

ISASI FORUM

“Air Safety Through Investigation”

OCTOBER–DECEMBER 2009



**This issue is devoted to
ISASI 2009 events**



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Lederer Award winners beam over their selection as the recipients of the highest ISASI award that is bestowed by the Society. Left to right, Capt. Richard B. Stone, ISASI; Richard Batt, ATSB; Award presenter ISASI President Frank Del Gandio; and Stewart Ross, ATSB. (Photo by E. Martinez)



Volume 42, Number 4

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ISASI Forum (ISSN 1088-8128) is published quarterly by International Society of Air Safety Investigators. Opinions expressed by authors do not necessarily represent official ISASI position or policy.

Editorial Offices: Park Center, 107 East Holly Avenue, Suite 11, Sterling, VA 20164-5405. Telephone (703) 430-9668. Fax (703) 430-4970. E-mail address isasi@erols.com; for editor, espmart@comcast.net. Internet website: www.isasi.org. ISASI Forum is not responsible for unsolicited manuscripts, photographs, or other materials. Unsolicited materials will be returned only if submitted with a self-addressed, stamped envelope. *ISASI Forum* reserves the right to reject, delete, summarize, or edit for space considerations any submitted article. To facilitate editorial production processes, American-English spelling of words will be used.

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Publisher’s Editorial Profile: *ISASI Forum* is printed in the United States and published for professional air safety investigators who are members of the International Society of Air Safety Investigators. Editorial content emphasizes accident investigation findings, investigative techniques and experiences, regulatory issues, industry accident prevention developments, and ISASI and member involvement and information.

Subscriptions: Subscription to members is provided as a portion of dues. Rate for nonmembers is US\$24 and for libraries and schools US\$20. For subscription information, call (703) 430-9668. Additional or replacement *ISASI Forum* issues: members US\$3, nonmembers US\$6.



'Accident Prevention Beyond Investigation'

By Frank Del Gandio, ISASI President

(President Del Gandio's September 15 opening remarks to the delegates of ISASI 2009 have been abbreviated. His entire presentation is available in ISASI Proceedings 2009, which will soon be placed on the ISASI website at www.isasi.org. —Editor)

Welcome to Orlando, hometown of our famous Mickey and his friends—land of adventure, magic, imagination, fun, and excitement. We are all characters of our own, and we are in this hall today in Orlando to participate in the 40th annual seminar of the International Society of Air Safety Investigators. When ISASI started, the adjective “international” was a bit presumptuous as ISASI was, in fact, only Jerry Lederer and a few close friends. Today ISASI is the premier professional society for accident investigators and for others whose work revolves around accidents and accident prevention.

ISASI now is truly international, with chapters and members from all over the world. Next year, for example, the annual seminar will meet for the second time in Asia, and we recently held the seminars in Australia and Halifax. We have aviation safety professionals here this week from all over the world. ISASI brings a rich mixture of perspectives from different continents, different cultures, and different national systems and aviation markets.

Every year I point out that the room is full of expertise, and this year is no different. Any students or entry-level professionals should take advantage of the expertise that is all around you. Professionals with extensive experience should also make certain they do not overlook the chance to learn

something. If you have a question about the details of a particular accident, or the subtleties of a particular aircraft system, or broader questions about the overall state of aviation safety, or some other topic, someone in this room can provide encyclopedic answers to your questions. In short, take advantage of the expertise that is here this week and share your own knowledge.

Our theme this year is “Accident Prevention Beyond Investigation.” It is a timely theme because the entire field of aviation safety is changing rapidly and in multiple ways. Start with the bottom line: fatal accidents. Both the rate for fatal accidents and the absolute number of fatal accidents are much lower today for airlines in most regions of the world than they were just a decade ago. I realize that major accidents have not gone away, and any talk about a nearly permanent zero accident rate is premature rhetoric, but we continue to move in that direction.

