



AAR-100

Human Factors Newsletter # 04-19

September 18, 2004 – October 1, 2004

Technical Note: On Oct 13th, Dr. Jeff Mulligan (NASA-Ames) will present the Precision Visual Flight Rules (PVFR) Eye Tracking October 2003 Helicopter Flight Results at the Vertical Flight Human Factors Research Program Review in Wash, DC. Below is an abstract of his talk. An illustration of the eye tracking analysis can be found at <http://www.hf.faa.gov/docs/508/docs/VF-PVFRflight.mpg>.

Abstract. Gaze tracking measures can provide information about the spatial locus of attention of a behaving agent. Here we examine the looking behavior of helicopter pilots flying under visual meteorological conditions. The goal of the study is to correlate various types of looking behavior with pilots' accuracy in maintaining a precisely specified route, to support the formulation of new regulations and procedures. Eight pilots were instructed to fly a precision route specified by a series of waypoints. The geographic coordinates of the waypoints were entered into an onboard receiver of global positioning system (GPS) signals. Using a single 8mm videocassette, we recorded four video streams (30 frames per second), one audio stream, and GPS data sampled at 1 Hz. The four video streams were comprised of two cameras attached to the pilot's head, and two stationary cameras mounted on the aircraft. The head-mounted cameras consisted of a camera viewing the pilot's right eye through an infrared "hot" mirror, and a forward-looking scene camera located in front of the subject's forehead. From the eye images we compute estimates of head-relative gaze, while we obtain independent estimates of the head pose from the head-mounted scene camera and a stationary "face" camera. This talk will present an overview of the technical challenges encountered in the processing of the images, as well as preliminary results of the study.

Point of Contact: W. Krebs (ATOP-R&D)

Technical Note: Carla Hackworth presented a paper titled *The Application of Human Factors to Technological Modification of the Air Traffic Control System* at the American Institute of Aeronautics and Astronautics convention in Chicago, IL.

Abstract. Carla Hackworth, Carol Manning, Frank Durso, Andy Dattel, Brian Johnson, and Crystal Cruz, Civil Aerospace Medical Institute, Federal Aviation Administration, Oklahoma City, OK, Texas Tech University, Lubbock, TX.

Air traffic control involves a complex interplay of multiple technological systems used to support a human operator to maintain a safe and expeditious flow of air traffic. As technological and non-technical modifications are implemented within the National Airspace System (NAS), resulting improvements are likely coupled with challenges for the human operator. During the next decade, several automation platforms will be in service to augment the NAS. The FAA Target System Description (TSD) illustrates the projected evolution of the systems and facilities within the NAS to the year 2015. The four major systems that comprise the TSD are communication, surveillance, navigation, and automation mechanisms. As technological modifications are implemented, addressing the human factors issues associated with the integration of these modifications into the existing systems is critical to maintaining safety. This paper examines several human factors areas affected by technological modifications in the air traffic control (ATC) environment. For example, one modification is to move from a paper flight progress strip environment to electronic flight progress data. Several en route air traffic control centers across the country have begun converting from paper to electronic flight data. Making a similar transition within the tower environment may involve different considerations. What are the consequences of automating certain tower controller tasks? How will alterations in tasks and procedures affect controllers' situation awareness? These issues and others must be considered for a successful implementation of the TSD within the next decade.

Point of Contact: D. Piccione (ATOP-R&D)

Technical Note: Dino Piccione presented a poster on "FAA Human Factors Workbench: Integration between Research and System Development" at the Annual Meeting of the Human Factors and Ergonomics Society held in New Orleans, LA, September 20-24, 2004.

Poster: Dino Piccione and Glen M. Hewitt, FAA, Washington, DC; Peter M. Moertl Titan Corporation, Washington, DC.

The FAA Human Factors Workbench is an online resource providing integrated access to information in four areas for aviation human factors practitioners and researchers: Human Factors Process in FAA's System Acquisitions, Human Factors Tools, Technical Reports, and Human Factors Awareness Training. The Workbench provides information addressing human factors goals in FAA systems, FAA's acquisition policy, and how to build a Human Factors Plan. Over 90 human factors tools have been assembled to support program planning, analysis, design, and evaluation activities. The Workbench provides access to human factors research products and technical reports published by the FAA Civil Aerospace Medical Institute, the FAA William J. Hughes Technical Center, as well as other government research offices, contractors, universities, and EUROCONTROL. The Human Factors Awareness Web Course provides basic human factors training. The Workbench supports the FAA's product teams, human factors practitioners, and researchers.

