



ATOP-R&D

Human Factors Newsletter # 06-02

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Technical Note: Stein, E.S., Della Rocco, P.S. & Sollenberger, R.L. (2005). *Dynamic Resectorization in Air Traffic Control: A Human Factors Perspective*. (DOT/FAA/CT - TN05/19). Atlantic City: William J Hughes FAA Technical Center

Abstract. The National Airspace System is a highly structured environment. Structure provides benefits including predictability for the decision-maker, the air traffic controller. When something is unusual, controllers can identify the event as out of the ordinary, given their inherent and trained capacity for pattern recognition. The expertise in pattern recognition does not develop quickly. In the current system, it takes en route controllers an average of about three years to become Certified Professional Controllers (CPCs, formerly Full Performance Level). In general, CPCs must learn and checkout on at least six different sectors to certify. There are situations, however, when the usual structure is reduced and the typical patterns do not work. This can happen with weather events and systems outages as examples. Dynamic resectorization offers a tool in these situations to increase the options and promote flexibility. In our current system, traffic managers can resectorize in a very systematic structured way to balance the load and increase the level of structure for controllers. The system of the future may include several types of resectorization supported by automation tools. Limited dynamic resectorization is similar to what is done now but may see more widespread use. Unlimited dynamic resectorization represents a leap into the future with underlying technology that does not exist today. Both approaches raise human factors questions, which should be approached systematically in a proactive manner. The more flexible the system becomes, the more dynamic

the options will be. Operators will need solid anchors if they are going to be able to efficiently and expeditiously maintain safe separation between aircraft.

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems. It also supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.

Point of Contact: E. Stein, WJHTC

En Route:

- In the March 2006 timeframe, William J. Hughes Technical Center personnel are planning for an Early User Involvement Event with the Automatic Data Block Offset Management Tool and the Future En Route Workstation (FEWS). This will be a small sample exercise to validate the usability of simulation algorithms for the FEWS program. These tools will be tested later in the year within a full scale simulation exercise. This work is a longer term effort to effectively use what we have now and what we can conceive which may allow en route controllers to move more traffic against projected increases in airspace demand for 2015 and beyond. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance the safety of FAA's air traffic systems. It also supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.* (B. Bunting, B. Willems, WJHTC)
- William J. Hughes Technical Center researchers have been developing metrics for assessing the effectiveness of the En Route Automation Modernization (ERAM) system in the areas of user interaction and controller performance. The metrics will be used in ERAM test activities planned to occur in 2007-2008. The overall goal for the project is to develop techniques for validating that ERAM supports air traffic with at least the same effectiveness as the legacy system. The project examines three areas, and each was the target of data collection and analysis activities. The first, completed in September 2005, focused on routine "day in the life" operations and commands that controllers use every day, such as assigning altitudes and modifying routes. The metrics for this activity include speed, accuracy, attention, and effort. The second, completed in November 2005, focused on less common operational situations such as emergencies and equipment outages. In these cases, the commands that controllers use are infrequent overall but are critical in specific cases. The metrics for this activity include overall controller performance measures such as number of aircraft handled, and lower-level metrics for specific commands such as speed and accuracy. The third activity, completed in January 2006, examines specific areas where the ERAM makes changes over the legacy system, including changes to the user interface, safety alerts, and backup capabilities. The metrics developed for this activity include overall performance and usage metrics and detailed analyses of the timing of alerts. Future work on the project will focus on developing formal test plans to collect baseline data in each of these areas to compare ERAM and the legacy system. Researchers also plan to expand some of the analyses conducted in 2006 to include more facilities and operations. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 5: Enhance*

the safety of FAA's air traffic systems. It also supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled carriers.
(B.Bunting, K. Allendoerfer, WJHTC)

Human Factors Publications: William J. Hughes Technical Center personnel from the NAS Human Factors Group make the following publications available on their website:

<http://hf.tc.faa.gov>:

- Human Factors Evaluation of a Digital, Air-Ground Communications System, by Carolina Zingale, Mike McAnulty, and Karol Kerns, which was published at the recent AIAA/IEEE Digital Avionics Systems Conference.
- Dynamic Resectorization in Air Traffic Control: A Human Factors Perspective, by Earl Stein, Pam Della Rocco, and Randy Sollenberger.

This 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.

