air traffic communications system. VDL3 provides increased channel capacity and is capable of transmitting both voice and data. VDL3 also compensates for known limitations in the analog system by virtually eliminating "step-ons" with an antiblocking feature, enabling

controller override, and providing a transmit status indicator (TSI) to indicate if the channel is occupied.

VDL3 is expected to have a longer voice throughput delay (up to 350 ms) than the existing analog system (approximately 70 ms), which could potentially disrupt the communications flow. The delay and the acceptability of the new features were previously evaluated in a high-fidelity human-in-the-loop simulation with air traffic control specialists (ATCSs). That study found that a system with a 350 ms system delay and the additional features was acceptable to controllers and did not adversely affect performance or workload. This report summarizes the second, high fidelity, human-in-the-loop simulation of VDL3 system performance and operational acceptability from the flight deck perspective. The objectives of this study were to validate the findings of the earlier simulation with pilots, to compare data obtained under analog communications to those obtained using a digital system simulating VDL3, and to assess analog and VDL3 communications under routine conditions and adverse weather conditions that further increased demand for access to the channel.

Fourteen airline pilots participated in the study using two realistic flight deck simulators. The results showed that the participants attempted to access the channel similarly with either radio system, but that the digital system allowed more successful transmissions to be made. Most other communications characteristics did not differ between the two systems. The effects of adverse weather were similar for both systems. The participants rated the operational acceptability of the digital system higher than the analog system, and nearly always rated the digital system as equal to, or better than, the analog system for completing communication tasks. The participants rated the anti-blocking, controller override, and TSI features as highly useful. However, ratings of some aspects of the TSI were variable, indicating that improvements may be needed. In a separate effort, a group of human factors specialists evaluated alternative implementations of the TSI and made recommendations for modifications. Overall, the results indicated that VDL3, with a 350 ms voice throughput delay and enhanced system features, is an acceptable communications system for pilots.

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objectives 1 and 5: Reduce the commercial fatal accident rate; Enhance the safety of FAA's air traffic systems.

Point of Contact: C. Zingale, WJHTC

Weather Information Display: On November 7, 2005, Ulf Ahlstrom gave a briefing and demonstration of the Terminal Radar Approach Control controller human-in-the-loop weather simulation at the William J. Hughes Technical Center's NAS Human Factors Laboratory. The briefing included efficiency outcomes and human factors issues measured during the simulation, as well as hands-on demonstrations of weather tools and simulation conditions. The participants discussed operational benefits from weather tools during severe weather avoidance, and the human factors issues related to the use of color in precipitation displays for controllers and pilots. The following participants were present during the briefing and demonstration: Lisa Bee, Kevin Browne, Richard Heuwinkel, and Dino Rovito, ATO-P NAS Weather; Sadegh Kavoussi, ATO-P/AVMET; and, Nannette Kalani, Susanne Spincic, ATO-P. (U. Ahlstrom, WJHTC). *This*

research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.

ERIDS Benefits Study: During October 19-22, 2005, researchers from the William J. Hughes Technical Center's Human Factors Group visited Jacksonville Air Route Traffic Control Center to collect data on controller use of the En Route Information Display System (ERIDS). The researchers observed controllers using ERIDS during live operations and also collected data with 17 supervisors in an ERIDS simulation activity at the facility. The data will be used to determine how controllers are using ERIDS and the potential benefits of the system. *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.* (R. Sollenberger, WJHTC)

Performance Data Analysis and Reporting System: On October 25, 2005, a research psychologist from the William J. Hughes Technical Center's NAS Human Factors Group participated in a preliminary data gathering activity for a study of traffic management analysis tools. Two experienced users of the Performance Data Analysis and Reporting System and Post Operations Evaluation Tool from the field were interviewed. The users described commonly performed types of analyses and discussed which tool they preferred for conducting the analyses and why. They also provided feedback on usability, effectiveness of existing capabilities, and desired future capabilities. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems.* (T. Yuditsky, WJHTC)

Traffic Flow Management: On October 20, 2005, research psychologists from the NAS Human Factors Group supported a meeting of the Traffic Flow Management User Team. They worked with the team to review requirements for user interface changes to the Traffic Situation Display (TSD) and Flight Schedule Monitor and provided feedback on proposed design changes to the fly.faa.gov website. Many of the changes they discussed will support implementation of Airspace Flow Programs in the spring of 2006. The researchers also worked with the user team to refine scenarios for the TSD Baseline Study. They focused on special situation scenarios that present national as well as local constraints due to weather. (T. Yuditsky, WJHTC). *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.*