The purpose of the Human Factors Workbench is to provide integrated access to relevant information for human factors practitioners and human factors researchers. To improve the impact of human factors on the design and implementation of FAA systems, human factors research needs to be aligned with the information needs of current and future system design. The FAA's human factors practitioners work with system engineers on the implementation of FAA systems and apply human factors principles and knowledge into the design of systems for tomorrow's National Airspace System. For this purpose, human factors practitioners need access to domain-specific state-of-the-art human factors knowledge and tools that are made available by research institutions inside and outside the FAA. In addition, human factors researchers need access to current and upcoming human factors problems that arise from the design of aviation systems in the FAA acquisition process. The FAA's Human Factors Workbench intends to bridge a gap between research and practitioners by providing information that both practitioners and researchers can use. The workbench is available via the World Wide Web to all types of users and consists of four sections to integrate various human factors information needs.

The first section in the FAA Human Factors Workbench outlines and explains the integration of human factors in FAA's acquisition process. The section contains 10 chapters and demonstrates in a step-wise manner when, what, and how human factors activities link to the FAA's acquisition process. This section also contains links to FAA Human Factors Policy and formal system acquisition activities during the acquisition life cycle. By juxtaposing human factors activities and the formal system acquisition process, the intent is to help the practitioner prepare and execute a program that supports product development team goals.

The second section provides online access to tools for various human factors tasks such as analysis, assessment, evaluation, design, and development of human factors programs. Specific examples include situation awareness assessment tools, workload assessment tools, task analysis tools, evaluation tools, tools to develop human factors programs, and cost-benefit assessment tools. Each tool is briefly described and linked to other online resources where either the tool itself or additional information can be accessed. The tools are categorized and cross referenced to corresponding phases in the FAA acquisition process and can be accessed either via categorization by tool type, by acquisition phase, or from within the 10 chapters of the first section of the workbench. Giving users multiple information access points serves the purpose of helping them find appropriate human factors tools depending on user background, interest, and the specific task at hand.

The third workbench section provides access to more than 1000 human factors technical reports from the FAA's Civil Aerospace Medical Institute in Oklahoma City, the William J. Hughes FAA Technical Center, Volpe National Transportation Systems Center, Department of Defense, EUROCONTROL, and other organizations engaged in aviation human factors research. Research reports can be searched by year, research domain, keyword, and performing organization. The objective of this search section is to enable human factors practitioners to find research products that meet their technical information needs during system development. This attempts to close the gap between technology and human performance by offering research products to practitioners in a manner that requires minimal search and retrieval effort.

The fourth section in the workbench provides general human factors information for system design in a course-like fashion. The Human Factors Awareness Web Course provides training on a basic level using ten different modules that cover areas such as usability evaluations, human factors implications for display and control design, human cognition, and human factors principles for team performance. There is generous use of pictures and graphics to illustrate training points, and the user is sequentially guided through each module. The Workbench intends to support the FAA's product development teams, human factors practitioners, system vendors, and researchers.

The four sections of the FAA Workbench provide an integrated means to address various information needs of human factors practitioners as well as researchers. Future versions of the FAA workbench will expand the scope by including research project information about ongoing human factors research projects inside and outside of the FAA. The workbench is accessible on the World Wide Web at <http://www.hf.faa.gov/Workbench/default.aspx>

Point of Contact: Dino Piccione (ATOP-R&D)

En Route ATC: In support of the future en route workstation project, researcher Pam Della Rocco reports that technical interaction and iteration testing will begin at the William J. Hughes Technical Center. The purpose of this activity is development of a new test bed with the capability to evaluate functionality being designed to help air traffic controllers handle anticipated task load for the year 2015. A simulation test of functionality is being planned for this winter. (E. Stein, WJHTC)

Laboratory Tour: On September 21st, Representatives from the Civil Aeronautical Administration of China toured the human factors laboratory facilities during a visit to the William J. Hughes Technical Center. Albert Macias provided an overview of capabilities and current research projects. A similar tour is being planned for personnel from McGuire Air Force Base, New Jersey. (E. Stein, WJHTC)

More information on human factors research can be found at the FAA Human Factors (AAR-100) web site: <http://www.hf.faa.gov>

Mark D. Rodgers
FAA (ATOP-R&D)



October 4-7, 2004 – SAE SEAT – Aircraft Seat Committee Meeting, Albuquerque, NM
mlemank@sae.org

October 5-7, 2004 – Aircraft Seat Committee Meeting, Albuquerque, NM
mlemank@sae.org

October 5-7, 2004 – International Test and Evaluation Association (ITEA) & Johns Hopkins University Workshop, Baltimore Harbor Holiday Inn, Baltimore, MD
<http://www.sksi.net/fskitea/2004VirtualWorkshop.php>
<https://wx7.registeredsite.com/user845698/pages/eventregform/itea/e/2004e.asp>

October 10-16, 2004 – ACM Multi-Media 2004, New York, NY <http://www.mm2004.org/>

October 11-14, 2004 – User Interface 9 Conference, Cambridge, MA uiconf@uie.com.

