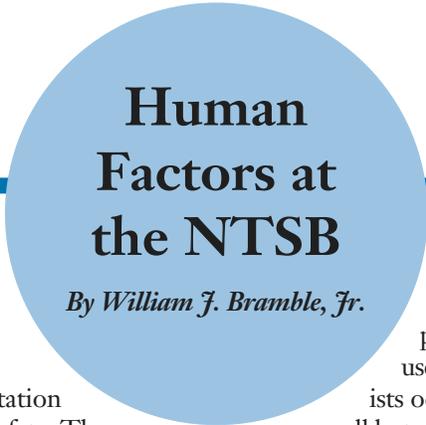




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## Human Factors at the NTSB

*By William J. Bramble, Jr.*

*Note: Periodically the HFES Bulletin will feature work by HFES members in a variety of settings. The following article was invited by the Communications Department staff.*

I work for the U.S. National Transportation Safety Board's (NTSB's) Office of Aviation Safety. The NTSB is an independent federal agency charged with, among other things, investigating and determining the probable cause of all civil aircraft accidents in the United States. (It also investigates nonmilitary, nondefense public aircraft accidents, and investigates certain major accidents in other modes of transportation as well.)

I am a recent graduate of a human factors psychology program at the University of Central Florida (UCF). Having been in the work force as a human factors Ph.D. for only four years, I am still at the beginning of my career. However, my experiences and perspective may be of interest to others who are mapping their programs of study or are about to enter the job market.

### The Human Factors Investigator's Role

In 2002, after working with NTSB as a transportation research analyst, I stepped into the role of human performance investigator. My day-to-day responsibilities include participating in major aircraft accident investigations as a member of the rapid response aviation "go team," writing investigative reports, and aiding in the development of safety recommendations. In less than a year, I have supported two regional investigations, participated in two major aviation accident investigations, and championed a general aviation safety proposal. Working as an NTSB investigator has been exciting. It has provided direct exposure to real-world aviation problems and challenged me to learn new skills, some of which are very different from the skills needed to perform well in the laboratory.

During a major accident investigation, a human performance investigator is one of many NTSB specialists who make up a go team led by an investigator-in-charge. A full go team includes at least eight investigative specialists. Areas of specialization include aircraft structures, aircraft systems, power plants, vehicle performance, air traffic control, weather, operational factors, human performance, and survival factors. The teams are heavily weighted with engineers and are supported from headquarters by additional specialists in such areas as vehicle recorders and metallurgy.

Most go team members chair their own working groups, which include representatives of outside organizations. Such organizations represented in the groups commonly include the Federal Aviation Administration, the airline, the pilots' union,

and aircraft and engine manufacturers. With the exception of the FAA, outside members serve at the pleasure of the NTSB and must possess some knowledge, skill, or resource that is useful to the agency. Human performance specialists occasionally chair their own working group as well but are otherwise attached to the Operational Factors Working Group, chaired by a former airline captain.

At the beginning of an investigation, attention is focused on the most perishable evidence. Because human memories are among the most perishable forms of evidence, interviews are typically the first order of business. Live witnesses are usually found at locations other than the crash site. For this reason, human performance investigators (and operational factors investigators) spend relatively little time there. After a brief visit and participation in an initial organizational meeting with the other group chairs, the human performance investigator departs the crash site and heads to a local hospital (if there are surviving crew members), the accident airplane's departure airport, crew bases, company offices, or the homes of next of kin.

Like memories, biological specimens are also highly perishable. The human performance investigator often coordinates with the airline, local medical examiner, and NTSB Transportation Disaster Assistance office to ensure that appropriate biological specimens are collected from key personnel for toxicological screening. Such screening helps determine whether the performance of key individuals may have been impaired by alcohol, prescription medication, or other drugs.

