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A Team Training Taxonomy to Reduce Friendly Fire Incidents

By Katherine A. Wilson, Eduardo Salas, Heather A. Priest, & Dee Andrews

One of the most tragic consequences of war occurs when warfighters fire on their own forces. Such incidents are referred to as *friendly fire* or *fratricide*. Since early February, when classified cockpit footage was leaked showing the mistaken attack by U.S. jets on a British convoy in Iraq in March 2003, friendly fire has drawn worldwide attention. A British soldier was killed and four others were wounded in the attack.

A February 12, 2007, *Belfast Telegraph* article quoted U.S. Central Command Commander General John Abazaïd in October 2003, who said the accident investigation showed that “cognitive and physical task overload, ineffective communication and failure to recognize identification panels contributed to the terrible loss of life, injury and damage.”

These findings are not unique, and similar findings have been cited as contributing to other friendly fire incidents. What we have found, however, is that many of these findings leave us with additional questions. For example, what part of communication was ineffective (e.g., information exchange, phraseology, closed-loop communication)?

The Study

For the last three years, we have been examining various reports, both official and from the press, relating to friendly fire incidents that have occurred over several years. In addition, we have examined human factors literature that might cast some light on how scientists might help to reduce the probability of friendly fire. Our goal is to explore the underlying human factors causes of these incidents. Work in this area is frequently referred to as *combat identification research*. The goal in combat identification research is to improve the human-system interface so that the warfighter is provided with as many cues as possible about the identity of a system or human on the battlefield.

Some of our findings will be published in the April issue of *Human Factors*. The paper includes an initial taxonomy of behavioral markers that may help military leaders reduce the consequences of fratricide in war. It highlights dozens of potential areas in which teamwork could be strengthened.

First, we examined the literature on friendly fire, and then used a human-centered approach to understand errors and create the

taxonomy. We concluded that in the absence of adequate shared cognition, soldiers can have problems interpreting cues, making decisions, and taking correct action.

Although technological solutions have been implemented to prevent friendly fire incidents, such as combat identification systems (e.g., Blue Force Tracker), factors such as sleep deprivation can still lead to human error, and technology can fail or simply be unavailable. What’s needed, we believe, is a better understanding of specific failures of teamwork, including information transmission, team behavior, and team attitude.

The Taxonomy

Under the umbrella of shared cognition, a number of factors can influence the behavior of teams; these are related to the individual, the task, the organization, the technology, and the environment. In this study, we focused solely on the three team factors that can influence shared cognition: communication, coordination, and cooperation.

Communication covers all types of communication among team members. We further broke it down into information exchange (what is passed between sender and receiver), phraseology (how information is passed), and the three steps of closed-loop communication (sender transmission, receiver acceptance and acknowledgment of receipt, and sender verification). Among the questions related to communication in our taxonomy are the following:

- Did team members seek information from all available resources?
- Did team members use proper terminology and communication procedures?
- Did team members acknowledge requests from others?

Coordination is the behavioral mechanism team members use to orchestrate their performance requirements. Coordination includes knowledge requirements, mutual performance monitoring, backup behavior, and adaptability. Questions regarding coordination in the taxonomy include

- Did team members have a common understanding of the mission, task, team, and resources available to them?

continued on page 2

A Team Training Taxonomy...

(continued from page 1)

- Did team members recognize mistakes made by others?
- Did team members correct other team members' errors?
- Did team members adjust strategies to situation demands?

Shared attitudes and beliefs lead to successful cooperation, which includes team orientation, collective efficacy, mutual trust, and team cohesion. Here are examples of cooperation-related questions in the taxonomy:

- Did team members put group goals ahead of individual goals?
- Did team members exhibit confidence in fellow team members?
- Did team members exchange information freely across team members?
- Did team members remain united in pursuit of mission goals?