October 11-15, 2004 - ACI World Conference and Exhibition, Lisbon, Portugal
www.airports.org/events/event_frame.htm

October 12-14, 2004 – Shared Vision of Aviation Safety Conference, San Diego, CA
<http://www.aviationsafetyconference.com/index2.html>

October 12-14, 2004 – 57th Annual Business Aviation Association Meeting and Convention, Las Vegas County Convention Center, Las Vegas, NV <http://web.nbaa.org/public/cs/amc/>

October 13-15, 2004 – Sixth International Conference on Multimodal Interfaces, Penn State University, State College, PA <http://www.icmiplace.org/>

October 18-19, 2004 – National Academies Institute of Medicine Annual Meeting, National Academy of Sciences, Washington, DC <http://wwwsearch.nationalacademies.org/>

October 18-20, 2004 – Human Factors in Aeronautics Symposium, NASA-Ames Conference Center, Moffett Field, CA richard.h.mogford@nasa.gov

October 18-22, 2004 – AC-9 Aircraft Environmental Systems Meeting, Wichita, KS
mlemank@sae.org

October 19-20, 2004 – Aerospace Council Meeting, Toulouse, France
mlemank@sae.org

October 21-23, 2004 – Aircraft Owners and Pilots Association Expo 2004, Long Beach Convention and Entertainment Center, Long Beach, CA <http://www.aopa.org/expo/2003/virtual/>

October 23-27, 2004 – NordiCHI 2004, Tampere, Finland <http://www.cs.uta.fi/nordichi2004/>

October 24-27, 2004 – UIST 2004, 17th Annual ACM Symposium on User Interface Software and Technology, Santa Fe, NM <http://www.acm.org/uist/>

October 25-28, 2004 - [7th Annual Systems Engineering Conference](#) Dallas Marriott Quorum, Dallas, TX

October 25-28, 2004 – SAE S-9 Cabin Safety Technical Committee Meeting, San Diego, CA
mlemank@sae.org

October 25-28, 2004 – DoD Maintenance Seminar and Exhibition, Hilton Americas, Houston, TX
<http://www.sae.org/calendar/aeromtgs.htm>

October 26-28, 2004 – ICAO Security Seminar, Merida, Mexico <http://www.icao.org>

October 27-29, 2004 – EUROCONTROL Airport Operations Conference and Exhibition, Brussels, Belgium <http://www.eurocontrol.int/airports/events/index.html>

October 27-29, 2004 – Human Factors and Ergonomics Society Europe Chapter Annual Meeting, Delft University, the Netherlands
http://utopia.ision.nl/users/hfsec/meeting/ec_meet.htm

October 27-29, 2004 – S-9 Cabin Safety Technical Committee Meeting,, San Diego, CA
mlemank@sae.org

October 31, 2004 – ATCA Annual Conference and Exposition, Marriott Wardman Park Hotel, Wash., DC
http://www.atca.org/event_items.asp#

November 1-4, 2004 – DOD Human Factors Engineering Technical Advisory Group Meeting, Holiday Inn Select, Alexandria, VA
<http://hfetag.dtic.mil/meetschl.html>

November 2-4, 2004 – World Aviation Conference, Hilton Hotel, Reno, NV
<http://www.sae.org/events/wac/>

November 3-4, 2004 - Second ICAO-IATA LOSA & TEM Conference, Seattle, Wash
dmaurino@icao.int , curt.graeber@boeing.com

November 3-5, 2004 - AVSEC World 2004, The Westin Bayshore Resort and Marina, Vancouver, British Columbia, Canada. www.iata.org/ps/events/aw2004.htm

November 4-5, 2004 – Royal Aeronautical Society Seminar - Human Factors Training in Aviation Maintenance, RAF Bentley Priory, Stanmore, near Watford, North London
<http://www.raes-hfg.com/xmhftraining.htm>

November 7-9, 2004 – Aviation Maintenance Software Technology & Resource Symposium, Pointe South Mountain Resort, Phoenix, AZ <http://www.STARSymposium.com>

November 8-9, 2004 – European Aviation Training Symposium, Vienna, [Austria](#)
<http://www.at-events.com/eats/conference.asp>

November 8-10, 2004 – Aerospace Testing Expo 2005 Scientific Conference and Technology Forum, Long Beach Convention Center, Long Beach, CA <http://www.aerospacetesting-expo.com/northamerica/conf+forum.html>

November 12-17, 2004 – American Society for Information Science and Technology Annual Meeting, Providence, RI asis@asis.org

November 13-14, 2004 – Aviation Nation, Nellis AFB, NV www.nellisairshow.com

November 15-18, 2004 – 57th Annual International Air Safety Seminar (“Sharing Knowledge to Improve Safety”), Pudong Shangri-La Hotel, Shanghai, China
<http://www.flightsafety.org/seminars.html>

November 15-18, 2004 – Fire and Cabin Safety Research Conference, Lisbon, Portugal
www.caa.co.uk/srg/intsd/event.asp?groupid=73

November 16, 2004 - FY04 General Aviation, Vertical Flight, and Aviation Maintenance Human Factors Program Review, FAA Headquarters Bessie Coleman Training Center, Wash, DC <mailto:william.krebs@faa.gov>.