Point of Contact: E. Stein, WJHTC

Award: On January 27, 2006, the National Academy of Public Administration and the American Society for Public Administration announced that Joan Bauerlein, ATO-P Director of Research and Development, is the winner of one of this year's National Public Service Awards. The National Public Service Awards Program recognizes individuals who exhibit the highest standards of excellence, dedication, and accomplishments over a sustained period of time and who are creative and highly skilled career managers at all levels of the public service. Only five people are chosen each year to receive this prestigious award. Ms. Bauerlein will be presented a Steuben crystal eagle at an awards luncheon on April 3, 2006 in Denver, CO. (T. Kraus, ATO-P)

Human Factors Presentations: On February 9-10, 2006, FAA researcher Dr. Robert Helmreich of the University of Texas Human Factors Research Project and Dr. Kathy Abbott, the FAA Chief Scientific and Technical Advisor for Flight Deck Human Factors, will be keynote speakers at the Swinburne Aviation Multimodal Symposium on Safety Management and Human Factors to be held in Melbourne Australia. Dr. Helmreich's presentation is titled "Dealing with Danger in Aviation and Medicine". Dr. Abbott's presentation is titled "Safety Management and Human Factors: Looking Ahead". The symposium brings key international practitioners into an intensive two-day series of presentations and colloquium sessions to foster an integration of tools relevant to the transportation and medical fields. It also provides a valuable opportunity for safety, human factors and operational practitioners, senior management, and specialists to examine working practices that address risks and unsafe conditions in their respective organizations. *This activity supports the Administrator's Flight Plan Goal for International Leadership, Objective 1: Promote improved safety and regulatory oversight in cooperation with bilateral, regional, and multilateral aviation partners.* (E. Edens, 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)



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/.

March 2-3, 2006 – APA Division 21 (Applied Experimental Psychology), Division 19 (Military Psychology) and the Potomac Chapter, Human Factors and Ergonomics Society Mid-Year Symposium, George Mason University, Fairfax, VA
<http://www.apa.org/divisions/div21/.homepage.html>

March 12-14, 2006 – AirCargo 2006, Sheraton Bal Harbour, FL
<http://www.aircargoconference.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 18-20, 2006 – FAA Aviation Safety Programs Conference, Grand Hyatt Hotel, Denver, CO <http://www.aviationsafetyconference.com>

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 24-26, 2005 – ATCA/FAA/NASA Annual Technical Symposium, Atlantic City, NJ http://www.atca.org/activities/event_items.asp?month=4&year=2006&item_id=3557

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 3-5, 2006 - 6th Annual European Business Aviation Convention & Exhibition (EBACE2006), Geneva, Switzerland <http://web.nbaa.org/public/cs/amc/>

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 15-16, 2006 – ASTM F38 Unmanned Aircraft Systems Committee Workshop, Sheraton Centre Toronto; Toronto, ON CAN <http://www.astm.org/>

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 23-25, 2006 – 2006 International Air Cargo Conference, Brown Convention Center, Houston, TX <mailto:terryiacc@bellsouth.net>

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

June 6-8, 2006 – IEE System Safety Conference, Savoy Place, London, UK <http://www.iee.org/events/event/CE202BA5-A0D3-8FE7-2F35A59A02C8B3F3>

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

July 26-29, 2006 – CogSci 2006, Sheraton Vancouver Wall Centre, Vancouver, BC, Canada

<http://www.cogsci.rpi.edu/~rsun/cogsci2006/>

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](http://www.isam-india.org/conference44/newreg.php).

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

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 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, 25th DASC Network Centric
Environment: The Impact on Avionics and Systems, Hilton Portland and Executive Tower,
Portland, OR www.dasconline.org*

February 19, 2006 – Deadline for submitting abstracts of 1000 words

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:

March 1, 2006 - Proposals (all presentation types)

April 18, 2006 - Accept/reject letters sent

May 8, 2006 - Workshop preliminary handouts due

May 16, 2006 - Proceedings paper prep instructions available

May 22, 2006 - Workshop final acceptances sent

June 5, 2006 - Online preliminary program available

June 26, 2006 - Proceedings papers due

September 8, 2006 - Early registration deadline

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

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/>

October 29 - November 1, 2006 – ATCA Convention and Exposition, Marriott Wardman Park, Wash, DC

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/>

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

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

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

September 25-27, 2007 - NBAA 60th 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>

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