We believe that a better understanding of specific failures of teamwork is needed to prevent friendly fire incidents. The questions posed above and the framework that organizes human error is only one part of the larger solution. Our taxonomy can help in the diagnostic assessment of what causes teamwork breakdowns in fratricide incidents or near misses, which can lead to recommendations and solutions to improve teamwork in order to minimize risk. Such solutions include training to improve communication, coordination, and cooperation (within and across U.S. services and allies).

Our *Human Factors* article will be published as an Air Force Research Laboratory (AFRL) technical report and will be disseminated to training leaders in the Air Force and other military services. AFRL has a long-term R&D program in Distributed Mission Operations (DMO), and improving combat identification training methods is one of the goals of that program. A component of DMO research links AFRL training research simulators to partners in allied countries for collaborative research on topics like combat identification.

Although the current research has focused on team training and its relation to combat identification, AFRL is also examining other human factors topics to gauge their impact on friendly fire (e.g., visual discrimination, fatigue, emotions, cognitive set). We recognize that more human factors thinking is needed on this important topic, and we hope that the taxonomy proposed stimulates future research.

Katherine Wilson is a research assistant at the Institute for Simulation & Training in Orlando, Florida. Eduardo Salas is a professor of psychology and Trustee Chair at the University of Central Florida. Heather Priest is a research assistant at the Institute for Simulation & Training. Dee Andrews is a senior scientist in the Human Effectiveness Directorate at the Air Force Research Laboratory in Mesa, Arizona. This research was funded by the Air Force Research Laboratory. The opinions expressed here are those of the authors and do not necessarily reflect the views or policies of the Department of the Air Force or the Department of Defense. ☒

INTERORGANIZATIONAL

HFES to Cosponsor Home Health Care Conference

By Barry H. Beith, Conference Chair

On May 1 and 2, HFES and the Industrial Designers Society of America (IDSA) will cosponsor "Living Rooms: Human Factors and Industrial Design Contributions to the Home as a Health Care Venue." The conference will take place at the headquarters of the American Society of Association Executives in Washington, D.C.

This collaborative conference is based on the premise that the home will become a vital health care venue over the next 15–20 years as "baby boomers" grow older and put increased strain on our medical system. The home has always been a place to recover, deal with chronic conditions or catastrophic illness, and live out the end of one's days. However, health care-related equipment, furniture, and supplies have been pushed from institutions into the home, which was not designed to accommodate them. Consequently, in order to function as a health care facility, the home becomes "institutionalized" and, as such, compromises the quality of life for residents and caregivers – and all too often disrupts the relationships between caregiver and patient as well.

This conference brings together human factors practitioners and industrial designers to examine, discuss, and interact with one another about how to design products and homes that meet these needs. The goals are as follows:

- To facilitate interaction between human factors researchers/designers and industrial designers, and encourage them to explore further the potential synergism in their collaboration.
- To raise attendees' awareness regarding the impending crisis in home health care and the role they can play in better designing the home and the things needed for homes to function as health care venues.

The primary audiences for the conference include human factors engineers, psychologists, and industrial designers in HFES and IDSA, particularly those working in the health care arena. Additional audiences include medical device developers and manufacturers, the health care services and equipment industry, and government staffers and representatives representing the interests of the elderly and the medical community.



Bulletin

Volume 50, Number 3

March 2007

The *HFES Bulletin* (ISSN 1527-3660) is published 12 times a year by the Human Factors and Ergonomics Society, 1124 Montana Ave., Suite B, Santa Monica, CA 90403 USA, <http://hfes.org>. Address inquiries and address changes to HFES, P.O. Box 1369, Santa Monica, CA 90406-1369 USA, 310/394-1811, fax 310/394-2410, <http://hfes.org>.

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INTERORGANIZATIONAL, cont.

The program will consist of several invited addresses, including a keynote by Robert and Beverly Williges. Four panels will cover a range of topics, among which is a panel on home care and the elderly chaired by Dan Fisk and Wendy Rogers addressing the CREATE II project from the University of Miami's Center on Aging. CREATE is a collaboration of the University of Miami, Georgia Tech, the University of Pittsburgh, and Florida State University.

Further details about the program will be posted on the HFES Web site and promoted to members. Registration information will be available in March.