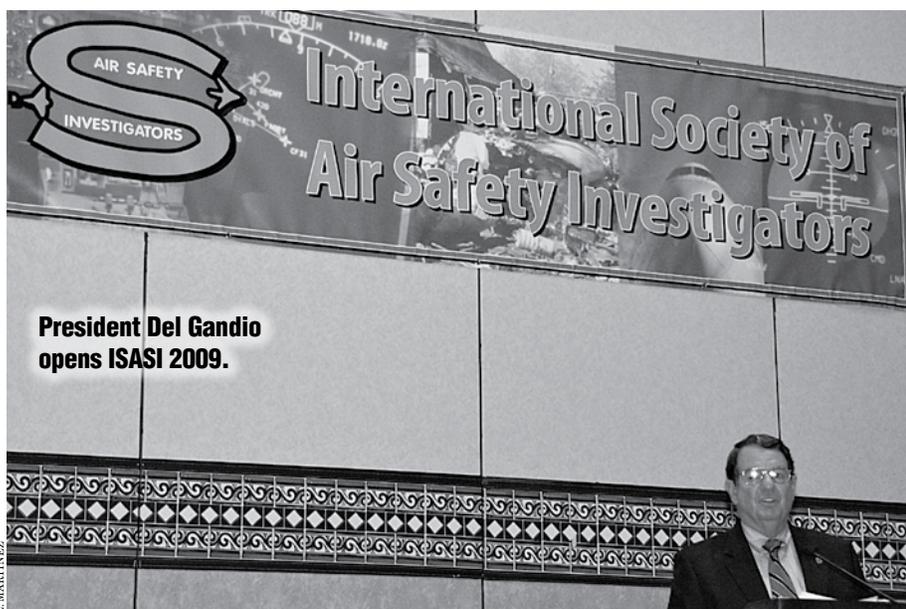
The world's airline industry has more than doubled in the past two decades, but fatal accidents have gone down by more than half with the important exception of sub-Saharan Africa. Safety officials in any other industry in the world economy would be thrilled to have numbers like that.

Most regions of the world also are seeing rapid improvements in general aviation. The U.S. experience in recent years is fairly representative. Just 15 years ago, we were still having close to 500 fatal accidents a year in general aviation and air taxi operations. This year we expect to end up at around 260;

again, down by nearly half, and one third of the remaining fatal accidents now involve amateur-built and other experimental aircraft. In short, among the fleet in which governments have a significant stake, the improvement in recent years has been dramatic.

Lots of factors explain these improvements, but technology is the primary explanation. Technology also is changing accident investigation. For starters, by greatly reducing the frequency of accidents, technology has reduced the demand for our services. It is that simple. In addition, it has changed the way that we do our work. More and more of the work is conducted off scene in laboratories, based on systems that continue to capture more and more data.

On-scene work will always be important,



PRESIDENT'S VIEW

Continued . . .

and we will continue to examine wreckage paths, impact foot prints, engine damage, and so on. But even in general aviation, more of our analysis is moving off scene, and that trend will continue for the foreseeable future. Technology has driven an even greater change in the broader field of accident prevention.

For several years now, we have had the benefit of systematic analysis of flight operations data, or "FOQA." We now are at a point where we can monitor well-documented precursors to several categories of accidents and take action before an accident occurs. For example, in the United States, we have begun to identify specific arrivals and approaches into specific airports where GPWS alerts and TCA resolution alerts are abnormally high. Similarly, we have identified areas in which unstable approaches are more common and in which long landings are more common, and so on. More to the point, we have been able to use these data to change local air traffic procedures, to change training and procedures within particular airlines, and to change emphasis areas within our safety inspection programs. All these efforts have reduced the risk of CFIT accidents, mid-air collisions, undershoots, runway excursions, etc.

These monitoring efforts are based largely on exhaustive analytical efforts that have examined hundreds of well-documented accidents from around the world in order to identify those parameters that we should and can measure, and these methodologies are changing accident prevention in a fundamental way. Few of the people who have conducted the analyses or who have undertaken the necessary analyses are accident investigators, but they understand accidents, concepts of risk, and overall safety performance.

This is the broader community and the intellectual framework in which accident investigation must work if we are to continue to make our contribution. Yet, at the same time, that broader community understands that it cannot avert every accident. My own country has had a rash of major accidents in the past 18 months or so. Most of those accidents have involved the usual suspects, like failure to monitor flight instruments, poor basic flying skills, maintenance issues, unstable approaches, management practices, and so on. Nevertheless, these data efforts have documented in detail the nature of those events and have reduced the risk and frequency of those events

Yet, analysis of selected parameters, even hundreds of parameters, will never anticipate accidents like the B-777 at Heathrow, or even the wrong runway takeoff at Lexington, because that work relies fundamentally on knowing what questions to ask



of the data. That is where accident investigation will continue to play a fundamental role in the system, by documenting and providing basic knowledge about the frequency with which well-understood failures continue to produce serious outcomes and by understanding and documenting new outcomes, such as the simultaneous failure of two jet engines at Heathrow.

