



## ATO-P R&D

### Human Factors Research and Engineering Group

#### Human Factors Newsletter # 06-13

June 23, 2006 – July 7, 2006

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**Technical Note:** Allendoerfer, K. R., Zingale, C., Pai, S., & Willems, B. (2006). *En Route Air Traffic Controller Commands: Frequency of use during Routine Operations* (DOT/FAA/TC-TN06/04). Atlantic City International Airport, NJ: Federal Aviation Administration, William J. Hughes Technical Center.

Abstract:

The Federal Aviation Administration has started development of the En Route Automation Modernization (ERAM) system to replace the current en route system. ERAM will provide a variety of new user interface (UI) capabilities for accessing and executing controller commands. An appropriate evaluation of the new UI capabilities will determine how effectively controllers are able to work with the new system. This technical note documents the frequency of use of controller commands using the legacy system. We calculated the number of each entry type made per hour in an 11-hour period at a field site and found that the most frequently used commands were: (1) Offset Data Block, (2) Implied Aircraft Selection (i.e., Accept Handoff/Force Data Block), (3) Initiate Handoff, and, (4) Assign Interim Altitude. The thirty most frequently used commands made up approximately 95% of the total number of controller entries. We recommend that future test activities target these most frequent commands. We discuss future phases of the project and ways that these data can be used to compare ERAM to the legacy system.

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

Point of Contact: K. Allendoerfer, WJHTC

**Technical Note:** Koros, A., Della Rocco, P. S., Panjwani, G., Ingurgio, V. D'Arcy, J. F. (2006). *Complexity in Airport Traffic Control Towers: A Field Study. Part 2. Controller Strategies and Information Requirements* (DOT/FAA/TC-06/22). Atlantic City International Airport, NJ: Federal Aviation Administration, William J. Hughes Technical Center.

Abstract:

This two-part field study investigated sources of complexity and their incidence within Federal Aviation Administration Air Traffic Control Towers (ATCTs). Human factors specialists from the William J. Hughes Technical Center selected six sites representing a combination of high traffic volume, traffic mix, and/or converging runways. Sixty-two Air Traffic Control Specialists participated in the study, providing ratings and descriptions of the complexity sources from a local- and ground-controller perspective. The first report represented a key step in identifying and characterizing the primary sources of complexity within ATCTs and assessing their relative incidence and importance. The second report identifies the strategies that tower controllers use to mitigate complexity, the types of information that they require, and the sources of this information. The participants reported relying on two to three core strategies, which they supplemented with *ad hoc* techniques. Results from this field study hold implications for future tower automation equipment design. Future research efforts should systematically investigate tower controller information needs and focus, in particular, on sources such as high traffic volume and frequency congestion, which are among the most prevalent sources of complexity within this environment.

*The above 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: A. Koros, WJHTC

**Secretary of Transportation Leaving:** Secretary Norman Mineta recently announced that he is leaving his post as Secretary of Transportation. On July 6<sup>th</sup>, in his last official speech, Mr. Mineta addressed the US Chamber of Commerce in Washington, DC. His remarks are available by pointing to: <http://www.dot.gov/affairs/mineteasp070606pm.htm> . We wish him the very best.

**Human Factors Certification:** The Acquisition Workforce Council provided funds this fiscal year to cover Human Factors Professional Certification. Under this program, FAA employees may apply to the Human Factors Research and Engineering Division Group (HFREG) for the opportunity to attend training and testing for "Human Factors Certification." Once approved, HFREG will pay for travel, per diem, and the certification testing up to a set maximum amount. Candidates must be fully qualified for certification prior to the training/testing under current definitions of the existing and recognized certification programs. Provisions of this program are subject to change and approval of HFREG. If interested, call (202-267-7163) or e-mail Glen Hewitt ([Glen.Hewitt@FAA.Gov](mailto:Glen.Hewitt@FAA.Gov)). *This activity supports the Administrator's Flight Plan Goal for Organizational Effectiveness, Objective 1: Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.* (Glen Hewitt, ATO-P)

**Safety Culture Seminar:** A safety culture seminar, sponsored by the ATO-P Human Factors Research and Engineering Group, was conducted by Dr. Manoj Patankar (Saint Louis University), on June 28, 2006. The seminar provided human factors and safety practitioners with a working understanding of Safety Culture -- what is it, its significance, how to measure the current status, what/how to change, how to measure the change, and how to institutionalize the change. This three-hour module presentation provided an overview of the principles of a safety culture, how to apply them in an operational setting, and how to measure the results. *This activity supports the Administrator's Flight Plan Goal for Organizational Effectiveness, Objective 1: Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.* (Glen Hewitt, ATO-P R&D)