For more information, please contact HFES Executive Director Lynn Strother (lynn@hfes.org, 310/394-1811). ☒

ANNUAL MEETING

First HFES Student Lounge a Success

By Jim Beno, San Jose State University Student Chapter Past Chair, HFES 2006 Host Committee

When I stepped out of the elevator, a line of students was packing into the Student Lounge for the first "Meet and Eat" lunch of the week. It was just the start of the HFES 50th Annual Meeting, but the turnout made it very clear: The student community needed a place to connect. Either that, or they were very hungry!

Last year's annual meeting in San Francisco was the first to feature the HFES Student Lounge. Created by the San Jose State University (SJSU) Student Chapter, the lounge was designed to help students network and socialize during the meeting. It was shaped by feedback from more than 30 students across the globe and made possible by the HFES Executive Council and Host Committee.

"The original idea of the Student Lounge was very simple," said Mayuko Ueda, Student Lounge Coordinator, HFES 2006 Host Committee. "I thought it would be nice to have a small, cozy gathering space at the conference for students to connect."

The need for the lounge was based on observations and discussions with students at the HFES 49th Annual Meeting in Orlando, Florida.

"Two years ago at the conference in Orlando, we really didn't have a place to go," Ueda said. "We made some great connections with students from other universities at the Student Reception, but there was no place to continue that the rest of the week."

So when the 2006 Host Committee began to plan the annual meeting, addressing this need was seen as a huge opportunity to add value. The committee brainstormed some ideas, surveyed other students for input, and wrote up a proposal that was eventually approved.

After a lot of planning and hard work, the Student Lounge opened its doors. Located just across from the elevator on the fourth floor of the Hilton, the lounge featured comfortable couch-

es, ambient music, wireless Internet access, games, coffee, and snacks. Whiteboards displayed a weekly schedule and student messages, and bulletin boards showcased student chapter posters.

Nearly 100 photos of students gradually covered the "Photo Board" during the week. The photos were taken with a polaroid camera in the lounge and served as entries in a raffle for three prizes: a personal organizer (donated by Anthony Andre) and two copies of *Reviews of Human Factors and Ergonomics, Volume 2* (donated by HFES).

Although there were some nice amenities in the lounge, the real value was in the connections it fostered among students and between students and professionals.

"The lounge offered me the opportunity to meet other graduate students that most likely I would have not met otherwise," said Julio C. Mateo, a human factors psychology Ph.D. student and IGERT Fellow at Wright State University. Mateo attended one of the daily "Meet and Eat" lunches, where students met in the lounge before heading out to a nearby restaurant. He also participated in Thursday's "Research Roundtable," a forum to discuss research ideas. "I believe both of these activities were beneficial to me at both a personal and professional level," Mateo said.

Throughout the week, a number of "Mentor Chats" were held with Anthony Andre (principal of Interface Analysis Associates), Arnie Lund (director of User Experience for Microsoft's Mobile Platforms Division), Marc Resnick (associate professor of ISE at Florida International University), and Carol Stuart-Buttle (Stuart-Buttle Ergonomics).

"It was great," said Resnick. "I had fun, and I think the students learned a lot and seemed to enjoy it as well. I strongly recommend continuing the idea."

"I very much enjoyed the afternoon discussions with professionals in the field," said Julie McMath, president of the California State University, Long Beach (CSULB) Student Chapter. "Also, if I were traveling to this conference without knowing anyone, I would have felt comfort in knowing that there was somewhere I could go to meet people, learn about student activities, and just sit for a while."

Clearly, the lounge was a nice alternative to camping out on the floor of a hallway. It also became the perfect rendezvous point for student excursions.

"The CSULB student chapter used the lounge for Internet connections and communication," McMath said. "We had all met

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Students introducing each other in Monday's Round Robin Social.