The bottom line for accident investigation is both complicated and simple. It is complicated because we must recognize the changes that are taking place in the broader field of accident prevention. It is complicated because we need to become much more active with that broader safety community, and it is complicated because, to be honest, we have to show more intellectual respect for what that broader community brings to aviation safety and to accident prevention. In short, it is complicated because we need to recognize more directly a basic idea that we have always understood at some level: accident investigation is but one element, albeit a key element, in the ultimate mission of preventing and reducing accidents.

Yet, the bottom line for accident investigation also is quite simple. It is simple because accident investigation will remain the primary source for understanding accident scenarios about which we had known little or nothing, such as at Heathrow. It also will remain the primary source for documenting the frequency at which well-known risks continue to rear their ugly heads and lead to serious outcomes. In short, your work and the well-documented reports that you produce will continue to be the source material from which analysts begin to understand what questions they need to ask of the data.

In the end, our profession is changing as we speak. We will find ourselves working more and more actively with a broader safety community that often will bring a different perspective to the table. Yet, as we say in this country, the more things change, the more they remain the same. In the end, accident investigation will remain at the front end of accident prevention.

Before I close, I urge you to enjoy Florida while you are here. The Atlantic Ocean is just an hour away to the east, and the Gulf of Mexico is just an hour away to the southwest. In addition, of course, we have Orlando, which can keep you busy and entertained all week. You can start right here with the Disney property and work you way down.

Finally, ISASI extends its thanks to everyone who volunteered to put this seminar together. Special thanks go to Jamie Nichols and Antony Brickhouse, but we also thank those who worked on the Technical Committee, those who organized the Companions' Program, and those who handled the demanding work of sorting out the details for hotel rooms, catering, audio visuals, and the million other things that sponsoring a seminar like this demands. We extend our thanks to everyone.

I encourage everyone to thank members of the Committee whenever you have an opportunity to do so and, again, I encourage you to participate in the seminar; to learn and to share your knowledge while you are here, and, most of all, to enjoy the seminar. ♦

Welcome to The World of Disney

ISASI 2009 Style

Three years ago, when Florida-based ISASI 2009 organizers began their quest in search of a location for ISASI's 40th annual air accident investigation seminar, the world's countries were enjoying a robust economy. And what could be a more perfect setting for a meeting of technical, sober-minded, realistic professionals than a place of make believe—Walt Disney World in Orlando, Fla.

By the dates of the actual seminar, September 14–18, the world's economy had been trashed, and the expectation of 400 seminar attendees dropped sharply. Yet, 215 delegates and 32 companions, some with children, did attend. Unfortunately, only the companions and children really got to enjoy the make-believe world of the Magic Kingdom Park and the other theme parks that fill Walt Disney World.

The delegate attendees found they had little time for nonscheduled events—their “magical experience” came from the enlightenment produced by the 35 persons who gave outstanding presentations on

Can one have a “magical experience” without “Mickey,” “Donald,” or “Pluto,” and all the other fanciful imagery created by Walt Disney's imagination?

By Esperison Martinez
Editor

many of the subjects accident investigators grapple with. Keynote speakers, too—all from regulatory agencies—opened ears with their frank discussions of the workings and findings of their agencies.

One speaker, *John Guselli* of JCG Aviation Services and chairman of ISASI's Reachout Committee, captured the essence of these presentation in his “seminar summary” presentation, which concluded

the technical program of the seminar. In establishing his context he drew upon the seminar theme of “Accident Prevention Beyond Investigation.” He noted that 33 nations were represented by more than 200 delegates in order to share safety views: a positive sign of harmony and a determination to improve the effectiveness of system safety. Below is his synopsis.

The keynote address, delivered by NTSB Chair *Deborah Hersman* (see page 11), set the tone for a productive seminar when she nailed

the NTSB's colors to the organizational mast. Her timely declaration of transparency, accountability, and cooperation for future dealings was welcomed by all delegates. Equally well regarded were accounts of her other vital role, motherhood! We were off to a great start.