After the most perishable data are collected, the investigator examines preliminary findings to identify instances in which the performance of key personnel may have deviated from desired performance. Then the investigator assesses the contribution of these

*continued on page 6*

## Executive Council Midyear Meeting

The 2003 Midyear Meeting of the HFES Executive Council will be held April 24-26 in Santa Monica, California. Members who are not part of the Executive Council and are interested in attending should contact HFES Executive Director Lynn Strother at 310/394-1811, fax 310/394-2410, [lynn@hfes.org](mailto:lynn@hfes.org).



## Family Planning in Graduate School

By *Melanie Diez*, HFES Bulletin Student Views Editor

Many students in graduate school are faced with the difficult decision of when to start a family. Although there are several advantages to having a child in graduate school, many moms-and-dads-to-be worry about their ability to balance school and a baby. With that in mind, I offer a few suggestions that helped me make the transition from student to mother.

*Consider discussing your plans with your adviser.* If you have a reasonably close relationship with your adviser, consider letting him/her know you are thinking of starting a family. In many cases, your adviser faced the same decision while in graduate school and knows first-hand what to expect. Your adviser might even suggest the best time to take a leave of absence with respect to your program of study. By giving your adviser a heads-up, you avoid possible snags later on when you ask for time off or wonder where your funding went upon your return. If you are going to be a new father, an open relationship with your adviser can be a benefit when you have to stay home unexpectedly or bring Junior onto campus with you.

*Be flexible. Be prepared for anything.* Pregnancy is nine months long, but many women falsely believe that they won't see a real change in lifestyle until the third trimester when the physical changes are most visible. Keep in mind that no woman can predict how her pregnancy will affect her (especially first-time moms). Some women breeze through all nine months with nary a twinge while others suffer from every symptom in the book. Play it safe by limiting your nonessential commitments. Think of the next few months as an opportunity to "wind down" and resist the urge to take on new projects. Enlist your spouse or other family members and friends to help out at home so that you can get more rest. Dads-to-be should make themselves as accessible as possible to their partners, especially toward the due date. If this involves a cell phone, do your professors and colleagues the courtesy of telling them why they may suddenly be interrupted by your mobile phone.

*Set a goal to finish big projects before baby arrives.* The logic behind this suggestion is based on the assumption that you won't have time to do anything else (nor will you want to) once baby is born. In my case, I took my comprehensive exams ten days before I delivered. Though I would not recommend timing things so close, I must admit that studying for the exams during my third trimester prevented me from dwelling on the inevitable birth. Further, the anticipation of having a baby helped put things in perspective; after all, it was only a test. And once the baby came, I was free to enjoy my time with him completely, having fulfilled my immediate academic obligations.

*Take some time off after the baby is born.* Few lifestyles are as forgiving as that of the academic. Take advantage of that. Student moms might dread the thought of prolonging graduation another six months or a year, but the fact is that most employers don't look at how long it took to get a degree. Most schools have published policies for leaves of absence. Find out how much time you can take off without having to reapply to your program. Then take the time off guilt free and enjoy your baby. Student dads should also take advantage of their flexible schedules once baby arrives. Paternity leave is a lot harder to come by in the "real world."

*Once you return to school, try to schedule all of your meetings and classes on one or two days.* This suggestion is easiest if you have finished the bulk of your classes and your thesis is just on the horizon. If you can consolidate your on-campus commitments into one or two days, this is the best of both worlds. Unfortunately this arrangement depends on a lot of things, including the type of research you do, your adviser's expectations, and your ability to find part-time day care. Neighbors and relatives may be more willing to babysit if it is only once or twice a week.

*At the very least, use this life-altering event as an opportunity for professional growth.* You will be amazed at how baby products are poorly designed. Reading a car seat installation manual, for instance, is enough to spur anyone to write a strongly worded letter to the manufacturer. Take this opportunity to explore the world from a different point of view: as a pregnant woman trying to get in and out of a car, as a new dad assembling a crib, and as a baby exploring a mobile that only looks attractive from above instead of below. These and so many other instances will remind you why the world needs human factors professionals. Between the exersaucers, diaper genies, swings, mobiles, monitors, and infant carriers, you will discover the baby product industry is ripe for an ergonomics overhaul. My advice is to make use of those comment cards that accompany every baby product you buy and let the manufacturers know what they are doing wrong. Maybe one of them will listen to you. Who knows? Maybe one of them will hire you.