Student Lounge Survey Highlights

By Mayuko Ueda, Student Lounge Coordinator, HFES
2006 Host Committee

1. How often did you visit the lounge? (62 responses)
 - 53% A couple times during the week
 - 16% Every day
 - 14% More than once a day
 - 14% Once during the week
 - 1% Never
2. What was your main reason for visiting? (61 responses)
 - 65% Relaxing
 - 60% Social Events (Lunch, Social)
 - 39% Networking
 - 31% Other
 - 29% Academic Events (Mentors, Research)
3. Which event did you like the most? (45 responses)
 - 51% Meet & Eat Lunches
 - 26% Mentor Chats
 - 15% Round Robin Social
 - 6% Research Roundtable
4. What amenity was the most useful/fun? (55 responses)
 - 36% Lounge Furniture
 - 30% Internet Access
 - 20% Activity Announcement Board
 - 5% Photo Board
 - 3% Student Chapter Posters
 - 3% Other (Coffee, Snacks, etc.)
5. Should the lounge be a permanent part of the meeting? (58 responses)
 - 100% Yes
6. Some "Likes" & Compliments:
 - "The lounge was great! A wonderful place to meet people, network, and relax. I hope to see it at future meetings."
 - "It was a nice place to relax with fellow students for a few moments in between talks, or when I was totally exhausted but didn't have enough time to walk to my hotel and back for a break."
 - "As students, we need to network amongst ourselves in a way that is easy to find each other. Further, it shows that HFES, as an organization, recognizes that students are the future of the Society."
 - "The interaction with people that otherwise would have been difficult to meet. I think it was a great idea, it was well done, and was a success. I hope to see a student lounge next year in Baltimore also."
 - "It was a great way to meet new people and build closer ties with them, in an environment that wasn't rushed or overly structured."
7. Some "Dislikes" & Suggestions:
 - "Must be in a more central location. Better snacks/refreshments. More info about what is going on and when."
 - "Make sure that students from a wide range of schools are able to participate, and able to help organize and run it."
 - "I think it should be integrated more with the rest of the conference, like in the same vicinity. That way, students don't have to go out of their way to find it, just pop in as convenient."
 - "It might help at future conferences if the space was a little larger and had greater visibility."
 - "Perhaps advertise that it is a good place for professionals to interact with students... or just have more than one mentor chat a day, as those who gave a talk tended to hang out throughout the week as well."

in there several times to plan our events, check e-mail, or just kill time until there was something else that needed to be done."

In a postconference survey (see above), 100% of respondents said the lounge should be a permanent part of the HFES annual meetings. Those students will be happy to know that George Mason University and the 2007 Host Committee are already planning the second Student Lounge.

Looking forward to "lounging around" in Baltimore! ☉

TECHNICAL GROUPS

Call for Nominations and Judges: User-Centered PDTG Award

By Dianne McMullin and Stan Caplan, Award Cochairs

The Product Design Technical Group (PDTG) welcomes your submissions for the Sixth Annual User-Centered Product Design Award. The award recognizes both product design and methods used to specify and achieve the design. Emphasis will be placed on innovative and user-centered approaches to human factors and industrial design.

Consideration is limited to products, software, or systems that are purchased for use in the home, in the workplace, or while

mobile. They include consumer, commercial, and medical products but exclude military equipment or systems. The product or system being nominated must be operational and capable of being marketed with no more than minimal changes. Products that have been on the market for more than three years will not be considered.

Nominations may be submitted for your own work or that of others. Award candidates must be members of HFES but do not have to be members of the PDTG. Detailed submission requirements, including the submission format, are shown on the PDTG Web site, <http://pdtg.hfes.org>.

The deadline for submitting nominations is *May 4, 2007*. Nominations should be submitted electronically to Dianne McMullin at dianne.l.mcmullin@boeing.com.

The winning product/system will be recognized at the 2007 Annual Meeting, and the awardees will be asked to present a talk on the product and methodology.

Call for Judges

An award selection committee consisting of a panel of judges drawn from the PDTG membership will evaluate the submissions. Judges may award multiple winners or a combination of winners and honorable mentions. Judging will be done by a predetermined systematic process and will take place in June.

