



AAR-100

Human Factors Newsletter # 03-05

March 15, 2003 – March 28, 2003

Project Report – Technical Report: *The Effect of Voice Communications Latency in High Density, Communications-Intensive Airspace.* Randy L. Sollenberger, PhD., ACB-220; D. Michael McAnulty, Ph.D., ACB-220; Karol Kerns, Ph.D., AND-300, MITRE/CAASD

The Next Generation Air-Ground Communications program plans to replace aging analog radio equipment with a digital system, the Very High Frequency Digital Link Mode 3 (VDL3). VDL3 will implement digital voice and data link communications, and will include special features such as controller override, anti-blocking, and a transmit status indicator. There are two human factors concerns with the VDL3 system. The first is the quality of the speech generated by voice coding technology. The second is the effect of additional audio throughput delays introduced by the voice coding and time division multiple access techniques of the VDL3 system configuration. Previous studies by the FAA William J. Hughes Technical Center (WJHTC) and International Civil Aviation Organization States have determined that the intelligibility of the digital voice system is acceptable for Air Traffic Control operations. Engineering Research Psychologists from the National Airspace System Human Factors Group (ACB-220) of the WJHTC Research, Development, and Human Factors Laboratory conducted a high fidelity, human-in-the-loop simulation. This study compared system efficiency and controller performance and workload using a simulated VDL3 system with controller override, anti-blocking, and transmit status features under three delay conditions based on increasing ground system delays: 250 ms (current specification), 350 ms (practical alternative), and 750 ms (to demonstrate the sensitivity of the simulation measures). Each of the delay conditions also included appropriate delay factors for airborne system processing. The resulting end-to-end delays were somewhat longer for controller-to-pilot than they were for pilot-to-controller transmissions. Ten controllers from the busiest Level 11 and 12, Air Route Traffic Control Centers participated in the study. The results indicated that there were no significant differences between the 250 and 350 ms delay conditions. However, the 750 ms condition did produce a significant increase in controller overrides, and the controllers rated it as interfering with some aspects of their communication (e.g., providing optional services). The conclusion of the study is that a VDL3 system with anti-blocking, controller override and transmit status features, and a 350 ms ground system delay, would be operationally effective for Air Traffic Service communications and acceptable to controllers. (E. Stein, WJHTC)

Cockpit Design: Dr. Dennis Beringer participated in the Part 23 Integrated Cockpit Design Standards meeting at the Small Airplane Directorate in Kansas City on March 11-12. A GAMA representative moderated the meeting, and the group decided upon which items should be considered for standardization. The various attendees received writing assignments to draft portions of the descriptive document to be titled "Standardization Guide for Integrated Cockpits in Part 23 Airplanes." GAMA is developing a template for the standards, and drafts are to be submitted to GAMA by April 30th. The next meeting of the group is expected to be in May. (D. Schroeder, CAMI)

Air Transportation Human Factors: The Air Transportation Human Factors Research program held its annual research review meeting at the Beckman Center of the National Academy of Sciences in Irvine, California. Rather than a closed meeting format, this meeting was focused on sharing past research products with the airline industry. Since September 11th, industry participation in FAA research has been reduced, and one of the objectives of this meeting was to re-partner with the airlines. New research initiatives are being developed at Delta and UPS as a result of the exchanges at the meeting. (E. Edens, AFS-230)

Human Factors Researcher Retires: Dr. Edna Fielder, Manager of AAM-520 (Training & Organizational Research Laboratory), retired on February 28, 2003 after 14 years of government service. Dr. Fiedler led a human factors research team whose primary responsibilities include development and validation of selection tests for the FAA workforce; future workforce analysis based on the NAS; general aviation maintenance-related research; organizational assessments including the Employee Attitude Survey (EAS); and research into the communication and training needs of FAA employees related to changing technology. With Dr. Fiedler's outstanding leadership, researchers served the FAA and the DOT community by successfully providing large-scale organizational assessments, such as the EAS, and an extensive Aviation Medical Examiner survey. Under her direction, they completed the first version of the computerized Air Traffic Selection and Training assessment tool, which has now been implemented; developed computerized selection tools for airway facilities; and worked closely with Air Traffic Services to develop workforce attrition tools. Communication patterns and other human factors issues associated with emerging technology continue to be studied, as well as large-scale assessments of the agency's efforts to improve the model workforce environment.

Before joining the FAA, Dr. Fiedler served as director of a US Air Force-wide psychological screening program and as research coordinator for the Division of Neurosciences at Wilford Hall Medical Center, Lackland Air Force Base, Texas. Prior to her service in the Air Force, she was professor and chair of the psychology department at St. Mary's University.