*In an effort to better reflect the intent of the student column, we are changing the name from Student News to Student Views. Students are encouraged to submit brief articles (500 words) that reflect their experiences and perspectives. Possible topics include internship adventures, campus initiatives to raise awareness, and teaching activities. Articles can be submitted year-round. Please contact Melanie Diez, Student Views Editor, at [mdiez@gmu.edu](mailto:mdiez@gmu.edu) for more information.*



### Bulletin

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## EID Marks Its Tenth Year

By *John F. (Jeff) Kelley, Editor*

*Ergonomics in Design* is 10 years old! I am very excited to be a part of *EID*'s mission during this celebration of our 10th anniversary. During the past decade, we have been bringing what I'm sure you'll agree is real value to the practice of human factors/ergonomics. We have done and will continue to do this in two major ways.

First, *EID* has brought us a much-needed channel for practitioners in our calling, fermenting a community and a forum for collegial exchange. Our magazine is a bridge among the 20 or so disciplines that make up our field. Second, *EID* has demonstrated its great promise as an effective outreach tool. To nonpractitioners, managers, and potential consumers of our work, we offer technically sound expositions of the best of our ideas presented in an accessible, attractive, and compelling format.

Our authors and reviewers have made this magazine the success that it is. For that, the entire editorial staff express our sincere appreciation. We'd also like to extend an invitation to you to join us in expressing this gratitude in a special advertising display. In the Summer and Fall 2003 issues, we will dedicate space for small congratulatory ads. Help us celebrate and show our readership the pride we all feel to be a part of this singular, dedicated community. The special rate for these sixth-page anniversary ads is \$350 (\$200 off the regular rate). Please contact Lois Smith at HFES (lois@hfes.org, 310/394-1811) for dimensions and deadlines.

Thank you for being a part of our success! We've got plenty more in store for the next 10 years!

### IN THE NEWS

Peter Earnest, executive director of the International Spy Museum, 800 F St. NW, Washington, DC, "knows all the secrets about the practical, everyday applications of subterfuge," according to Editor E. Socha of *Washington Technology* magazine. In an interview in the January 13, 2003, issue, Mr. Earnest, a 36-year veteran of the CIA, asserted that "the practical applications (of spying) are infinite. The skills of spying can serve anyone seeking to find out information or data that is not overtly available or is otherwise denied them." His most telling revelation, apropos of nothing: "Human engineering, as you probably already know, is how most hackers covertly elicit unwitting individuals' passwords."

We suspect Ms. Socha actually didn't know that. We certainly didn't. (At some future time, though, it could evolve into a non-degreed specialty, with its very own TG.) Yeah, sure it could!

— Submitted by *John Duddy*

**Najmedin Meshkati** was quoted in a January 19 *Los Angeles Times* article on a rail crossing in Burbank, CA, that has the highest number of train-auto collisions in the six-county Metrolink com-

muter rail network. Meshkati explained that the crossing is poorly marked, with no clear indication of where to stop, therefore making it confusing to drivers.

### PEOPLE

**Robert W. Swezey**, a nationally recognized industrial/organizational psychologist, died November 30 at his home in Leesburg, Virginia, after a courageous battle with cancer. Bob was president and founder of InterScience America, Inc. He had over thirty years' experience in instructional systems technology, simulation, and human factors engineering. His expertise in those areas has left a mark on many of us who knew him.

Bob was a Fellow of the Human Factors and Ergonomics Society, the American Psychological Association, the Washington Academy of Sciences, and the American Psychological Society. He was an author or editor of five books and more than 150 journal articles and reports on ergonomics, training, and instructional technology topics. He most recent contribution was coeditor with Dee Andrews of *Readings in Training and Simulation: A 30-Year Perspective*. He held a Ph.D. in industrial psychology from the University of Maryland.