Please contact Stan Caplan at scaplan@usabilityassociates.com for more information, or to volunteer for the award selection committee. ☉

Call for Article Ideas

By C. Melody Carswell, Editor

Ergonomics in Design is seeking contributions from authors on a number of topics identified as either underrepresented in recent volumes or of emerging interest to our readers. We are inviting submissions on any of the topics below in the form of either feature articles (3,000 words) or department articles (1,500 words). Please note that we continue to accept submissions on other topics related to the practice of human factors/ergonomics; however, submissions on any of the following or closely related topics will be given priority review and consideration.

- Maritime and rail travel issues
- Armor training or use of simulation in military training
- Electronic/video games and usability
- Comprehensive review of consumer electronics (good design versus poor design): new iPhone, iPod, hand-held navigational devices, cell phones, etc.
- Effects of fatigue on safety and productivity in the workplace
- Portable activity-monitoring devices for human factors investigations for longitudinal data collection using state-of-the-art algorithms and devices such as accelerometers, gyroscopes, and GSR
- Point-of-care devices
- Driver simulation research
- Comparative usability methodology
- Work on "culture-friendly" interfaces relevant to product globalization
- A series of case studies that document the problem, approaches to a solution, the solution, and cost-benefits

Of course, this list is not exhaustive of all the topics, controversies, or techniques we would love to see in our pages. If you have another topic in mind, please submit it as well. All articles will be reviewed by a primary and secondary reviewer, and we try to provide feedback within an eight-week period, depending on the specific need to find outside reviewers. Author guidelines may be found at <http://www.hfes.org/Web/PubPages/EIDGuidelines.pdf>.

Manuscripts should be submitted in electronic form (.doc format) to shoshana@hfes.org. For questions or to discuss article ideas, please e-mail me at cmcars@uky.edu, or relay the idea to any of the development editors, Jeff Kelley [jfkhfes@wellhost.com], John Shafer [jbshafer@stny.rr.com], or Dan Fisk [af7@mail.gatech.edu].

HFES 2007



Plan to attend the 51st Annual Meeting!

October 1–5, 2007

<http://www.hfes.org>

HFES 200 Technical Standards Committee Software Ergonomics Project

By Paul Reed, HFES 200 Chair

The HFES 200 Technical Standards Committee is working to establish HFES/ANSI 200 *Human Factors Engineering of Software User Interfaces* as an American National Standard using procedures approved by the American National Standards Institute (ANSI). The committee initiated consensus-building processes in July 2006 with the formation of a canvass committee consisting of key stakeholders, among whom are software producers, software users, and general-interest categories.

The initial review and ballot generated hundreds of comments from stakeholders. ANSI procedures require that every single comment must be addressed, and the comments from all stakeholders – along with the disposition of each comment – must be documented and distributed to all stakeholders for a second ballot. The HFES 200 Committee has addressed all the comments received by December 2006, and we plan to distribute a document containing the comments and the disposition of every comment to the stakeholders in March 2007. Based on largely favorable responses from ballots received during the first round of balloting, the committee is cautiously optimistic that the second ballot will result in approval of HFES 200 as an American National Standard.

The Society undertook the HFES 200 project following extensive participation in the development of international standards through the International Organization for Standardization (ISO). A key principle driving the HFES 200 Committee's contributions to ISO was the use of design guidance based on robust empirical findings and established industry practices. The objective of HFES 200 is to consolidate available design guidance to provide design requirements and recommendations that will lead to usability benefits such as increased ease of learning and ease of use of software, and accessibility benefits such as increased compatibility of assistive technology with available operating system software.

The HFES 200 software user interface standard consists of five parts:

- HFES-200.1: Introduction (Paul Reed, editor)
- HFES-200.2: Accessibility (Gregg Vanderheiden, editor)
- HFES-200.3: Interaction Techniques (Jim Williams, editor)
- HFES-200.4: Interactive Voice Response (IVR; Daryle Gardner-Bonneau, editor)
- HFES-200.5: Visual Presentation and Use of Color (Aaron Bangor, editor)

IN THE NEWS

Anthony D. Andre, professor at San Jose State University and principal of Interface Analysis Associates, was quoted in a February 4, 2007, *Los Angeles Times* article on the potential boom of the touch-screen computer market. He said that touch-screen interfaces could become so popular in the near future that developers might include them in just about anything, whether or not they are actually necessary.

