



## AAR-100

### Human Factors Newsletter # 03-20

November 15, 2003 – December 3, 2003

**Technical Report:** Evaluation of Proteus™ (Model AQP II Database) Software Tool

Proteus™ is a commercial training and development software tool that supports the creation of air carrier advanced training programs. Researchers conducted a detailed review of the software program to assess the extent to which it meets the FAA's AQP database requirements under Advisory Circular 120-54. The software was installed in a state-of-the-art personal computer, and then, following the software's documentation step-by-step, a training program was created. Throughout the evaluation, researchers took detailed notes about the software's performance, and compared this to the manufacturer's claims. Assessments were made of the software's functionality in several key areas: compliance with AC 120-54 requirements, program usability and functionality from a user's perspective, the utility and correctness of the user guide, and the adequacy of the vendor-supplied training program.

The evaluation suggests that Proteus™ is a useful tool for AQP database development. However, the review identified a number of major deficiencies in the software. For example, the software does not allow the user to send generated reports directly to the FAA (AFS-230); the revision control feature does not identify who made the changes; and the software does not work correctly with all Windows XP applications (such as Microsoft Word). In addition, users identified a number of other minor deficiencies. The evaluation report, although critical of the software, provided a number of practical recommendations for improving the application, documentation, and training program. The program developers will incorporate the recommended changes in an upcoming software release. (E. Edens, AFS-230)

**Simulation of the Environment:** Based on Volpe's work on realistic radio communications, the Royal Aeronautical Society invited Judith Bürki-Cohen to participate in its International Conference on the Simulation of the Environment, November 5-6, 2003 in London, UK. For this purpose, Volpe generated a new paper: Bürki-Cohen, J. (2003). *Evidence for the Need of Realistic Radio Communications for Airline Pilot Simulator Training and Evaluation*. This paper represents an update of earlier work, summarizing existing radio communication practices, the literature, and industry and airline efforts to improve realistic radio communications simulation. It also presents the results of an earlier study on the impact of current practices on Initial

Operating Experience. Volpe's work was referenced in several papers on radio communications published in the proceedings. It was clear that the FAA's vision in tasking Volpe to investigate this question was a major driver in conceiving the conference. However, although the consensus at the conference was that a realistically simulated environment including radio communications, visual traffic, and weather is very important for effective training and accurate evaluation, the fiscally ailing airlines may need further incentives to assume its cost. (J. Bürki-Cohen, VNTSC, Eleana Edens, AFS-230)

**DOD Technical Advisory Group (TAG):** Dr. Thomas Nesthus (AAM-510) chaired the Sustained & Continuous Operations (SUSOPS) Sub-TAG during the DOD's 50<sup>th</sup> Human Factors Engineering Technical Advisory Group meeting in Tempe AZ, November 3-6, 2003. In keeping with the theme of Human Factors Engineering: Past, Present, and Future, the plenary session focused on historical presentations. Although overall attendance was down from previous meetings, interest and discussions surrounding issues of fatigue and fatigue countermeasures during the SUSOPS sub-TAG meeting remained high. (T. Nesthus, CAMI)

**Night and Shiftwork:** Dr. Thomas Nesthus and Ms. Crystal Cruz met with members of the Physical Activity Science Institute of Aeronautics (NUICAF) for two days on a Brazilian Air Force Base in Rio de Janeiro, to receive briefings and laboratory tours. In turn, Dr. Nesthus and Ms. Cruz provided briefings on the various activities of the Civil Aerospace Medical Institute as part of an information exchange and MOA for the development of collaborative research with NUICAF. Numerous common-interest areas were identified during these meetings and collaborative ideas were discussed.