Bob was also past president of the Society of Applied Experimental and Engineering Psychology, a division of the American Psychological Association. He delivered the presidential address to this group in August 2001. He was a member of the editorial board of the journals *Human Factors* and *Human Factors and Ergonomics in Manufacturing*, and he served for 10 years as an adjunct full professor in the psychology and engineering administration departments at George Washington University. He testified before the U.S. Congress. He is listed in numerous *Who's Who* and biographic references and has presented invited papers and addresses at more than 40 conferences and symposia in the United States, Scotland, Netherlands, Sweden, Germany, Canada, and Argentina.

On a personal note, Bob and I worked together for more than 25 years. Sometimes Bob worked for me, sometimes I worked for Bob. The friendship that developed over those years transcended our working relationship. His high standards and commitment to excellence could make for tense moments and looming deadlines. However, our profession has lost someone important.

— *John Brock*

**Randolph Bias** has left Austin Usability to become an associate professor in the School of Information at the University of Texas at Austin. He will continue to serve as an independent consultant while teaching usability engineering, human-computer interface design, research methods, and statistics. Contact him at School of Information, University of Texas at Austin, Austin, TX 78712; 512/471-7046(w) 512/657-3924 (c), 512/836-0845 (h), fax 512/471-3971; rbias@school.utexas.edu.

## National Medal of Technology

Nominations are invited for the National Medal of Technology, the U.S. equivalent to the Nobel Prize. The Medal is given annually to individuals, teams, or companies for accomplishments in the innovation, development, commercialization, and management of technology, as evidenced by the establishment of new or significantly improved products, processes, or services. Nominations are due May 23, 2003.

Nominations forms may be obtained from <http://www.ta.doc.gov/medal>. Contact Mildred Porter, Director, National Medal of Technology, U.S. Department of Commerce, 1401 Constitution Avenue, N.W., Room 4226, Washington, D.C. 20230; 202/482-5572; [nmt@ta.doc.gov](mailto:nmt@ta.doc.gov).

## Anthropometrist McConville Dies

By John Brock

John T. McConville, retired president of Anthropology Research Project (now Anthrotech), died unexpectedly on November 25, 2002, of a massive heart attack. McConville, who had a long and distinguished career in the field of applied physical anthropology, helped improve the design and sizing of military clothing, personal protective equipment, and a variety of military and civilian workspaces.

Among his many achievements was the ground-breaking 1988 anthropometric survey of 9000 Army personnel, still the definitive source of reliable body size data for all U.S. military services and many civilian groups. The design and methodology used in that survey has served as a model for most anthropometric studies since that time.

McConville worked with NASA in the 1970s to assemble a worldwide anthropometric database to help accommodate women and ethnic minorities in the astronaut corps. He developed techniques for applying head and face anthropometric data to face forms for the development of respirators as well as for many civilian applications.

Earlier in his career McConville, working with the late Charles Clauser, former chief of the Anthropology Branch of the Aerospace Medical Laboratory at Wright-Patterson Air Force Base, conducted pioneering studies for the Federal Aviation Administration on body segment mass properties; this work formed the basis for crash simulations used in aviation and automobile design for many years and led directly to the development of more accurate crash test manikins for adults and children. ☒

## INSIDE HFES

## Update Your Member Record

Updating the information in your member record is simple. Log on to <http://hfes.org> and enter the Members Only Log-In section by entering your last name and membership number (on the mailing label of this issue). Select "Enter the Member Directory," then "Review or update your membership information." The corrections will be entered into the membership database by around the first or fifteenth of the month following your submission.

