



## ATOP-R&D

### Human Factors Newsletter # 04-25

December 11, 2004 – December 24, 2004

**Technical Note:** Ahlstrom, V., Allendoerfer, K., William J. Hughes Technical Center. *Information Organization for a Portal Using a Card-Sorting Technique*. DOT/FAA/CT-TN04/31.

Abstract: The Office of Knowledge Management (ACK-1) at the William J. Hughes Technical Center (WJHTC) is sponsoring development of a web-based portal for employees. The portal will centralize and standardize numerous information systems currently used by WJHTC employees in their work. To increase the usability of the system, the office tasked the National Airspace System Human Factors Group to conduct several user-centered design and usability testing activities. This technical note describes the methodology used in one of the activities. In order for the portal to be successful, information needs to be organized so that users can find what they need quickly and accurately. The challenge for portal designers is how to organize the information to achieve this goal for portal users. Different users or user communities may have very different views and priorities regarding the information contained in the portal. It is not at all clear which items belong together or what hierarchical categories would make sense to users.

Card sorting is a technique used to gain insight on how users mentally categorize information. By performing a card-sorting task, researchers can create a taxonomy and organize information in a way that corresponds to how intended users of a system think about the information the system contains. By basing the organization on the results of the card sort, the system is more likely to match the mental model of the users, facilitate their ability to find information, and achieve good usability. The card-sorting methodology and the techniques for analyzing results is fully described. Researchers use the employee portal project as a running example to discuss the methodology and the benefits and drawbacks of different analysis techniques. They also created a list of information items to include in the portal based on high priority items provided by the sponsor, items currently available via the intranet, and structured interviews with potential end users. The researchers created sets of cards where each card contained one of the items from the list. Participants sorted the cards into groups based on their own ideas of where items belong and then named each group. Once all of the participants completed the card sort, the data were analyzed using a set of converging methods to determine overall categories and organization. The first method examined the categories and identified patterns that were similar across

participants. This was followed by two more quantitative methods: cluster analysis and factor analysis. Data indicated there was agreement between the methods. The result of the card-sorting task was a taxonomy that provided an initial structure to the portal. The taxonomy will be verified and refined through iterative usability testing.

This research supports the Administrator's Flight Plan Goal for Organizational Excellence, Objectives One and Three: 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.

Point of Contact: K. Allendoerfer, WJHTC

**Alarms and Alerts in AF:** For many years, the number of systems in the Airway Facilities (AF) environment has increased dramatically. As new systems are added, there is often little consideration to the existing systems. This stovepipe approach has led to a proliferation of divergent coding systems for alarms and alerts. The multitude of different colors, sounds, etc., can quickly exceed the ability of users to remember the meaning of each item, potentially leading to errors. As new systems are developed or acquired, program managers and product teams are repeatedly faced with the same decisions on how to effectively code alarms and alerts for AF systems. AF has been moving toward standardization by sponsoring a number of different projects that lay the initial groundwork for the development of an AF standard for alarms and alerts. The development of a standard agreed upon by key AF stakeholders has the potential to decrease development time, decrease training, and minimize the potential for errors. Researchers at the William J. Hughes Technical Center are reviewing alarms and alerts literature, documenting gaps, and suggesting resolutions. Many sources (e.g., standards, specifications and subject-matter experts) continue to be tapped in order to create a comprehensive evaluation of alarms and alerts currently in use as well as alarms and alerts that are in the process of being implemented. Site visits will be conducted in the spring of 2005. This research supports the Administrator's Flight Plan Goal for Increased Safety, Objective Seven: Enhance the safety of FAA's air traffic systems. (V. Ahlstrom, WJHTC)

**Laboratory Visit:** Researchers at the William J. Hughes Technical Center provided consulting services to a representative from the New York City Transit Authority who was looking for assistance in developing medical standards for personnel selection. Basic human factors information was provided to help frame the key questions necessary to begin the selection process, and a referral to the Civil Aerospace Medical Institute was also provided for additional guidance. (E. Stein, WJHTC)

**RNAV:** A research team from the William J. Hughes Technical Center successfully completed a high fidelity human-in-the-loop ATC simulation at the Northern California Terminal Radar Control Center (NCT). The Required Navigation (RNAV) Performance Program Office (ATO-R) sponsored the study at the NCT training facility. The research team included engineering research psychologists, engineers, AT subject-matter-experts, computer systems specialists, and simulation pilots. The simulation investigated Airport Traffic Control Tower human factors implications for implementing Required Navigation Performance (RNP) approaches under low

ceiling conditions. Sixteen NCT controllers participated in the four operational scenarios and one reaction time task. Researchers are completing data analyses and will provide recommendations to the RNP Program Office for implementing RNP approaches at San Francisco and other sites. This was the first instance that the Technical Center research team transported an all-inclusive portable ATC simulation system, including Distributed Environment for Simulation, Rapid Engineering and Experimentation and Target Generation Facility, to an operational facility to conduct a full human-in-the-loop onsite simulation. This research supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 2: Increase or improve airspace capacity in the eight major metropolitan areas and corridors that most affect total system delay. (R. Sollenberger, WJHTC)