Excellence in Aviation Research Awards: Administrator Blakey has announced recipients of the 2005 FAA Excellence in Aviation Research Award. They are: Richard Dolbeer, Coordinator of the Aviation Safety and Assistance Program for the U.S. Department of Agriculture; and ***Colin Drury, UB Distinguished Professor and chair of the Department of Industrial Engineering at the University at Buffalo: State University of New York.*** Dr. Richard Dolbeer is a world-renowned expert in airport wildlife hazard mitigation whose work is sponsored by ATO-P R&D wildlife mitigation R&D program, which is lead by Dr. Michele Hovan. Dr. Dolbeer pioneered applied research in wildlife hazards to aviation, and created the U.S. Department of Agriculture/Wildlife Service Aviation Research Project, an effort focused entirely on reducing wildlife hazards to aviation. He also helped create the National Wildlife Strike Database, the most extensive and accurate database of its kind in the world. ***Dr. Colin Drury is internationally recognized for his research in aviation maintenance human factors. He has been a key contributor to the FAA Human Factors in Maintenance Research and Development Program,***

conducting critical safety research, since 1989. His research has spanned many of the most critical topics in aviation maintenance human factors, including: visual and non-destructive inspection, the use of simplified English for maintenance technical documentation, the effectiveness of error investigation processes, and the effect of English as a second language on maintenance error. FAA's Office of Research and Development (ATO-P R&D) administers the award program. The awards will be presented at FAA HQ on November 16 and 17, 2005. Congratulations! *Dr. Drury's research supports the Administrator's Flight Plan Goal for Increased Safety, Objective 1: Reduce the commercial fatal accident rate.* (T. Kraus, ATO-P)

Flight Safety Foundation Award: FAA researcher Dr. Robert Helmreich, University of Texas, is this year's recipient of the Flight Safety Foundation – Boeing Aviation Safety Lifetime Achievement Award, which recognizes an individual for lifetime commitment and contribution to enhancing aviation safety. For over twenty years, Dr. Helmreich has been at the forefront of crew performance improvement endeavors. His research developed the Line Operational Safety Audit, and he has been instrumental in providing the foundation for safety enhancing Crew Resource Management (CRM) and Threat and Error Management programs for both United States and international air carriers. These programs are credited with improving air carrier safety. Additionally, his CRM principles have been adopted and tailored for aircraft maintenance, air traffic controllers and the United States military. Congratulations! *Dr. Helmreich's research supports the Administrator's Flight Plan Goal for Increased Safety, Objective 1: Reduce the commercial fatal accident rate.* (P. Krois, ATO-P R&D)

More information on human factors research can be found at the FAA Human Factors (ATOP-R&D) web site: <http://www.hf.faa.gov>

Paul Krois
FAA (ATO-P R&D Human Factors)



November 15-17, 2005 - National Business Aviation Association's 58th Annual Meeting & Convention. www.nbaa.org

November 16-17, 2005 – IEE Human Factors Engineering Professional Network/MoD Human Factors Integration Defense Technology Center “People and Systems Symposium: Who Are We Designing For?”, Grange City Hotel London, UK <http://conferences.iee.org/pas2005>

November 17-19, 2005 – HCIS Symposium, Greenbelt, MD
<http://gandalf.ncat.edu/ihms/CenterHumanCentric>

November 28-29, 2005 – Joint FAA/Association of Asia Pacific Airlines Workshop on Human Factors in Engineering and Maintenance, Prince Hotel, Kuala Lumpur
http://www.aapairlines.org/content/events/HumanFactorWS/HF2005_Flyer.pdf

November 28-30, 2005 – European Aviation Conference, Nice, France
<http://www.everestevents.co.uk/events.asp?eventID=39>

November 28 - December 1, 2005 – I/ITSEC 2005 (Interservice/Industry Training, Simulation and Education Conference), Orange Country Convention Center, Orlando, FL
<http://www.adlnet.org/news/articles/337.cfm>

November 29 – December 1, 2005 – FAA New Technologies Workshop, Sheraton National Hotel, Arlington, VA <http://www.cmpmeetings.com/faaafs> , csmith@cmpmeetings.com

December 6-8, 2005 – US Air Force T&E Days, Gaylord Opryland Hotel, Nashville, TN
<http://www.aiaa.org/content.cfm?pageid=230&lumeetingid=1297>