Najmedin Meshkati, associate professor at the University of Southern California, wrote an op-ed piece in the January 23, 2007, edition of the *Houston Chronicle* about the British Petroleum Refineries' report on safety culture. The report, initiated after a 2005 explosion at a BP refinery in Texas, offered recommendations for strengthening safety culture. "In order to improve the safety problems of refineries, we need to improve the safety culture of this industry and proactively address human and organizational factors," he wrote.

Jack Stuster, vice president and principal scientist at Anacapa Sciences, is studying the diaries of astronauts, a CNN Web site article reported. He will use their entries to measure how spending six months in tiny spaces with just two other people can affect morale, outlook, and performance. This will help NASA and other space agencies to train astronauts for longer stays in space, reduce risks, and identify factors that will make expeditions successful. ☉

News

Engineering Web Site for Brainstorming

The National Academy of Engineering (NAE) has established a new Web site designed to collect ideas and establish a worldwide brainstorming session to determine the grand challenges for engineering during the next 100 years and beyond. The project is sponsored through a grant from the National Science Foundation.

A committee of NAE-selected leading technical thinkers will consider submitted ideas and look at research and innovation – either already being explored or which should be considered – that could help address aspects of each challenge. Anyone can provide ideas. All input will be considered, and the ideas will be shared in raw form on the Web site. The committee's conclusions will appear on the site and will also be presented at a public event in Washington, D.C., in September 2007.

For more information or to submit your ideas, visit <http://www.engineeringchallenges.com>. ☉

PEOPLE

Gavriel Salvendy, professor at Purdue University and dean of the Industrial Engineering Department at Tsinghua University, received the 2006 Chinese Friendship Award, the highest science

and technology award in China. The award followed a meeting with Premier Wen Jiabao, where the two discussed the role of HF/E in furthering the economic revitalization of China.

Eugene I. Farber died in July 2006. Gene enhanced human factors engineering with his many contributions to motor vehicle design and traffic safety. He obtained a B.A. in psychology from Pennsylvania State University in 1957. His work at the Franklin Institute Research Laboratories is perhaps best remembered for his studies of the passing abilities of drivers on two-lane roads, which highlighted the fact that drivers have great difficulty making those judgments safely because of their perceptual limitations in estimating the closing rate with an oncoming vehicle. He joined the Safety Research Department of Ford Motor Company in 1971, where he directed research on visibility, lighting, and crash avoidance and contributed to the ergonomic design of vehicles. He was a leading researcher on the development of a comprehensive computer simulation of driver visibility in night driving that could be used as a tool to evaluate the performance and design of headlamp beams and other facets of the night driving environment. Later he became involved in driver information systems such as navigation systems, adaptive cruise control, and obstacle avoidance warning systems. He chaired the Society of Automotive Engineers Safety and Human Factors Committee and was involved in other standards organizations. He retired from Ford in 1999; moved with his wife of many years to the Washington, D.C., area to be near his children; and pursued an active practice as an expert witness. Gene was also a bit of a *bon vivant*, with an excellent taste for wine and knowledge of the best restaurants wherever HFES meetings took place.

– Rudolf Mortimer ☉

SHORT COURSES

Basics of Industrial Engineering, April 2–4, 2007, Orlando, FL. University of Wisconsin-Madison, Department of Engineering Professional Development, 432 N. Lake St., Madison, WI 53706; 800/462-0876, fax 608/263-3160; <http://epdweb.engr.wisc.edu/index.lasso>.