**Color Vision:** Dr. Nelda Milburn is in London (through August 4<sup>th</sup>) to participate in a collaborative study on color vision with scientists from London City University. As background, the National Transportation Safety Board (NTSB) determined that a contributing factor in the FedEx Flight 1478, Boeing 727-232 collision with trees on final approach to Tallahassee, Florida airport on July 26, 2002 was the first officer's color vision deficiency. Consequently, the NTSB made two safety recommendations (A-04-46 and -47) to the FAA describing needed research. As part of that research effort, CAMI initiated a grant with Dr. John Barbur from London City University to conduct a study assessing the ability of normal color vision and color deficient individuals to discriminate the red and white lights on a simulated performance test. Several different measures will be used to gather data from normal and color deficient observers

including: a computerized performance test, a newly developed color naming test, the modified Fransworth lantern, and other clinical tests. The proposal also includes the development of a new test that will employ less favorable stimulus conditions (i.e., a dark background with small-sized disc stimuli) that are closer to those observed in the most demanding color discrimination tasks in the aviation environment. Examination of that condition is especially important when no redundancy is involved and the task relies entirely on color discrimination. Information from the grant and other research will be used to identify whether existing standards need to be modified. Development of a revised testing protocol, including any practical tests, will also be addressed. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objectives 1 and 2: Reduce the commercial fatal accident rate; Reduce the number of fatal accidents in general aviation.* (N. Milburn, CAMI)

**International Working Group (IWG) Flight Simulator Qualification Criteria:** An IWG organized by the Royal Aeronautical Society's Flight Simulator Group convened at the International Civil Aviation Organization's (ICAO) headquarters in Montréal, Canada, June 19-22, 2006. Its purpose was to review the ICAO Manual of Criteria for the Qualification of Flight Simulators (Doc. 9625). Dr. Judith Bürki-Cohen (Volpe Center) contributed her expertise to the technical subgroup, representing the FAA's Human Factors Research and Engineering Group and the FAA's Voluntary Safety Program. She also presented her work on the effect of platform motion on simulator training and evaluation of airline pilots to the Training Credit Subgroup. The IWG was welcomed by ICAO's Paul Lamy, current Chief of Safety and former Chief of Training and Licensing. Attendees included representatives of regulatory agencies, manufacturers, the training industry, and airlines from North America, Europe, and Asia. The goal of this effort is expand the ICAO manual (which is currently restricted to devices authorized for zero-flight-time training) to include technical standards for lower level devices. Moreover, the Training Credit Subgroup endeavors to assign training credits to each of these levels. The IWG plans to meet at least five more times before submitting its proposal, tentatively scheduled for the end of next year. More information on the activity of the group is available on <http://www.raes-fsg.org.uk/>. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 1: Reduce the commercial fatal accident rate.* (J. Bürki-Cohen, VNTSC)

**Post Implementation Review:** Human factors representatives supported the recent development of a process, draft council charter, and draft implementation plan for the conduct of post-implementation reviews (PIR) that will be exercised under AMS Policy, Section 4.15. The role of human factors in these activities has been to strengthen the human-system integration component of the PIR. The primary objective of the post-implementation review is to provide managers with useful information on how to modify an ongoing investment program to optimize performance, benefits, and return on investment, and to ensure results are aligned with the service needs of customers. The PIR answers two questions: "Did we get what we asked for?" and "Are we providing what the customer needs?" Results of the PIRs will also assist management in decisions related to best practices and learned lessons to improve FAA investment planning and control processes. *This research activity supports the Administrator's Flight Plan Goal for Organizational Excellence, Objective 3: Make decisions based on reliable data to improve our overall performance and customer satisfaction.* (Glen Hewitt, ATO-P R&D)

**ATC Weather Information Requirements:** Engineering research psychologists and subject-matter experts from the William J. Hughes Technical Center's Human Factors Group are currently working on an assessment of weather information requirements for en route controllers. In an initial phase of this project, researchers are using a previous work domain analysis of TRACON controller weather information requirements to assess differences between the en route and terminal domain with regard to weather information flow and operational usage. In a second phase of this project, researchers are preparing for work group discussions using subject-matter experts from the field. The third and final phase of this project entails a summary of weather information requirements for en route controllers, a comparison of weather requirements for the en route and terminal domain, and a summary of potential shortcomings in weather information flow and recommendations for improved weather information display. *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.* (U. Ahlstrom, WJHTC)