From this point, the technical program developed, commencing with *Mike Poole's* focus on the value of data in training, reinforced by *John Cox* with his somber lessons in the role of basic aerodynamics in what should have been recoverable events. The children of the magenta line present in the audience were left with no doubt as to the potential about these types of accidents.

The increasing likelihood and catastrophic consequence of runway excursions were highlighted by *Jim Burin*, who once again espoused the return on investment that could be gained from stabilized approaches. *Marcus Costa* capped this session with a timely update of the ICAO Annex 13 enhancements recently made. These were threaded through background issues related to the tragic example of the recent Air France Flight 447 accident.



Photos of ISASI 2009 seminar activities are available for viewing on line at isasi.org. (Photo link is found in the ISASI 2009 promotion box.)



PHOTOS: E. MARTINEZ

Robert Sumwalt's (NTSB) presentation captures the delegates' attention.

Speakers and Technical Papers Presented at ISASI 2009

Tuesday, September 15

Welcome Remarks—Frank Del Gandio, President, ISASI
Keynote Address—Honorable Deborah A.P. Hersman, Chairman, NTSB
Closing the Gap Between Accident Investigation and Training—*Michael Poole and Lou Nemeth, CAE*
Prevention of Inflight Upset (LOC-I) Though Knowledge and Training—*John Cox and Jack Casey, Safety Operating Systems*
Reducing the Risk of Runway Excursions—*Jim Burin, Flight Safety Foundation*
AIG/08: Developing Investigations to Enhance Safety Worldwide—*Marcus Costa, Chief, Accident Investigation and Prevention Section, ICAO*

Afternoon Session

ISASI Reachout: Does Charity Begin at Home?—*John Guselli, JCG Aviation Services, Chairman, ISASI Reachout Committee*
A Comparison Study of GPS Data and Recorded Radar Data Using a Fully Instrumented Flight Test—*Ryan Graue and Jeff Edwards, AvSafe LLC, USA*
Safety Strides Foreseen with Lightweight Flight Recorders for GA—*Phillippe Plantin de Hugues, BEA*
Using ADS-B for Accident Investigation and Prevention: An Embry-Riddle Perspective—*David Zwegers, Embry-Riddle Aeronautical University*

Wednesday, September 16

Keynote Address—Paul-Louis Arsianian, Director, BEA
Human Errors Prevention: Acceptable Means of Compliance With the New Human Factors Certification Requirement for Large Transport Aircraft (EASA)—*Wen-Chin Li, National Defense University, Taiwan*
Human Factors Aspects During Post-Maintenance Flight Test—*Claudio Daniel Caceres, Continuous Safety*
Findings of Using Human Factors Analysis and Classification System (HFACS) as a Toll for Human Factors Investigation—*Yung-An Cheng, Thomas Wang, Jenn-Yuan Liu, Chi-Liang Yang, Aviation Safety Council, Taiwan, and Wen-Chin Li, National Defense University, Taiwan*
Closing the Loop on the System Safety Process: The Human Factors Intervention Matrix (HFIX)—*Scott Shappell, Clemson University, and Douglas Wiegmann, University of Wisconsin*

Afternoon Session

At What Cost? A Comprehensive and Statistical Analysis of EMS Helicopter Accidents, Incidents and Events in the United States from 1987 to 2009—*Christine Negroni, Humanitarian Research Services, Inc., and Patrick Veillette, Air Safety Specialist*
Sifting Lessons from the Ashes: Avoiding Lost Learning Opportunities—*Ludwig Benner, Starline Software, Ltd, and Ira Rimson, USA*
Using the Best Cost Analysis for Effective Safety Recommendations—*Simon Mitchell and Graham Braithwaite, Cranfield University*
Safety: A Function of Leadership—*Gary Brauman, Sikorsky Aircraft Corporation*

Thursday, September 17

A Review of Fly-by-Wire Accidents—*Tony Lambregts, FAA, and Dick Newman, Consulting Engineer*
A Simulation Study of Emergency Egress Factors in Transport-Category Aircraft—*Eric Savage, Embry-Riddle Aeronautical University*
The Accident “CAUSE” Statement: Is It Beyond Its time?—*Robert MacIntosh, Jr., NTSB*
Accident Prevention: Pushing the Limits—*Bernard Bourdon, EASA*
Guest Speaker Industry Updates
Robert Sumwalt, Member, NTSB
David Miller, UK Air Accidents Investigation Branch