Dr. Nesthus and Ms. Cruz also traveled to Santos, Brazil to participate in the XVI International Symposium on Night and Shiftwork. This important meeting was attended by approximately 200 shiftwork and fatigue researchers from 22 countries to share information on the following topics: work relations and health impact; diversity and equity: dealing with biological and social differences; methodological aspects of shiftwork research: comprehensiveness and limitations; management and safety in transportation; multidimensional aspects related to health and well being; changes in work schedules or worker strategies: do they generate the same effects; building a safe environment; and, working time and health promotion: the role of education. Dr. Nesthus provided a poster presentation concerning relationships between occupational stress, gender, and shiftwork. Ms. Cruz provided an oral presentation on countermeasures to mitigate fatigue effects during shiftwork. Continued interest in CAMI's fatigue research program promoted active information exchange with world-renowned fatigue researchers and demonstrated the importance of our contributions to the Working Time Society's International Symposium. Many professional contacts have requested further communication following the meeting.

Ms. Cruz met with Dr. Adam Fletcher of the University of South Australia to discuss her contributions to review and contribute to a document entitled "A Review of Fatigue Management Research Literature and Current Air Traffic Control Practices for Airservices Australia." Ms. Cruz's contributions were valuable and especially well received by the Australian air traffic controllers involved in the project and familiar with the occupation-specific research CAMI has done on shiftwork and fatigue. Dr. Fletcher indicated that he was very interested in collaborating

with CAMI researchers in the future and toward the development of outside publications. (T. Nesthus, CAMI)

**Aircraft Decontamination:** Strategic Technology Enterprises, Inc., a subsidiary of Steris Corporation, and CAMI are engaged in a cooperative research and development agreement aimed at enhancing commercial aviation safety associated with decontaminating commercial aircraft in the event of a chemical or biological event. Steris will set up a maximum of 4 VHP generators onboard CAMI's Boeing 747 Aircraft Environmental Research Facility. Initially the generators will be run without biological test strips to determine how many generators are needed for how long to generate a given level of vaporized hydrogen peroxide. Real-time process monitoring will be conducted using guided wave near-infrared spectrophotometers. Biological indicators will be tri-pack stainless steel coupons inoculated with approximately 10x4th, 10x5th, and 10x6th *Geobacillus stearothermophilus* spores packaged in sub-divided Tyvek (50 coupons per trial) Note: Tyvek is a registered trademark of E.I. du Pont Nemours and Company envelopes. The first test will consist of the portable VHP generators aerating the interior with a maximum reservoir load. The two VHP gas outlets will be located at the level of the center of the overhead luggage bins. Portable fans will be used to promote even distribution of the VHP throughout the cabin segment. Subsequent tests (2-4) will use the aircraft's existing ventilation system for the distribution of the VHP. Portable fans will not be used. The ventilation system will be run at a different capacity during each of these trials. Kill rates for the bacterial indicators at the different flow levels will be used to quantify the dose response characteristics of VHP treatment.

- **Run decontamination cycle with the VHP units.**

- A. Vaporized hydrogen peroxide (VHP) distribution runs:

- VHP distributed via aircraft ventilation system running at 100% and portable fans
- VHP distributed via aircraft ventilation system running at 100%, no fans
- VHP distributed via aircraft ventilation system running at 67%, no fans
- VHP distributed via aircraft ventilation system running at 33%, no fans

- B. Gas will be allowed to dwell for a minimum of three hours after introduction

- If 100% kill is not achieved, double time and repeat.
- System set up Nov 19 – 21

- C. Decontamination runs are planned for December 1-5, 2003.

Point of Contact: J. Whinnery (CAMI)

**Innovation Award:** Insightful Corporation, a leading provider of software solutions for analysis of numeric and text data, announced today that it has awarded customers Time

Distribution Services, Inc., Great Lakes Dredge & Dock, Novartis, Surrmed, and the Federal Aviation Administration, Civil Aerospace Medical Institute its Insightful Innovation Awards for commercial leadership in data analysis. Academic recipients included researchers from The Bioconductor Group including Berkeley University, Johns Hopkins University, Harvard School of Public Health, and the University of Virginia. The President and CEO of Insightful remarked “Each year we recognize leading organizations that are building and deploying analytic solutions that improve the richness and reach of information. These award winners are using advanced analytics to extract intelligence with their organization to deliver better information to key decision-makers optimizing business performance”.