**ATC Automation:** Researchers on the William J. Hughes Technical Center's Human Factors Team evaluated the initial test bed of the Display System Replacement (DSR), En Route Automation Modernization (ERAM), and Future En Route Workstation (FEWS) environments that will be used for a human-in-the-loop (HITL) study planned for September-December, 2006. The ERAM human computer interface (HCI) is derived from requirements, specifications, and prototypes used by the vendor to build the operational version of ERAM. While the FEWS interface used during a HITL study conducted in FY05 was derived from the DSR HCI, the current interface is based on the new ERAM HCI. The FEWS concepts provide controllers with an environment that integrates automation functions and attempts to extend controllers' ability to manage traffic levels projected for the 2015 timeframe and beyond. *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.* (B. Willems, WJHTC)

**Eye Tracking:** Researchers on the William J. Hughes Technical Center's Human Factors Team evaluated a system that derives a real-time index of cognitive activity from pupil dilation. The tool is manufactured by Eye Tracking, Inc., a woman-owned small business that has a patented method to derive an index of cognitive activity (ICA) from pupil diameter measurements. The ICA measure is potentially an objective physiological measure of mental workload that can be used in the ATC working environment. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems.* (B. Willems, WJHTC)

**EEC Annual Report:** The EUROCONTROL Experimental Centre (EEC) plays a leading role in research relevant to the safe, efficient, and environmentally-sustainable management and operation of the European ATM system. The EEC 2005 Annual Report provides highlights of short-term and mid-term research including for their next generation single European sky aviation research program called SESAR, and other research activities and partnerships. For a copy of the annual report, point to:

[http://www.eurocontrol.int/eec/public/related\\_links/eec\\_annual\\_reports.html](http://www.eurocontrol.int/eec/public/related_links/eec_annual_reports.html)

P. Krois, ATO-P R&D

**Concept and Requirements Definition Guidelines:** Human factors representatives recently reviewed and revised draft Concept and Requirements Definition Guidelines. These guidelines now include references to human performance considerations that need to be included in the processes used during development of concepts of use. The guidelines can also be used in the determination of requirements during the early phases of system and non-material acquisitions. The document will be provided to the Acquisition System Advisory Group for final approval. *This research activity supports the Administrator's Flight Plan Goal for Organizational Excellence, Objective 3: Make decisions based on reliable data to improve our overall performance and customer satisfaction.* (Glen Hewitt, ATO-P R&D)

**ATC Communications:** During the week of June 19, 2006, Dr. Roni Prinzo met with contractors in Roswell, NM to discuss project requirements and issues related to research on digital voice reproducer systems. The purpose of this task is to develop a baseline description of current voice communications between native and foreign pilots and controllers. A content analysis will be performed, the duration of transmissions summarized, and communication problems will be reported that include readback/hearback errors, repeated transmissions, requests to repeat a transmission, and the amount of time required to complete controller-pilot transactions. Dr. Prinzo copied digital audio tapes from Los Angeles and Miami Centers. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 1: Reduce the commercial fatal accident rate.* . (R. Prinzo, CAMI)

**Traffic Flow Management (TFM):** A research psychologist from the William J. Hughes Technical Center's Human Factors Team participated in a meeting at MITRE CAASD to discuss proposed future concepts for planning and execution of re-routes. Together with representatives from the TFM User Team and the TFM Program Office, the researcher evaluated the feasibility of the proposed concepts and identified potential human factors issues. Of particular concern are impacts on workload, potential for human error, and situational awareness. The human-computer interface will be addressed in the future. *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.* (T. Yuditsky, WJHTC)

**Technical Operations Human Factors Standardization Team:** On June 28th, Vicki Ahlstrom traveled to Washington, DC participate with the Technical Operations (TO) Human Factors Standardization Team. She presented results of current TO research on password management, communication between ATC and TO, and the optimum design of event lists. She also discussed a research project that will begin soon on reliability-centered maintenance. Delegates remarked that the research has great potential for creating a positive impact on the workplace, and they would like to help find ways to enhance implementation of research results into operational environments. *This activity supports the Administrator's Flight Plan Goal for Organizational Effectiveness, Objective 1: Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.* (V. Ahlstrom, WJHTC)