## Nomination Ballots

Ballots for nominating 2003-2004 officers and at-large Executive Council members will be mailed in March to all full Members and Fellows. If you have not received your ballot by the end of March, please call the Member Services Department at 310/394-1811 or send e-mail to [stefanie@hfes.org](mailto:stefanie@hfes.org). ☒

## CALLS FOR PAPERS

## Display Research Conference

Abstracts are invited for the Society for Information Display 23rd International Display Research Conference, to be held September 15-18, 2003, in Phoenix, AZ. Abstracts are due *April 25, 2003*. Contact Ralph Nadell, Palisades Convention Management, 411 Lafayette St., Ste. 201, New York, NY 10003; 212/460-9700, fax 212/460-5460; [rnadell@pcm411.com](mailto:rnadell@pcm411.com), <http://www.sid.org/conf/idrc2003/idrc2003.html>

## SAFE Association

Abstracts, workshop, and demonstration proposals are invited for the SAFE Association 2003 Annual Symposium, to be held September 22-24, 2003, in Jacksonville, FL. Areas of interest include simulation, testing methods, and human factors. Abstracts, workshop, and demonstration proposals are due *June 20, 2003*. Contact SAFE Association, P.O. Box 130, Creswell, OR 97426-0130; 541/895-3012, fax 541/895-3014; [safe@peak.org](mailto:safe@peak.org), <http://www.safeassociation.com>.

## Interdisciplinary Safety Conference

Saint Louis University's Parks College of Engineering and Aviation invites abstracts for its Safety Across High-Consequence Industries Conference, to be held March 9-11, 2004, in St. Louis, MO. The conference will explore the common need to enhance safety in the seemingly disparate areas of aviation, health care, and industrial fields. Abstracts are due *June 15, 2003*. Contact Manoj. S. Patankar, Dept. of Aviation Science, Saint Louis University, Parks College of Engineering and Aviation, 3450 Lindell Blvd., Saint Louis, MO 63103; 314/977-8355, fax 314/977-8388; [patankar@slu.edu](mailto:patankar@slu.edu), <https://www.slu.edu/servlet/TestPilot3/colleges/parks/msasm/aviation/tp3>.

## Ergonomics Society Annual Conference

Abstracts and workshop proposals are invited for the Ergonomics Society 2004 Annual Conference, to be held April 14-16, 2004, in Swansea, UK. The conference covers all areas of ergonomics research and application and is intended for all ergonomists, human factors professionals, and those with related interests. Abstracts and workshop proposals are due *August 22, 2003*. Contact Annual Conference Programme Secretary, Ergonomics Society, Devonshire House, Devonshire Square, Loughborough, Leicestershire LE11 3DW, UK; 44 0 1509 234904, fax 44 0 1509 235666; [ergosoc@ergonomics.org.uk](mailto:ergosoc@ergonomics.org.uk). ☒

## SHORT COURSES

**65th Technical Management Program** (March 23–28, 2003, Los Angeles, CA). UCLA Extension, Short Course Program Office, 10995 Le Conte Ave., Ste. 542, Los Angeles, CA 90024-2883; 310/825-3344, fax 310/206-3223; shortcourses@uclaextension.org, <http://uclaextension.org/shortcourses>.

**Clear Writing for Safety and Health Professionals** (March 25–26, 2003, Seattle, WA). Department of Environmental Health Continuing Education, University of Washington, 4225 Roosevelt Wy. NE, #100, Seattle, WA 98105; 206/543-1069, fax 206/685-3872; ce@u.washington.edu, <http://depts.washington.edu/ehce/>.

**Certified Safety Professional (CSP) Review Course** (April 7–11, 2003, Chapel Hill, NC). Occupational Safety and Health Education and Research Center, University of North Carolina, 3300 Hwy. 54 W., Chapel Hill, NC 27516-8264; 888/235-3320, fax 919/966-7579; oshercww@sph.unc.edu, <http://www.sph.unc.edu/osherc/>.

**Assessing Ergonomic Hazards in the Workplace** (April 23, 2003, Seattle, WA). Department of Environmental Health Continuing Education, University of Washington, 4225 Roosevelt Wy. NE, #100, Seattle, WA 98105; 206/543-1069, fax 206/685-3872; ce@u.washington.edu, <http://depts.washington.edu/ehce/>.