Dr. Fiedler received numerous awards and recognitions for her research and government service. We will all miss this outstanding researcher and leader. (C. Hackworth, CAMI)

William J. Hughes Technical Center Activities:

- An ACB-230 Open House was held on March 27th. Jay Merkle (AUA-200) and En Route IPT personnel from Washington, DC attended.

- The En Route Communication Gateway (ECG) Operational Capability Demonstration (OCD) Dry Run will continue until the Formal Demonstration scheduled for the end of April. An ECG OCD Checkpoint Status meeting will be held on April 11th.
- Direct-To Phase 2(D2)/User Request Evaluation Tool (URET) Conflict Probe Simulation Dry Runs will continue until the Formal Demonstration which was rescheduled for April 22nd thru April 24th.
- ACB-230 researchers continue to work on integrating the En Route Air Route Traffic Control Center Maintenance Control Center Data Acquisition System and the Host Interface Device NAS Local Area Network System Monitor into the Host and Oceanic Computer System Replacement Monitor and Control environment.
- ACB-230 personnel are migrating their network infrastructure to follow the Cisco Systems SAFE blueprint for enterprise level security and design. The infrastructure upgrades will incorporate a model to accommodate En Route operational and administrative networks.

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 (AAR-100)



April 2-8, 2003 – Sun ‘n Fun EAA Fly In, Lakeland, FL <http://www.sun-n-fun.org>

April 5-10, 2003 –CHI 2003 Conference on Human Factors in Computing Systems, Broward Convention Center, Ft. Lauderdale, FL <http://www.chi2003.org/>

April 9-11, 2003 – SAE Aircraft Environmental Systems Committee, Dayton, OH
<mailto:elizd@sae.org>

April 14-17, 2003 – 12th International Symposium on Aviation Psychology, Convention Center, Dayton, OH http://web.house.com.ar/users/hf_crm/12h%/20call.doc

April 22-23, 2003 – 48th Annual Corporate Aviation Safety Seminar, presented by the Flight Safety Foundation and the National Business Aviation Association, Westin Diplomat Resort and Spa, Hollywood, FL <http://www.flightsafety.org/seminars.html>

April 27-30, 2003 – Symposium on Interactive 3D Graphics, Monterey Marriott, Monterey, CA
<mailto:Pausch@cmu.edu>

April 29-30, 2003 - FAA Research, Engineering and Development Advisory Committee (REDAC) Meeting, FAA Headquarters, Bessie Coleman Room gloria.dunderman@faa.gov

May 3-10, 2003 – International Conference on Software Engineering, Hilton Portland, Portland, OR <mailto:ldillon@cse.msu.edu>

May 4-9, 2003 – 74th Annual Scientific Meeting of the Aerospace Medical Association, Convention Center, San Antonio, TX <http://www.asma.org/>

May 5-8, 2003 – ATCA Civil/Military Air Traffic Management Conference, Prague, Czech Republic http://www.atca.org/static2_item.asp?item_ID=19

May 6 – 8, 2003 - AHS International 59th Annual Forum and Technology Display, Phoenix Civic Plaza, Phoenix, AZ. [General Information](#) - [Call for Papers](#) - [Exhibitors](#)

May 12-15, 2003 – DOD TAG-49, Country Suites Augusta Riverwalk, Augusta, GA
<http://hfetag.dtic.mil/meetschl.html>

May 12-17, 2003 - 2003 IEEE International Conference on Robotics and Automation, The Grand Hotel, Taipei, Taiwan <http://www.icra2003.org/>

June, 2003 – SAE Digital Human Modeling for Design and Engineering, Location TBD
<http://www.sae.org/calendar/aeromtg.htm>

June 2-3, 2003 - The National Center of Excellence for Aviation Operations Research (NEXTOR) Conference on Air Traffic Management and Control, hosted by NEXTOR - Virginia Tech, Virginia Tech Graduate Center, Falls Church, VA

June 9 – July 4, 2002 – World Radio Communication Conference, Geneva, Switzerland
<http://www.itu.int/ITU-R/conferences/wrc/wrc-03/index.asp>

June 15-22, 2003 – 45th Paris Air Show le bourget <http://www.paris-air-show.com/index3.htm>

June 16-19, 2003 –SAE Digital Human Modeling for Design and Engineering, Montreal, Canada <http://www.sae.org/calendar/dhm/index.htm>

June 18-19, 2003 – 6th GAIN World Conference, Alitalia Auditorium, Rome, Italy
<http://www.gainweb.org/whatsnew.html>

June 22-27, 2003 – 10th International Conference on Human-Computer Interaction, Institute of Computer Science Foundation, Research and Technology, Science and Technology Park of Crete, Heraklion, Crete, Greece <mailto:info@hci2003.gr>