**Human Factors Informational Brochure:** The William J. Hughes Technical Center's Human Factors Team has prepared an informational brochure on human factors. The publication is a tri-

fold color brochure which provides high level information defining what human factors is, how to recognize if you have a human factors problem, and where to get help if you do have a human factors problem. The purpose of this brochure is to provide human factors information to operational sites and obtain feedback directly from those most affected by the human factors problems. Following an initial usability test conducted in April, a small number of brochures were printed for distribution to Technical Operations delegates at the Technical Operations Human Factors Standardization Team meeting on June 28<sup>th</sup>. Results have been positive. *This research activity supports the Administrator's Flight Plan Goal for Organizational Excellence, Objective 3: Make decisions based on reliable data to improve our overall performance and customer satisfaction.* (V. Ahlstrom, WJHTC; L. Cole, ATO-P R&D)

**Technical Community Requirements Group for Technical Operations (TO):** On June 28th, Vicki Ahlstrom participated in the TO Technical Community Requirements Group meeting in Washington, DC. Present at the meeting were representatives from: the Human Factors Research and Engineering Group, TO field domains, human factors technical domains, FAA headquarters TO organizations, and the lead for the TO Human Factors Standardization Team. Ms. Ahlstrom opened the session by providing an overview of concepts such as NGATS that are shaping research in other areas of the FAA. She also presented human factors issues that have been raised at past meetings. Each delegate from different operational areas discussed their biggest human factors concerns and what they predict the issues to be in the future. Human factors issues raised by the delegates will be transformed into research requirements. *This activity supports the Administrator's Flight Plan Goal for Organizational Effectiveness, Objective 1: Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.* (V. Ahlstrom, WJHTC)

**OEP Version 8 Now On-Line:** Version 8 of the FAA's Operational Evolution Plan (OEP) is now available online at [www.faa.gov/programs/oeep](http://www.faa.gov/programs/oeep). The OEP is the FAA's commitment to our stakeholders for building capacity and increasing efficiency in the National Airspace System. With this new version, the OEP now contains all of the commitments needed to produce the thirty-percent increase in effective capacity that the plan originally promised. This is a great success story for the FAA. The OEP is comprised of some 150 agency commitments for operational improvement, including new runways projects, airspace redesigns, and deployment of decision support tools. *This activity supports the Administrator's Flight Plan Goal for Organizational Excellence, Objective 1 and 2: Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce; Make decisions based on reliable data to improve our overall performance and customer satisfaction.* (T. Kraus, ATO-P R&D)

**Weather:** On July 6, 2006, Dr. William Knecht traveled to NASA Langley, Norfolk, VA, to attend the first invitational meeting of the SAE G-10 weather research group. Representatives from FAA, NASA, NTSB, Boeing, WSI Weather Service, Rockwell-Collins, and Avidyne avionics were present. Topics of discussion included:

- The importance of getting human factors input into weather products during the R&D phase

- Need to cooperate with Europeans on standards & human factors guidelines for weather data link
- Real-time weather in the cockpit
- Color standards for weather displays
- Tropospheric airborne meteorological data reporting (TAMDAR--the system whereby numerous aircraft are fitted with sensors to automatically feed data to ground stations concerning conditions aloft).
- Coordination of different lines of weather research across agencies.

*This activity supports the Administrator's Flight Plan Goal for Increased Safety, Objectives 1, 2, and 5: Reduce the commercial fatal accident rate; Reduce the number of fatal accidents in general aviation; Enhance the safety of FAA's air traffic systems.*

Point of Contact: W. Knecht, CAMI

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

Terry Allard  
FAA (ATO-P R&D)



**July 8-22, 2006** - 26th International Congress of Applied Psychology, Athens, Greece  
[dgeorgas@dp.uoa.gr](mailto:dgeorgas@dp.uoa.gr) ,  
[http://www.erasmus.gr/dynamic/conventions.asp?conv\\_id=21r/dynamic/conventions.asp?conv\\_id=21](http://www.erasmus.gr/dynamic/conventions.asp?conv_id=21r/dynamic/conventions.asp?conv_id=21)

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

*July 11-15, 2006 - 18th International Congress of the International Association for Cross-Cultural Psychology <http://www.iaccp.org/conferences/Conferences.html>*

*July 16-21, 2006 - 26th International Congress of Applied Psychology <http://www.iaapsy.org/26icap.html>*