**Project Risk and Opportunity Management** (May 16, 2003, Los Angeles, CA). UCLA Extension, Short Course Program Office, 10995 Le Conte Ave., Ste. 542, Los Angeles, CA 90024-2883; 310/825-3344, fax 310/206-3223; shortcourses@uclaextension.org, <http://uclaextension.org/shortcourses>. ☒

## CALENDAR

*Announcement deadlines: 1st day of the month prior to the desired issue; for events or deadlines within the first 3 weeks of a month, send information at least 2 months in advance. Items are published according to space availability.*

★ **4th European Convention in Safety Promotion and Injury Control**, April 10–11, 2003, Paris, France. ECOSA, P.O. Box 75169, 1070 AD Amsterdam, Netherlands; 31 20 5114513, fax 31 20 5114510; ecosa@consafe.nl, <http://www.ecosa.org>.

★ **12th International Symposium on Aviation Psychology**, April 14–17, 2003, Dayton, OH. Terri Mileo, Wright State University, Director Conferences and Events, E180 Student Union, 3640 Colonel Glenn Hwy., Dayton, Ohio 45435-0001; 937/775-5512, fax 937/775-5517; theresa.mileo@wright.edu, <http://www.wright.edu/icap>.

**145th Meeting of the Acoustical Society of America**, April 28–May 2, 2003, Nashville, TN. Acoustical Society of America, Ste. INO1, 2 Huntington Quad, Melville, NY 11747-4502; 516/576-2360, fax 516/576-2377; asa@aip.org, <http://asa.aip.org>.

**Society for Information Display '03**, May 18–23, 2003, Baltimore, MD. Frank Libsch, Conference Chair, IBM T.J. Watson Research Center, P.O. Box 218, Route 134, Yorktown Heights, NY 10598-0218; libsch@us.ibm.com; <http://www.sid.org>.

**State-of-the-Art Research Symposium: Perspectives on Musculoskeletal Disorder Causation and Control**, May 21–22, 2003, Columbus, OH. National Institute for Occupational Safety and Health

and the Institute for Ergonomics at the Ohio State University, 1971 Neil Ave., 210 Baker Systems, Columbus, OH 43210; 614/292-4565, fax 614/292-7852; ergonomics@osu.edu, <http://osuergo.eng.ohio-state.edu/Institute/index.htm>.

**SEGD 2003 Annual Conference & Expo**, May 28–31, 2003, Las Vegas, NV. Society for Environmental Graphic Design, 1000 Vermont Ave., NW, Ste. 400, Washington, DC 20005; 202/638-5555; segd@segd.org, <http://www.segd.org>.

★ **American Psychological Society 15th Annual Convention**, May 29–June 1, 2003, Atlanta, GA. APS, 1010 Vermont Ave., NW, Ste. 1100, Washington, DC 20005-4907; 202/783-2077, fax 202/783-2083; convention@aps.washington.dc.us, <http://www.psychologicalscience.org>.

★ **6th International Congress on Work Injuries Prevention, Rehabilitation, and Compensation**, June 8–11, 2003. WorkCongress6 Secretariat, INAIL, Directorate of Communication, Piazzale Giulio Pastore 6, 1-00144 Rome RM, Italy; 39 06 5478 2115/5607/5608, fax 39 06 5487 2019; secretariat@workcongress6.org, <http://www.workcongress6.org>.

★ **SAE Digital Human Modeling for Design and Engineering Conference & Exhibition**, June 16–19, 2003, Montreal, Quebec, Canada. John R. Miller, 755 W. Big Beaver Rd., Ste. 1600, Troy, MI 48084; 248/273-2464, fax 248/273-2494; jmiller@sae.org, <http://www.sae.org/dhmc>.