June 23-25, 2003 – Human Systems Integration Symposium “Enhancing Human Performance in Naval and Joint Environments”, Sheraton Premier Hotel, Tyson’s Corner, VA

<http://www.navalengineers.org/Events/HSIS2003/HSIS.html>

July 7-10, 2003 – SAE 33rd International Conference on Environmental Systems, The Westin Bayshore Resort and Marina, Vancouver, Canada <http://www.sae.org/calendar/aeromtgs.htm>

July 14-17, 2003 – AIAA/ICAS International Air & Space Symposium and Exposition, Dayton Convention Center, Dayton, OH <http://www.flight100.org/>

July 21 – 23, 2003 - 4th Australian Pacific Vertiflite Conference on Helicopter Technology, Melbourne, Victoria, Australia. Contacts: [Dr. Arvind K. Sinha](#) and [Mr. Raden Kusumo](#)

July 29-August 4, 2003 – 51st Annual AirVenture, Oshkosh, WI <http://airventure.org/>

August 7-10, 2003 – 111th Convention of the American Psychological Association, Toronto, Ontario, Canada <http://www.apa.org/convention>

September 8-12, 2003 – SAE Aerospace Congress and Exhibition, Palais des Congrès, Montreal, Quebec, Canada <http://www.sae.org/calendar/aeromtgs.htm>

September 15-17, 2003 – FAA/TCA/CAA Safety Management in Aviation Maintenance Symposium, Toronto, Canada

September 16 – 18, 2003 - 29th European Rotorcraft Forum, Friedrichshafen, Germany. Contact B. Gmelin at bernd.gmelin@dir.de

September 18-19, 2003 – National Academy of Engineering 2003 Frontiers of Engineering Symposium, Irvine, CA [Welcome to the National Academy of Engineering \(NAE\)](#)

September 22 – October 3, 2003 – ICAO 11th Air Navigation Conference, Montreal, Canada <http://www.icao.int/icao/en/anb/meetings/anconf11/index.html>

October 6 – 9, 2003 - NATO Research and Technology Agency, Applied Vehicle Technology Panel (AVT) will present "The Vehicle Propulsion Integration Symposium" in Poland. For more information contact cheynes@rta.nato.int

October 7 – 9, 2003 - National Business Aviation Association Annual Meeting & Convention, Orlando, Florida. Contact: www.nbaa.org

October 13-17, 2003 – Human Factors and Ergonomics Society 47th Annual Meeting, Adams Mark Denver Hotel, Denver, CO <http://www.hfes.org/>

October 26-30, 2003 – ATCA 48th Annual International Technical Program and Exhibits, Marriott Wardman Park Hotel, Wash, DC http://www.atca.org/static2_item.asp?item_ID=19

October 27-28, 2003 – National Academies Institute of Medicine Annual Meeting, National Academy of Sciences, Washington, DC <http://wwwsearch.nationalacademies.org/>

October 27-30, 2003 – SAE DoD Maintenance Symposium and Exposition, Valley Forge Convention Center, King of Prussia, PA <http://www.sae.org/calendar/aeromtgs.htm>

November, 2003(tentative) – DOD TAG-50, Fall 2003, Phoenix, AZ
<http://hfetag.dtic.mil/meetschl.html>

November 17-20, 2003 – 56th Annual Air Safety Seminar, A Joint Meeting of Flight Safety Foundation, International Federation of Airworthiness, and International Air Transport Association, Bangkok, Thailand <http://www.flightsafety.org/seminars.html>

January 11-15, 2004 – Transportation Research Board Annual Meeting, Washington, DC
<http://www4.trb.org/trb/annual.nsf>

January 21 – 23, 2004 - AHS 4th Decennial Specialists' Meeting on Aeromechanics, Fisherman's Wharf, San Francisco, CA. For more information contact the Technical Chairman, Tom Maier at tmaier@mail.acr.nasa.gov

April, 2004 – SAE General Aviation Technology Conference and Exhibition, Century II Convention Center, Wichita, KS <http://www/sae.org/calendar/aeromtgs.htm>

May 6-8, 2004 - AHS International 60th Annual Forum and Technology Display, Virginia Beach, VA. Contact Staff@vtol.org

May 2-7, 2004 – 75th Annual Scientific Meeting of the Aerospace Medical Association, Egan Convention Center, Anchorage, AK <http://www.asma.org/>

July 27-August 2, 2004 – 52nd Annual AirVenture, Oshkosh, WI <http://airventure.org/>

July 28 – August 1, 2004 – 112th Convention of the American Psychological Association. Honolulu, Hawaii <http://www.apa.org/convention>

September 20-24, 2004 – Human Factors and Ergonomics Society 48th Annual Meeting, Sheraton New Orleans Hotel, New Orleans, LA <http://www.hfes.org/>

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

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