**July 17, 2006** – 4<sup>th</sup> International Aviation Training Symposium, Oklahoma City, OK  
<http://www.atca.org/home.asp>

**July 17-23, 2006** – Farnborough International Air Show, London, UK  
<http://www.farnborough.com/>

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

*July 26-27, 2006 - ALPA 52<sup>nd</sup> Annual Air Safety Forum <http://www.alpa.org/>*

**July 26-29, 2006** – CogSci 2006, Sheraton Vancouver Wall Centre, Vancouver, BC, Canada  
<http://www.cogsci.rpi.edu/~rsun/cogsci2006/>

**August 1, 2006** - The International Journal of Aviation Psychology, Special Issue on Air Traffic Control Human Factors, CALL FOR PAPERS. Please contact Jim Hitt at [hitt\\_james@bah.com](mailto:hitt_james@bah.com) <[mailto:hitt\\_james@bah.com](mailto:hitt_james@bah.com)> or Mike McAnulty at [mike.mcanulty@faa.gov](mailto:mike.mcanulty@faa.gov) <<mailto:mike.mcanulty@faa.gov>> with any queries, or to submit papers.

**August 2, 2006** – Annual ATCA Golf Outing, Waldorf, MD <http://www.atca.org/home.asp>

**August 1-3, 2006** – 27<sup>th</sup> National Aerospace FOD Prevention Conference, Seattle, WA  
[www.nafpi.com](http://www.nafpi.com)

*August 7-10, 2006 - SAE G-10 Aerospace Behavioral Engineering Technology Committee, Town & Country Hotel, San Diego, CA [customerservice@sae.org](mailto:customerservice@sae.org)*

*August 10-12, 2006 – LABACE, Sao Paulo, Brazil [www.labace.aero](http://www.labace.aero)*

**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>

**August 29-31, 2006** – General Aviation Technology Conference & Exhibition, Wichita Hyatt, Wichita, KS <http://www.sae.org/events/gat/>

**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 6-7, 2006** - FAA-ATA 18th Annual International Symposium for Human Factors in Maintenance and Ramp Safety, Orlando, FL. [www.airlines.org](http://www.airlines.org)

**September 8-13, 2006** – 75<sup>th</sup> NASAO Convention, New Orleans, LA [www.nasao.org](http://www.nasao.org)

**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 12-14, 2006** – 23<sup>rd</sup> International Air Cargo Forum and Exposition, Calgary, Ontario, Canada <http://www.tiaca.org>

**September 19-21, 2006** – Space 2006, San Jose, CA [www.aiaa.org](http://www.aiaa.org)

*September 19-21, 2006 - 2006 Conference on Risk Analysis and Safety Performance in Aviation, Taj Mahal Hotel, Atlantic City, NJ <http://aar400.tc.faa.gov/flightsafety/conference2006.htm>*

**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 21-22, 2006 – Aviation Training Asia 2006, Hong, Kong [http://www.centreforaviation.com/aviation/Conferences/Upcoming/Aviation Training Asia 2006/](http://www.centreforaviation.com/aviation/Conferences/Upcoming/Aviation_Training_Asia_2006/)*

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

**October 8-11, 2006** - IEEE International Conference on Systems, Man, and Cybernetics, The Grand Hotel, Taipei, Taiwan <http://ins.cn.nctu.edu.tw/smc2006/>  
March 1, 2006: Deadline for submission of papers (full papers only)

**October 15-19, 2006** – Digital Avionics Systems Conference, 25<sup>th</sup> DASC Network Centric Environment: The Impact on Avionics and Systems, Hilton Portland and Executive Tower, Portland, OR [www.dasconline.org](http://www.dasconline.org)  
February 19, 2006 – Deadline for submitting abstracts of 1000 words

**October 15-20, 2006** – 2<sup>nd</sup> Annual Augmented Cognition International Conference, Hilton San Francisco, San Francisco, CA [www.augmentedcognition.org](http://www.augmentedcognition.org)

**October 16-20, 2006** – Human Factors and Ergonomics Society Annual Meeting, San Francisco Hilton, San Francisco, CA <http://www.hfes.org/web/HFESMeetings/meetings.html>

Key Dates:

September 8, 2006 – Early registration deadline

**October 16-19, 2006** – ATA 49<sup>th</sup> Annual Non-Destructive Testing Forum, Ft. Worth, TX [www.airlines.org](http://www.airlines.org)