Afternoon Session

Rudolf Kapustin Memorial Scholarship—*Richard Stone, ISASI*
Rudolf Kapustin Memorial Scholarship Winner Presentations
Dujuan B. Sevilian—Cranfield University
Murtaza Telya—Massey University
Brian Dyer—Embry-Riddle Aeronautical University
Guest Speaker Industry Updates
Martine Del Bono, Corporate and Media Relations, BEA
Mark Clitsome, Director, Air Investigations, CTSB
Ikuo Takagi, Investigator-General for Aircraft Accident, Secretariat, Japan Transport Safety Board ♦

The seminar took a change of heading into a preventative direction. Guselli updated the delegates on recent ISASI Reachout initiatives and implored each person present, by example, to redress the imbalance between the safety ‘haves’ and ‘have not’s’ in the industry. Additional preventative presentations followed.

Ryan Graue and *Jeff Edwards* detailed investigative improvements that could be achieved by using GPS data over radar data. Coupled with this, *Phillippe Plantin de Hugues* brought the seminar up to date with current and future technology capable of functioning as lightweight flight data recorder devices.

The final session of Day 1 concluded with yet another practical example of modern technology delivering tangible benefits to aviation safety. *David Zwegers* took the seminar step by step down the path of ADS-B fitment into the Embry-Riddle national training aircraft fleet. The enhanced safety results are simple, safe, and cost effective.

Day 2 began with *Paul Arsianian’s* refreshing and realistic insight into the Air France Flight 447 investigation. His metaphor of the accident site being like “Switzerland beneath 2 miles of water” graphically established the context of the difficulties under which this investigation labored. Paul incorporated significant examples from this investigation into his presentation as he touched upon key elements of societal change, scattered knowledge, and the collective amnesia afflicting many organizations. His address concluded with a loud call for realistic policy on confidentiality in major investigations. Drawing on ICAO guidance, he implored all present to ensure that their investigative work is “based on fact, and not agenda.”

Seminar proceedings adjusted heading slightly to take in a raft of stimulating and relevant human factor issues. *Wen Chin Li* provided the means for compliance for large aircraft certification, while *Claudio Caceres* demonstrated the weaknesses in existing post-maintenance flight test op-

erations. The theme continued as *Thomas Wang* discussed the benefits of the Human Factors Analysis and Classification System as well as reminding attendees of the value of checklists. Finally, *Doug Wiegmann* got with the Disney theme as he moved the seminar toward “Tomorrowland” with his work on the Human Factors Intervention Matrix (HFIX).

The comfort of the psychology domain was soon replaced by the stark reality of the world of tinkering. *Christine Negroni* provided the seminar with chilling statistics related to the HEMS environment and at the same time proffered suggestions to take the industry to a safer place. One productive way out could well be in sharp alignment with the famous “money trail.”

The seminar was further treated to the vast experience of two “old stagers” in *Ludwig Benner* and *Ira Rimson* as they urged all present not to forget the lessons learned from past investigations. In sharp contrast they promoted the use



Speaker Takagi

of technology by means of the open-source library, MESLIB. The value of this session was further enhanced by *Simon Mitchell* through his insight into the best cost-analysis methods for safety recommendations. The day concluded with *Gary Braman* as he advised delegates of the notion of leadership as a function of safety. In addition to briefing the audience on the correct method of stowing fragmentation grenades, Gary cited the words of General Wickham when he called for safety practitioners to be proactive and aggressive.

The final day of the seminar opened with *Dick Newman's* excellent illustration of the pitfalls introduced to the unwary through fly-by-wire technology, particularly in the construction of MEL programs. In a



Speaker Guselli

similar vein, *Eric Savage* challenged all to reassess the principles that underpin emergency evacuation philosophies especially in light of passengers' ever-increasing body dimensions in comparison to the past.

Robert MacIntosh posed a most significant question—whether the traditional “cause” statement has passed its use-by date? His provocative words linked firmly with prior seminar statements allied to the lessons of the past.

Bernard Bourdon provided the seminar with a timely update of recent initiatives from EASA and impressed the delegation with his perspective of EASA's “total system approach in aviation safety regulation.”