December 6-8, 2005 – NASA Sixth Annual Risk Management Conference, Disney Coronado Resort, Orlando, FL <http://rnc.nasa.gov/>

January 9-12, 2006 - 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV <http://www.aiaa.org/>

January 21-25, 2006 – ASHRAE Winter Meeting and Expo, Chicago, IL
<http://www.ashrae.org/template/AssetDetail/assetid/45794>

January 22-26, 2006 – TRB 85th Annual Meeting, Washington, DC <http://trb.org/calendar/>

January 23-27, 2005 - S-18 Safety Assessment for Airborne Systems & Equipment San Antonio, TX, lemon@sae.org

February 9-10, 2006 - Swinburne University Symposium on Safety Management and Human Factors Symposium, Melbourne, Australia janca@groupwise.swin.edu.au
<http://www.swin.edu.au/aviation/forms/2006SwinburneSymposiumCallforPapers.pdf>

February 21-26, 2006 – Asian Aerospace 2006, Changi Exhibition Centre, Singapore
www.asianaerospace.com

February 26-28, 2006 – Heli-Expo, Dallas, TX <http://www.heliexpo.com>

February 28 – March 1, 2006 – 31st Annual FAA Aviation Forecast Conference, Wash, DC
[http://www.faa.gov/news/conferences/aviation_forecast_2006/.](http://www.faa.gov/news/conferences/aviation_forecast_2006/)

March 12-14, 2006 – AirCargo 2006, Sheraton Bal Harbour, FL
<http://www.aircargoonference.com>

March 13-15, 2006 – Flight Safety Foundation 18th Annual European Aviation Safety Seminar, Athens, Greece <http://www.flightsafety.org/seminars.html#eass>

March 20-23, 2006 – 16th Annual AAMI/FDA International Conference on Medical Device Standards and Regulation, Hyatt Regency, Reston, VA
<http://www.aami.org/meetings/isc/index.html>

March 22 - 25, 2006 - Society for Behavioral Medicine Annual Meeting and Scientific Sessions, San Francisco, CA www.sbm.org/annualmeeting/index.html

March 23-25, 2006 - 17th Annual International Women in Aviation Conference, Opryland Hotel Nashville, TN <http://www.wai.org/>

March 23-27, 2005 – IA Summit 2006, Hyatt Regency, Vancouver, BC, Canada
<http://www.iasummit.org/>

March 28-30, 2006 – Aviation Industry Expo, Las Vegas, NV
<http://www.aviationindustryexpo.com>

April 4-10, 2006 – Sun ‘n Fun, Lakeland, FL <http://www.sun-n-fun.org/content/>

April 6-7, 2006 – National Human Capital Summit, Chicago Marriott Downtown, Chicago, IL
http://www.humancapitalinstitute.net/conference_national.html

April 22-27, 2006 – CHI 2006, Montreal, Quebec, Canada
<http://www.chi2006.org/call/hcioverviews.php>

April 23-28, 2006 - Avionics Systems Division Meeting, New Orleans, LA (TBD)
lemon@sae.org

April 25-27, 2006 – Maintenance, Repair & Overhaul (MRO) Conference & Exhibition, Phoenix Civic Plaza, Phoenix, AZ <http://www.aviationnow.com/conferences/mromain.htm>

May 1-4, 2006 - 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference; 14th AIAA/ASME/AHS Adaptive Structures Conference; 7th AIAA Gossamer Spacecraft Forum; 2nd AIAA Multidisciplinary Design Optimization Specialist Conference; 1st AIAA Non-Deterministic Approaches Conference, Hyatt Regency Newport, Newport, RI <http://www.aiaa.org/>

May 9-11, 2006 – Flight Safety Foundation 51st Annual Corporate Aviation Safety Seminar, Phoenix, AZ <http://www.flightsafety.org/seminars.html#eass>

May 14-18, 2006 - 77th Annual Scientific Meeting of the Aerospace Medical Association, Caribe Royale Hotel, Orlando, FL <http://www.asma.org/>

May 15-16, 2006 – DoD TAG, Las Vegas, NV <http://hfetag.dtic.mil/meetschl.html>

May 17-19, 2006 – 17th International Conference on Heating and Ventilation, Prague, Czech Republic <http://www.acv2006.cz>