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

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



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

**January 9-13, 2005** – TRB 84<sup>th</sup> 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 19-21, 2005** – Air Cargo Symposium, Ritz-Carlton New Orleans, New Orleans, LA  
<http://www.aci-na.org>

*January 24-28, 2005* – SAE G-10 Aerospace Behavioral Engineering Technology Committee, Sheraton Safari Hotel, Lake Buena Vista, Orlando, FL  
[http://forums.sae.org/access/dispatch.cgi/TEAG10\\_pf](http://forums.sae.org/access/dispatch.cgi/TEAG10_pf)

**January 25-27, 2005** – AE-2 Aerospace Lighting Committee Meeting, New Orleans, LA  
[elizd@sae.org](mailto:elizd@sae.org)

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

**February 1-3, 2005** - ATC Maastricht (EUROCONTROL), Maastricht, Netherlands  
<http://www.atcmaastricht.com/>

**February 9-11, 2005** – 6<sup>th</sup> Annual Aviation Security Summit Expo, US Grant Hotel, San Diego, CA  
<http://www.worldrgr.com/AW500/wrg.asp>

**February 16-17, 2005** – World Aerospace Symposium, Pierre Baudis Toulouse Congress Center, Toulouse, France  
[http://www.aviationweek.com/conferences/meu\\_e3.htm](http://www.aviationweek.com/conferences/meu_e3.htm)

**March 6-8, 2005** – Air Cargo 2005, Hotel del Coronado, San Diego, CA  
<http://www.aircargoonference.com>

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

*March 17-18, 2005 – FAA Aviation Forecast, Washington Convention Center, Wash, DC*  
[apo.faa.gov/Conference/welcome.htm](http://apo.faa.gov/Conference/welcome.htm)

**April 2-7, 2005** – CHI 2005, Portland, OR [chi2005-chair@acm.org](mailto:chi2005-chair@acm.org).

**April 5-7, 2005** – Aviation Testing Expo 2005: Scientific Conference and Technology Forum, Europe, Messe Hamburg, Germany  
<http://www.aerospacetesting-expo.com/northamerica/conf+forum.html>

**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>

**April 12-18, 2005** – Sun ‘n Fun 2005, Lakeland, FL <http://www.sun-n-fun.org/>

**April 17-22, 2005** – International Federation of Air Traffic Controller’s Associations, Melbourne, Australia  
[http://www.ifatca.org/conferences/annual\\_conference.htm](http://www.ifatca.org/conferences/annual_conference.htm)

**April 18-21, 2005** – 13<sup>th</sup> International Symposium on Aviation Psychology (ISAP), Cox Convention Center, Oklahoma City, OK  
<http://www.wright.edu/isap/>

**April 28-29, 2005**- Mini-Conference on Human Factors in Complex Sociotechnical Systems, hosted by HFES South Jersey Chapter, Atlantic City, NJ, <http://www.sjhfes.org/>

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

**May 26-29, 2005** – American Psychological Society 17<sup>th</sup> Annual Convention, Westin Century Plaza Hotel, Los Angeles, CA  
<http://www.psychologicalscience.org/convention/>

**June 2005** – 6<sup>th</sup> 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](http://www.paris-air-show.com)

**June 20-22, 2005** – 3<sup>rd</sup> Human System Integration Symposium, Sheraton National Hotel, Arlington, VA <http://www.navalengineers.org/Events/HSIS2005/HSIS05Index.html>

**July 22-28, 2005** – HCI International 2005, 11<sup>th</sup> International Conference on Human-Computer Interaction, Caesars Palace, Las Vegas, NV [hci2005@ecn.purdue.edu](mailto:hci2005@ecn.purdue.edu)

**July 25-31, 2005** – EAA AirVenture Oshkosh 2005, Oshkosh, WI <http://www.airventure.org>

**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** - 113<sup>th</sup> 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 19-23, 2005** – ANA 2005 Aviation Conference and Exhibition, Connecticut Convention Center, Hartford. CN <http://www.aerospace-na.com/ace2005.asp>

**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 49<sup>th</sup> 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 6-9, 2005** – Aviation North Expo Conference, Fairbanks Princess Riverside Lodge, Fairbanks, AK [www.AviationNorth.org](http://www.AviationNorth.org)

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

**October 30—November 3, 2005** – 24<sup>th</sup> Digital Avionics Systems Conference, Hyatt Regency Crystal City, Wash., DC <http://www.dasconline.org>

**November 6-9, 2005** - ACI World / Pacific Conference and Exhibition, Auckland, New Zealand. [www.auckland-airport.co.nz](http://www.auckland-airport.co.nz)

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

**January 9-12, 2006** - 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV <http://www.aiaa.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  
or via e-mail at [bill.ctr.berger @faa.gov](mailto:bill.ctr.berger@faa.gov)

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