The award recognizes the innovative foresight and accomplishment in visualizing and subsequently developing a business support system that will integrate and analyze a complex array of aerospace medical data and provide a fact-based scientific foundation for decision making aimed at enhancing aerospace safety. (J. Whinnery, CAMI)

**ATC Automation Displays:** During a visit to MIT, Jing Xing attended two seminars by FAA grant researcher John Hansman entitled "Future Technologies in ATC" and "ATC Overview". She also participated in a discussion about ATC research and experimental design with MIT professors and their graduate students. In addition, Dr. Jing Xing presented a seminar to the MIT Department of Aeronautics on "Information Complexity and Cognitive Limitations in ATC Automation Displays". Below is the abstract:

In order to help controllers manage the increasing volume of air traffic, many automation tools are being developed. While the automation tools are designed with the objectives of increasing capacity and reducing the workload of controllers, using the tools may actually increase the complexity of the task. Moreover, if the information provided by the tools overwhelms controllers' cognitive capacities, the information can be either missed or misinterpreted. This study is to understand the impact of information complexity on controllers' task performance and develop measures of information complexity in automation displays. This talk introduces a framework of evaluating complexity. The framework proposes that information complexity is the combination of three basic factors: numeric size, variation and relation. Each of these factors is evaluated by three stages of information processing in the brain: perception, cognition and action. The focus of the talk is on the cognition stage. Based on the memory structure of the human brain, four measures of cognitive complexity are proposed, each affecting different cognitive processes: executive complexity that affects the execution of attention, representational complexity that affects the operation span of mental representations, dynamic complexity that affects computation of mental representations, and relational complexity that affects working memory. Each of these measures is associated with the limitations of cognitive capacities. At the conclusion, there is a discussion of some potential experiments to validate these measures and the application to interface design. (Jing Xing, CAMI)

*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)



**December 9-12, 2003** - Institute of Electrical and Electronics Engineers (IEEE) Decision and Control Conference, Maui, HI <http://www2.acae.cuhk.edu.hk/~ycliu/cdc03/>

**December 12-13, 2003** – Workshop on HCI Research in MIS, Seattle, WA  
[http://melody.syr.edu/hci/pre\\_icis03\\_wksp/index.cgi](http://melody.syr.edu/hci/pre_icis03_wksp/index.cgi)

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

**January 13-15, 2004** – SAE SEAT –Aircraft Seat Committee Meeting, Phoenix, AZ  
[mlemank@sae.org](mailto:mlemank@sae.org)

**January 13-16, 2004** – International Conference on Intelligent User Interfaces/Computer-Aided Design of User Interfaces, Island of Madeira, Portugal <http://www.iuiconf.org/>

**January 18-22, 2004** – Conference on Visualization and Data Analysis, San Jose Marriott and San Jose Convention Center, San Jose, CA <http://vw.indiana.edu/vda2004/>

**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](mailto:tmaier@mail.acr.nasa.gov)

**February 9, 2004** – Call for proposals (workshops, lecture papers, symposia, panels, debates, special-format sessions, and posters), Human Factors and Ergonomics Society 48<sup>th</sup> Annual Meeting to be held September 20-24, 2004, New Orleans, LA  
<http://www.hfes.org/meetings/2004menu.html>

**March 4-5, 2004** - Divisions 19 and 21, in conjunction with the Potomac Chapter of the Human Factors and Ergonomics Society, will be hosting the Annual Mid-year Symposium March 4<sup>th</sup> and 5<sup>th</sup>, 2004 at the Fort Belvoir Officer's Club, Fort Belvoir, Virginia. [jruffner@dcscorp.com](mailto:jruffner@dcscorp.com)

**March 8-11, 2004** – SAE World Congress, Cobo Hall, Detroit, MI  
<http://www.sae.org/congress/index.htm>

**March 15-17, 2004** – 16<sup>th</sup> Annual European Aviation Safety Seminar, Barcelona, Spain  
[http://www.flightsafety.org/eass04\\_cfp.html](http://www.flightsafety.org/eass04_cfp.html)

**March 22-24, 2004** – Eye Tracking Research and Applications Symposium, Menger Hotel, San Antonio, TX <http://www.e-t-r-a.org/>