★ **ASSE Professional Development Conference & Exposition**, June 22–25, 2003, Denver, CO. ASSE, 33477 Treasury Center, Chicago, IL 60694-3400; 847/699-2929, fax 847/768-3434; <http://www.asse.org>.

**2nd International Driving Symposium on Human Factors in Driving Assessment, Training, and Vehicle Design**, July 21–24, 2003, Park City, UT. Kathy Holeton, University of Iowa/PPC, 223 South Quadrangle, Iowa City, IA 52242; 319/335-6804, fax 319/335-6801; kathy-holeton@uiowa.edu, <http://ppc.uiowa.edu/driving-assessment>.

**XVth Triennial Congress of the International Ergonomics Association**, August 24–29, 2003, Seoul, Korea. Gangnam P.O. Box 467, Seoul, 135-146, Korea; +82 2 552 8350, fax +82 2 552 8325; info@iea2003.org, <http://www.iea2003.org>.

**10th International Conference for Vision in Vehicles**, September 6–10, 2003, Granada, Spain. VIV10, Institute of Behavioural Sciences, University of Derby, Kingsway House, Kingsway, Derby DE22 3HL, UK; tel/fax 44 0 1332 593131; ibs@derby.ac.uk; <http://ibs.ac.uk/viv/viv10.html>.

★ **SID 23rd International Display Research Conference**, September 15–18, 2003, Phoenix, AZ. Society for Information Display, 610 South 2nd St., San Jose, CA 95112-9896; 408/977-1013, fax 408/977-1531; office@sid.org, <http://www.sid.org/conf/idrc2003/idrc2003.html>.

★ **SAFE Association 41st Annual Symposium**, September 22–24, 2003, Jacksonville, FL. Jeani Benton, P.O. Box 130, Creswell, OR 97426-0130; 541/895-3012, fax 541/895-3014; safe@peak.org, <http://www.safeassociation.com>.

**HFES 47th Annual Meeting**, October 13–17, 2003, Denver, CO. Hosted by the Rocky Mountain Chapter. HFES, P.O. Box 1396, Santa Monica, CA 90406; 310/394-1811, 310/394-2410; info@hfes.org, <http://hfes.org>.

★ **Safety Across High-Consequence Industries**, March 9–11, 2003, St. Louis, MO. Manoj S. Patankar, Dept. of Aviation Science, Saint Louis University, Parks College of Engineering and Aviation, 3450 Lindell Blvd., Saint Louis, MO 63103; 314/977-8355, fax 314/977-8388; patankar@slu.edu.

★ **Ergonomics Society 2004 Annual Conference**, April 14–16, 2004, Swansea, UK. Annual Conference Programme Secretary, Ergonomics Society, Devonshire House, Devonshire Square, Loughborough, Leicestershire LE11 3DW, UK; 44 0 1509 234904, fax 44 0 1509 235666; ergosoc@ergonomics.org.uk.

★ *Indicates new listing.*



deviations to the overall sequence of events that led to the accident. Cockpit voice and flight data recordings are especially useful at this stage. When personnel are found to have made errors or violated established procedures, the investigator looks backward to identify factors that could have led to these behaviors. This process is aided by a working knowledge of human factors, and it may identify performance-shaping factors in any of the following areas:

- Behavioral factors, including attitudes, stress, or personal habit patterns
- Medical factors, including general health, sensory acuity, or chemical impairment
- Operational factors, including training, experience, currency, operating procedures, and policies
- Task factors, including information requirements, time pressure, and workload
- Equipment factors, including visibility, ergonomics, and the design of automation, displays, and controls
- Environmental factors, including time of day, weather, illumination, noise, and vibration

Data collected during the initial phase of an investigation are used to produce a human performance factual and analysis report. These two reports, in conjunction with the reports developed by other NTSB investigative specialists, are used by the investigator-in-charge and a professional writer to develop the major accident investigation report. Next, five presidential appointees who serve as members of the NTSB meet in public to review the report to determine whether it adequately documents the accident, draws reasonable conclusions, and contains appropriate safety recommendations. If the Board votes to accept the report, it is entered into the public record and its conclusions become the official government determination of an accident's circumstances and probable cause.