Ergonomic Quality in Facility Design, April 11, 2007, Seattle, WA. NIOSH Northwest Center for Occupational Health & Safety, 4225 Roosevelt Way NE, Ste. 100, Seattle, WA 98105, 206/543-1069, fax 206/685-3872, ce@u.washington.edu, <http://depts.washington.edu/ehce/NWcenter/schedule.html>.

Role of Warnings and Instructions, April 11–13, 2007, Madison, WI. University of Wisconsin-Madison, Department of Engineering Professional Development, 432 N. Lake St., Madison, WI 53706; 800/462-0876, fax 608/263-3160; <http://epdweb.engr.wisc.edu/index.lasso>.

Ergonomics Evaluation, April 16–20, 2007, Raleigh, NC. Ergonomics Center of North Carolina, 3701 Neil St., Raleigh,

NC, 27607; 919/515-2052, fax 919/515-8156, <http://www.TheErgonomicsCenter.com>.

Certified Safety Professional Review Course, April 23–27, 2007, Chapel Hill, NC. Occupational Safety and Health Education and Research Center, University of North Carolina, P.O. Box 16248, Chapel Hill, NC 27516-6248; 888/235-3320, fax 919/966-7579; osherc@unc.edu, <http://www.sph.unc.edu/osherc/ce.htm>.

Putting Ergonomics into Practice, May 1–4, 2007, Columbus, OH. Gary Allread, Institute for Ergonomics, The Ohio State University, 1971 Neil Ave., 210 Baker Systems, Columbus, OH 43210, 614/292-4565, ergonomics@osu.edu, <http://ergonomics.osu.edu/>.

Practical Solutions in Office Ergonomics, May 16, 2007, Raleigh, NC. Ergonomics Center of North Carolina, 3701 Neil St., Raleigh, NC 27607; 919/515-2052, fax 919/515-8156, <http://www.TheErgonomicsCenter.com>.

Principles of Ergonomics, May 21–24, 2007, San Diego, CA. OSHA Training Institute, University of California at San Diego, 404 Camino del Rio S. #102, San Diego, CA 92108, <http://osha.ucsd.edu>.

Principles of Ergonomics, June 19–21, 2007, Brighton, MI. Great Lakes Regional OSHA Education Center, 2000 Huron River Dr., Ste. 101, Ypsilanti, MI 48197, 734/487-2259, fax 734/481-0509, <http://www.emuosha.org>. ☒

Announcement deadlines: First day of the month prior to the desired issue; for events or deadlines within the first three weeks of a month, send information at least two months in advance. Items are published according to space availability. A more detailed Event Calendar is available at <http://hfes.org>.

★ **American Occupational Therapy Association 86th Annual Conference and Expo**, April 27–30, 2006, Charlotte, NC. AOTA, 4720 Montgomery Ln., Bethesda, MD 20814-3425, 301/652-6611 x 2715, fax 301/652-3218, <http://www.aota.org/nonmembers/area28/links/link01.asp>.

★ **International Conference on Inclusive Design**, April 2–4, 2007, London, UK. <http://www.bhrc.rca.ac.uk/programmes/include/2007/index.html>.

★ **Human Performance, Situation Awareness, and Automation (HPSAA III) Technology Conference**, April 3–6, 23, 2007, Cocoa Beach, FL. Mustapha Mouloua, Conference Chair, Dept. of Psychology, P.O. Box 1390, Orlando, FL, 32816, 407/823-2910, fax 407/823-5862, mouloua@pegasus.cc.ucf.edu, <http://faculty.erau.edu/hpsaa/>.

★ **2007 Florida Student Conference on Human Factors and Applied Psychology**, April 5, 2007, Embry-Riddle Aeronautical University, Daytona Beach, FL. 386/226-6790, fax 386/226-7050, dbstconf@erau.edu.

★ **2007 International Conference on Acoustics, Speech and Signal Processing**, April 15–20, 2007, Honolulu, Hawaii. Institute of Electrical and Electronics Engineers, info@icassp2007.com, <http://www.icassp2007.org>.