November 18-19, 2004 – IT World Expo, Toronto, Canada richardp@WowGao.com

November 18-21, 2004 – 45th Annual Meeting of the Psychonomic Society, Hyatt Regency and Millenium Hotels, Minneapolis, MN [45th Annual Meeting of the Psychonomic Society](#)

November 22-24, 2004 - ICRAAT 2004 - International Conference on Research in Air Transportation, University of Zilina , Zilina, Slovakia. www.icrat.org

January 9-12, 2005 – International Conference on Intelligent User Interfaces, San Diego, CA
<http://www.catamaranresort.com/>

January 9-13, 2005 – TRB 84th Annual Meeting, Washington, DC <http://trb.org/calendar/>

January 10-13, 2005 - 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV <http://www.aiaa.org/>

January 25-27, 2005 – AE-2 Aerospace Lighting Committee Meeting, New Orleans, LA
elizd@sae.org

January 28, 2005 – Deadline for papers - 6th USA/Europe ATM Seminar, Baltimore, MD, June 2005 <http://atmseminar.eurocontrol.fr/>

*March 17-18, 2005 – Aviation and Environment Summit, Crowne Plaza, Geneva, Switzerland
<http://www.iata.org>*

April 2-7, 2005 – CHI 2005, Portland, OR chi2005-chair@acm.org.

April 11-15, 2005 – SAE 100th Anniversary World Congress, Cobo Hall, Detroit, MI
<http://www.sae.org/congress/about/news/congressdates.htm>

April 17-22, 2005 – International Federation of Air Traffic Controller's Associations, Melbourne, Australia
http://www.ifatca.org/conferences/annual_conference.htm

April 18-21, 2005 – 13th International Symposium on Aviation Psychology (ISAP), Civil Aerospace Medical Institute (CAMI), Oklahoma City, OK (note: call for papers deadline is September 30, 2004). <http://www.cami.jccbi.gov/>, <http://www.wright.edu/isap/>

May 9-12, 2005 - 76th Annual Scientific Meeting of the Aerospace Medical Association, Kansas City, MO <http://www.asma.org/>

June 2005 – 6th USA/Europe ATM Seminar, Baltimore, MD (note: call for papers deadline is January 28, 2005) <http://atmseminar.eurocontrol.fr/>

June 13-19, 2005 - Paris Air Show 2005, Parc des expositions de Paris Nord - Le Bourget, 93350, France. www.paris-air-show.com

July 22-28, 2005 – HCI International 2005, 11th International Conference on Human-Computer Interaction, Caesars Palace, Las Vegas, NV hci2005@ecn.purdue.edu

August 15-18, 2005 - 43rd AIAA Aerospace Sciences Meeting and Exhibit, Hyatt Regency San Francisco at Embarcadero Center, San Francisco, CA <http://www.aiaa.org/>

August 18-21, 2005 - 113th Convention of the American Psychological Association, Wash, DC
<http://www.apa.org/convention>

September 12-16, 2005 – Interact 2005, Tenth IFIP TC13 International Conference on Human-Computer Interaction, Rome, Italy <http://www.interact2005.org/>

September 25-28, 2005 - 11th Ka and Broadband Communications Conference and 23rd AIAA International Communications Satellite Systems Conference 2005 (organized by IIC), Aurelia Convention Center, Rome, Italy <http://www.aiaa.org/>

September 26-28, 2005 - AIAA 5th Aviation, Technology, Integration, and Operations Forum (ATIO), Hyatt Regency Crystal City, Arlington, VA <http://www.aiaa.org/>

September 26-28, 2005 - AIAA 2nd Intelligent Systems Conference (IS), Hyatt Regency Crystal City, Arlington, VA <http://www.aiaa.org/>

September 26-30, 2005 – Human Factors and Ergonomics Society 49th Annual Meeting, Royal Pacific Resort at Universal Orlando, Orlando, FL <http://hfes.org/meetings/menu.html>

October 3-6, 2005 – SAE 2005 AeroTech Congress and Exhibition, Gaylord Texan Resort and Convention Center, Dallas/Fort Worth Airport Area, Texas

<http://www.sae.org/events/conferences/aerospace/>

October 24-25, 2005 – National Academies Institute of Medicine Annual Meeting, National Academy of Sciences, Washington, *DC* <http://wwwsearch.nationalacademies.org/>

November 6-9, 2005 - ACI World / Pacific Conference and Exhibition, Auckland, New Zealand.
www.auckland-airport.co.nz

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

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

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

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