### **My Road to NTSB**

The nature and direction of my career were influenced by a couple of outstanding professors at UCF. My graduate adviser, Jeff Koonce, was a general aviation enthusiast and past president of the Association of Aviation Psychologists who had a passion for rigorous experimentation and a willingness to ask hard questions. Jeff claimed people were still mad at him over his dissertation research, which showed no incremental transfer of training benefit for simulator motion bases. Bob Kennedy, a measurement expert who has done pioneering work on vestibular function and surrogate performance measures for environmental research, was another great mentor of mine.

These men introduced me to aviation psychology and helped shape my perspectives on the field of human factors. With Jeff's assistance, I obtained an internship at FlightSafety International's Training Systems Division in Winter Park, Florida, in 1995. What began as an internship evolved into a continuing part-time job, and working at FlightSafety served as a complementary field exercise related to the academic material Jeff and Bob were feeding me on human factors, training, and psychological measurement.

By the fall of 1998, I was nearing the completion of my doctoral dissertation and needed full-time work. I was torn between working in academia or getting a job in industry. While attending an HFES Annual Meeting, I learned that the Safety Board's Office of Research and Engineering had an opening for a research analyst. I was drawn to the idea of working for the NTSB in any capacity. I thought of the NTSB as an exciting nerve center for applied aviation human factors. I applied for the job and was hired in January 1999, six months before I defended my dissertation. I worked as a transportation research analyst for the next three years, during which time I finished my dissertation, provided analytic and writing support for former Chairman Jim Hall's Child and Youth Safety Initiative, and served as primary author on two safety studies (*Public Aircraft Safety*, and *Transportation Safety Databases*). I also began taking flying lessons.

By the fall of 2001, I was eager to concentrate more exclusively on aviation projects, and the Office of Aviation Safety had announced an opening for a human performance investigator. Since 1983, NTSB human performance investigators have been responsible for identifying and classifying personnel failures contributing to the causation of aircraft accidents and for identifying factors leading to such failures. The job required a Ph.D. in a human-factors-related field and piloting or aviation-related work experience.

I deliberated for some time about whether to apply, worried that an investigator position would take me further away from the kind of research I was trained to conduct in graduate school. I also knew I would be trading a comfortable, predictable work environment for controlled chaos by moving from a role behind the scenes to a place on the front lines of the agency. After careful consideration, I applied for the job and transitioned to the new position last March.

This article provides a highly abbreviated discussion of the role human factors plays in the accident investigation process, but I hope it provides a small window on what I have found to be an exciting and rewarding career. Although the job of an aviation accident investigator entails being on call for extended periods and can be tiring and stressful, the knowledge that one's job improves the safety of everyday people by learning from past mistakes more than makes up for its occasional rigors. I highly recommend accident investigation, or any kind of forensic human factors work, as a career path for human factors specialists.

*William Bramble may be contacted at [bramblw@ntsb.gov](mailto:bramblw@ntsb.gov). Note: The views and opinions expressed in this article are those of the author and are not the official views of the National Transportation Safety Board.* ☒

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Communications Director: Lois Smith

Student Views Editor: Melanie Diez

Assistant Editor: Alexandra Sartor

Advertising: R. C. Bublitz & Associates,  
800/485-5029; dick-rcb@juno.com

## POSTMASTER:

Send address changes to the *HFES Bulletin*,  
Human Factors and Ergonomics Society,  
P.O. Box 1369, Santa Monica, CA 90406-1369 USA,  
310/394-1811, fax 310/394-2410.

General Information: [info@hfes.org](mailto:info@hfes.org)

Editorial/Advertising: [lois@hfes.org](mailto:lois@hfes.org)

Placement Service: [placement@hfes.org](mailto:placement@hfes.org)

Annual Meeting: [lois@hfes.org](mailto:lois@hfes.org)

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