May 22-24, 2006 - 9th IFAC Symposium on Automated Systems Based on Human Skill And Knowledge, Nancy, France <http://www.cdc.gov/niosh/exhibits.html>

May 25-28, 2006 – American Psychological Society 18th Annual Convention, New York Marriott Marquis, New York City, NY <http://www.psychologicalscience.org/convention/>

June 8-10, 2006 – NTSB Bar Association Annual CLE Conference, NTSB Conference Center, L'Enfant Plaza, Wash, DC <http://www.ntsbbar.org/>

June 11-14, 2006 – The American Society of Safety Engineers Safety 2006 Conference, Washington State Convention and Trade Center, Seattle, WA
<http://www.asse.org/2006pdcallforpapers.pdf>

June 12-16, 2006 – UPA 2006 – 15th Annual Conference, Broomfield, CO
http://www.usabilityprofessionals.org/conferences_and_events/upa_conference/2006/

June 24-26, 2006 – AAMI Conference & Exposition, Wash, DC
<http://www.aami.org/proposals/index.html>

June 24-28, 2006 – ASHRAE Annual Conference, Quebec, Canada <http://www.ashrae.org/>

June 26-29, 2006 - [General Aviation Technology Conference](#) , Hyatt Hotel, Wichita, Kansas,

July, 2006 - 26th International Congress of Applied Psychology, Athens, Greece
dgeorgas@dp.uoa.gr ,
http://www.erasmus.gr/dynamic/conventions.asp?conv_id=21r/dynamic/conventions.asp?conv_id=21

July 10-14, 2006 – IEA 2006, 16th World Congress on Ergonomics, Maastricht, The Netherlands
<http://www.iea2006.org/>

July 24-30, 2006 – EAA AirVenture, Oshkosh, WI <http://www.airventure.org/>

August 10-13, 2006 – American Psychological Association Annual Meeting, New Orleans, LA
<http://www.apa.org/convention05/future.html>

August 21-24, 2006 - AIAA Modeling and Simulation Technologies Conference and Exhibit. Keystone Resort and Conference Center, Keystone, CO
<http://www.aiaa.org/content.cfm?pageid=1>

August 21-24, 2006 - AIAA Guidance, Navigation, and Control Conference and Exhibit, Keystone Resort and Conference Center, Keystone, CO
<http://www.aiaa.org/content.cfm?pageid=1>

September 6-8, 2006 - 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Renaissance Portsmouth, Portsmouth, VA,
<http://www.aiaa.org/content.cfm?pageid=1>

September 10-14, 2006 - 54th International Congress of Aviation and Space Medicine, Bangalore, India. A preliminary registration form may be found at <http://www.isam-india.org/conference44/newreg.php>.

September 20-22, 2006 – HCI-Aero 2006, Seattle, WA <http://www.eurisco.org/hci-aero2006>

Note: Submission Deadlines:

15th March 2006 - Full Research Papers

15 April 2006 - Industry Papers

15 April 2006 - Early Stage Research Papers

15 April 2006 - Panels, Workshops

15 April 2006 - Posters and Demos

September 26-27, 2006 – AIAA Aviation Technology, Integration and Operations Conference, Hyatt Regency, Wichita, KS <http://www.aiaa.org/content.cfm?pageid=1>

October 15-19-2006 – Digital Avionics Systems Conference, Hilton Portland, Portland, OR
<http://www.dasconline.org/>

September 25-27, 2006 - 6th AIAA Aviation Technology, Integration and Operations Forum, Hyatt Regency Wichita, Wichita, KS <http://www.aiaa.org/content.cfm?pageid=1>

October 23-25, 2006 – 44th Annual SAFE Symposium, Reno Hilton Hotel, Reno, NV
<http://www.safeassociation.org/symposium.htm>

October 23-26, 2006 - DoD Maintenance Symposium & Exhibition, Reno Hilton, Reno, Nevada <http://www.sae.org/events/conferences/aerospace/>

November 9-11, 2006 – AOPA Expo 2006, Palm Springs, CA
<http://www.aopa.org/expo/2005/virtual/>

January 8-11, 2007 - 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV <http://www.aiaa.org/content.cfm?pageid=1>

July 22-27, 2007 – 12th HCI International, Beijing, China <http://www.hcii2007.org/>

Note: Calendar events in Italics are new since the last Newsletter



Comments or questions regarding this newsletter?
Please contact Bill Berger at (334) 271-2928
or via e-mail at bill.ctr.berger@faa.gov