**March 22-25, 2004** – HPSAA II Conference, Human Performance, Situation Awareness, and Automation Technology, hosted by Embry-Riddle Aeronautical University and the University of Central Florida, Hilton Oceanfront Resort, Daytona Beach, FL

<http://faculty.erau.edu/vincenzd/hpsaa>

**March 23-26, 2004** – 4<sup>th</sup> International Workshop on Smart Appliances and Wearable Computers, Tokyo, Japan <http://www.unl.im.dendai.ac.jp/IWSAWC/>

*April 2004* – DOD TAG-51, Atlantic City, NJ <http://hfetag.dtic.mil/meetschl.html>

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

**April 18-21, 2004** – FAA Worldwide Airport Technology Transfer Conference, Hilton Atlantic City Hotel, Atlantic City, NJ <http://www.airtech.tc.faa.gov/att04/>

**April 20-22, 2004** – SAE General Aviation Technology Conference and Exhibition, Century 21 Convention Center, Wichita, KS <http://www.sae.org/calendar/aeromtgs.htm>

**April 24-29, 2004** – CHI 2004, Conference on Human Factors in Computing Systems, Vienna, Austria <http://www.acm.org/sigchi/chi2004/>

**April 25-28, 2004** – SAE Cabin Safety Technical Committee Meeting, Oklahoma City, OK [mlemank@sae.org](mailto:mlemank@sae.org)

**April 27-29, 2004** – 49<sup>th</sup> Annual Corporate Aviation Safety Seminar, Tucson, AZ [http://www.flightsafety.org/cass04\\_cfp.html](http://www.flightsafety.org/cass04_cfp.html)

**May 3-6, 2004** – SAE Aircraft Oxygen Equipment Committee, Anchorage, AK [mlemank@sae.org](mailto:mlemank@sae.org)

**May 3-6, 2004** – 75<sup>th</sup> Annual Scientific Meeting of the Aerospace Medical Association, Egan Convention Center, Anchorage, AK <http://www.asma.org/>

**May 6-8, 2004** - AHS International 60th Annual Forum and Technology Display, Virginia Beach, VA. Contact [Staff@vtol.org](mailto:Staff@vtol.org)

**May 10-12, 2004** – Royal Aeronautical Society 10<sup>th</sup> AIAA CEAS Aeroacoustics Conference, Manchester Town Hall, UK <http://www.aerosociety.com/homepage.asp>

**May 11-13, 2004** – SAE SEAT – Aircraft Seat Committee, Savannah, GA [mlemank@sae.org](mailto:mlemank@sae.org)

*May 23-26, 2004* – Tenth International Conference on Mobility and Transport for Elderly and Disabled People, Hamamatsu, Japan <http://trb.org/calendar/>

**May 26-27, 2004** – Royal Aeronautical Society Conference – Flight Simulation 1929-2029, A Centennial Perspective, London, UK <http://www.aerosociety.com/homepage.asp>

**June 15-17, 2004** – SAE Digital Human Modeling for Design and Engineering Meeting, Oakland University, Rochester, Michigan <http://www.sae.org/calendar/aeromtgs.htm>

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

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

**August 1-4, 2004** – Designing Interactive Systems, Cambridge, MA  
<http://www.sigchi.org/DIS2004/>

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

**September 29 – October 1, 2004** – 2004 International Conference on Human Computer Interaction (HCI-Aero), Toulouse, France  
<http://www.eurisco-international.com/hci-aero2004>.

**October, 2004** – 18<sup>th</sup> Airbus/JetBlue Human Factors Symposium, New York City, NY  
<http://www.airbus.com/customer/events.asp>

**October 4-7, 2004** – SAE SEAT – Aircraft Seat Committee Meeting, Albuquerque, NM  
[mlemank@sae.org](mailto:mlemank@sae.org)

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

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

**October 25-28, 2004** – SAE S-9 Cabin Safety Technical Committee Meeting, San Diego, CA  
[mlemank@sae.org](mailto:mlemank@sae.org)

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

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

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

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

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

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

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

*January 22-26, 2006* – TRB 85<sup>th</sup> 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  
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