**October 17-19, 2006** – NBAA 59<sup>th</sup> Annual Meeting and Convention, Orlando, FL <http://web.nbaa.org/public/cs/amc/futuresites.php>

**October 23-25, 2006** – 44<sup>th</sup> 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/>

*October 23-26, 2006 – ADEAC2006, Atlanta, GA <http://www.adeac2006.org/>*

**October 25-27, 2006** – Cargo Facts 2006, Miami, FL [ashoemaker@cargofacts.com](mailto:ashoemaker@cargofacts.com)

**October 29, 2006** – 51<sup>st</sup> Annual ATCA Conference & Exposition, Marriott Wardman Park, Wash., DC <http://www.atca.org/home.asp>

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

**November 13-14, 2006** ASTM F38 Unmanned Aircraft Systems Committee Workshop, Hyatt Regency, Atlanta, GA <http://www.astm.org/>

**November 14-16, 2006** – Aerospace Testing Expo, Anaheim, CA [www.aerospacetesting-expo.com](http://www.aerospacetesting-expo.com)

**November 17-19, 2006** – NBAA Annual Meeting and Convention, Orlando, FL [www.nbaa.org](http://www.nbaa.org)

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

**January 27-31, 2007** - ASHRAE Winter Meeting, Dallas, TX [jyoung@ashrae.org](mailto:jyoung@ashrae.org), or [www.ashrae.org](http://www.ashrae.org).

*February 6-7, 2007 – ABACE, Hong Kong <http://www.abace.aero/>*

**February 13-15, 2007** – US Air Force T&E Days, Hilton San Destin Beach, Destin, FL  
<http://www.aiaa.org/content.cfm?pageid=230&lumeetingid=1474&viewcon=submit>

**February 27, 2007** – CMAC 2007, Bangkok, Thailand <http://www.atca.org/home.asp>

**March 3-10, 2007** – IEEE Aerospace Conference, Big Sky, Montana  
<http://www.aiaa.org/content.cfm?pageid=1&show=All>

**March 7-8, 2007** – Avionics 07 Expo XXI, Amsterdam [http://www.avionics-event.com/avionics06/why\\_exhibit.html](http://www.avionics-event.com/avionics06/why_exhibit.html)

**March 9-11, 2007** - Human-Robot Interaction Conference 2007 Washington, DC:  
<http://www.hri2007.org/>

*March 20-22, 2007 – PAMA 36<sup>th</sup> Annual Aviation Maintenance Symposium, Orlando, FL*  
<http://www.sae.org/events/conferences/aerospace/>

**April 17-23, 2007** – Sun ‘n Fun, Lakeland, FL <http://www.sun-n-fun.org/content/>

**April 22-26, 2007** – 2007 International Symposium on Aviation Psychology, Dayton, OH  
[www.wright.edu/isap](http://www.wright.edu/isap) (NOTE: Call for Papers – Due July 10, 2006)

**May 21-22, 2007** - ASTM F38 Unmanned Aircraft Systems Committee Workshop, Waterside Convention Center, Norfolk, VA <http://www.astm.org/>

*May 22-24, 2007 – EBACE, Geneva, Switzerland* <http://www.ebace.aero/>

**June 23-27, 2007** – ASHRAE Annual Meeting, Long Beach, CA [jyoung@ashrae.org](mailto:jyoung@ashrae.org),  
[www.ashrae.org](http://www.ashrae.org)

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

*September 17-20, 2007 – SAE AeroTech Congress & Exhibition, Los Angeles, CA*  
<http://www.sae.org/events/conferences/aerospace/>

**September 25-27, 2007** - NBAA 60<sup>th</sup> Annual Meeting and Convention, Atlanta, GA  
<http://web.nbaa.org/public/cs/amc/futuresites.php>

**October 1-5, 2007** – Human Factors and Ergonomics Society Annual Meeting, Baltimore Waterfront Marriott Hotel, Baltimore, MD  
<http://www.hfes.org/web/HFESMeetings/meetings.html>

**October 28, 2007** – 52<sup>nd</sup> Annual ATCA Conference & Exposition, Marriott Wardman Park, Wash., DC <http://www.atca.org/home.asp>

**November 13-16, 2007** – DoD Maintenance Symposium and Exhibition, Rosen Shingle Creek, Orlando, FL <http://www.sae.org/events/conferences/aerospace/>

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



Comments or questions regarding this newsletter?  
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