★ **2007 Society of Automotive Engineers World Congress**, April 16–19, 2007, Cobo Center, Detroit, MI. Society of Automotive Engineers World Headquarters, 400 Commonwealth Dr., Warrendale, PA 15096, 724/776-4841, mjena@sae.org, <http://www.sae.org/congress>.

★ *Indicates new listing* ☒

Missouri Western State University
Department of Psychology
Faculty Position in Human Factors Psychology

The Department of Psychology at Missouri Western State University invites applications for a tenure-track Human Factors Psychologist to begin August 2007 or January 2008. A Ph.D. is required. The candidate will be instrumental in helping to develop a new graduate option in Human Factors and Usability Testing as part of a Masters of Applied Science degree. Candidates will be considered at any rank, but all candidates must demonstrate potential for an active research program suitable for Master's level students. The position will entail teaching graduate courses in human factors research and user-centered design methods, as well as undergraduate and graduate classes in the candidate's area of expertise. Candidates will be expected to supervise student internships and theses, and develop and maintain relationships with local and regional businesses for internship purposes.

Qualified applicants must submit a letter of application, statement of teaching interests, evidence of teaching effectiveness, representative publications or technical reports, vita, transcripts, and at least three confidential letters of reference to Human Resources, Missouri Western State University, 4525 Downs Dr., St. Joseph, MO 64507. Visit our Web site at www.missouriwestern.edu. Review of applications will begin March 30, 2007. To receive full consideration, please submit your materials by April 5, 2007. AA/EOE



NEW!

Reviews of Human Factors and Ergonomics, Volume 2

Volume 2 of *Reviews of Human Factors and Ergonomics* presents eight reviews of current topics of practical significance to human factors/ergonomics (HF/E) researchers and practitioners and anyone interested in the design of user-centered devices, systems, and processes. Each chapter provides implications for future research and real-world applications. Topics include situation awareness, crew resource management training, representation aiding, usability assessment methods, divergent visual needs in user-centered computing, multidimensional aspects of slips and falls, hearing in noise, and design of effective warnings.

About the Series

Each review in each volume of *Reviews of Human Factors and Ergonomics* covers a specific topic of timeliness and importance for HF/E researchers and practitioners. Volumes are broader in scope than handbooks and deeper in detail than encyclopedias, and they include both discipline-oriented and problem-oriented chapters. As it develops, the *Reviews* series will constitute an increasingly broad coverage of the entire field, establishing itself as the primary reference for an overview summary and status review of central HF/E topics – one that is important to students, researchers, practitioners, and the informed public.

About the Editor

Robert C. Williges is the Ralph H. Bogle Professor Emeritus of Industrial and Systems Engineering at Virginia Polytechnic Institute and State University. Williges was president of the Human Factors and Ergonomics Society and president of Division 21 of the American Psychological Association. He is a past editor of *Human Factors*, has authored more than 275 scientific publications, and has given more than 190 technical presentations at scientific meetings.

ISBN 0-945289-27-8, 300 pages, 6 x 9", paperback. \$80 HFES members, \$95 non-members, plus shipping/handling. Order online at <http://hfes.org/Publications> or contact HFES at 310/394-1811, fax 310/394-2410, store@hfes.org.

Reviews of Human Factors and Ergonomics

VOLUME 2
Edited by
Robert C. Williges

PUBLISHED BY THE HUMAN FACTORS AND ERGONOMICS SOCIETY

Bulletin

Volume 50, Number 3 March 2007

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Send address changes to the *HFES Bulletin*,
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310/394-1811, fax 310/394-2410, <http://hfes.org>

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FLASH!

Election reminder! Nomination ballots for officers and at-Large Executive Council members will be mailed March 28. Completed ballots are due at the HFES Central Office on April 25.

Midyear Meeting – The Executive Council Midyear Meeting will take place April 19–21 at the Marriott Courtyard Baltimore Downtown/Inner Harbor Hotel.

HFES/IDSA MiniConference – HFES is cosponsoring a two-day conference on May 1–2 in Washington, D.C., on human factors and industrial design issues in home health care for the aging. See page 2 for details.

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