The concluding industry update pre-

sentations were then delivered. *Robert Sumwalt* implored us to remember why we exist as an investigative body. ISASI was challenged to produce safety recommendations that will prevent recurrence of accident and incident sequences. He amply illustrated his message through a series of structured case studies to emphasize the lessons.

David Miller then brought the assembly up to date with the breadth of successful work achieved by the UK AAIB. In a span from Russia to the Caribbean, and the North Sea to literally its own backyard at Heathrow, the AAIB has been stretched enormously. This led David to espouse the virtues of cooperative resources for obvious reasons. He concluded with support for *Paul Arsianian* and highlighted the hindrances generated by the leakage of confidential information at critical stages of an investigation.

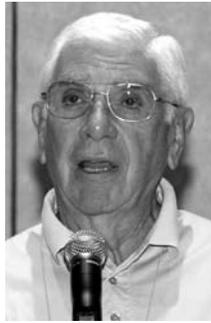
The future of ISASI was then on display as the Rudolph Kapustin Memorial Scholarship winners, *Dujuan Sevillian*, *Murtaza Telya*, and *Brian Dyer*, were introduced to the assembly. From their topical presentations it was obvious that they will perform valuable service to the industry into the future. Although the students were a hard act to follow, *Martine Del Bono* of the BEA, *Mark Clitsome* of the TSB, and *Ikuo Takagi* of the JTSA completed the update process for investigation throughout the world.”

In closing his summation, Guselli urged all delegates to measure the value of the ISASI 2009 seminar from a personal perspective and to remember that, like any structure, the strength of ISASI is dependent on the integrity of its components.

Conducted in the conference center of Disney's Coronado Springs Resort, the technical program is the core of the annual seminar, spanning 3 days. One of the two remaining days is devoted to tutorial workshops with the last day is generally geared to a full tour day designed to bring some relaxation.



Peter Knudson (NTSB) opens the crisis communication tutorial.



ABOVE LEFT: Questions are posed to panel members, above, Douglas Wiegmann, Wen-chen Li, Thomas Wang, and Claudio Caceres. **LEFT:** Session 1 delegates listen. **BELOW:** Companions disembark their airboat. **BELOW LEFT:** Enjoying a “pirate” performance.



Tutorials

Two hot-button topics comprised the tutorials presented on September 14. They were media relations in air safety investigations and the criminalization of events in aviation safety. Tutorial 1 was facilitated by Peter Knudson of the NTSB office of Public Affairs and Bruce Hicks of the Alliant Group of Houston. This tutorial was designed to help attendees “understand the media”: interview techniques, reporter’s rights, newsmaker’s (interviewee) rights, differences of print and electronic interviews, do’s and don’ts, and all the other subjects that are involved in dealing with the news media in the many varied situations that can occur. The tutorial was heavily attended with a high degree of attentiveness.

Facilitators for Tutorial 2, the criminalization of events in aviation safety, were

Réal Levasseur, a safety and security representative with ALPA; Julianne Fox Cummings, a managing scientist with Exponent, U.S.; Vonnick le Guillou, the head of the Aviation Department of Bird and Bird, France; and J. Denny Shupe, the chair of the Litigation Services Department of Schnader Harrison Segal & Lewis, LLP, U.S. They addressed challenges faced by state accident investigative boards, company investigators, and legal officials in the struggle to achieve their respective aims. Among the topics covered were

- What is the basis and rationale for filing criminal charges in both the common law and civil law systems?
- What types of human behavior and/or performance constitute grounds for filing criminal charges?
- Is there an opportunity to refine the criteria used in determining whether a

criminal act has been committed? How might this be accomplished?

- Is there an opportunity for global harmonization around the processes that take place after an accident occurs?
- What are some steps that can and/or should be taken to start to influence change in this arena?

It wasn’t until the dinner bell sounded that attendees got to trade their assembly chairs for a relaxing social time. On the program agenda were three evening social events: president’s welcome; pirate’s dinner adventure; and the center social event, the awards banquet. The companions fared a bit better—in addition to the evening events, the 32 companions had 2 full days of sightseeing and catered meals.

The Tuesday companion tour showcased the natural beauty of Florida along with some history and wildlife. Both involved

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boats, one narrated cruise that gently moved through 12 miles of Winter Park's tranquil lakes and canals. The group floated by the Kraft Azalea Gardens, Isle of Sicily, and opulent private homes and exquisite estates sprawling along the shores. The second boat trip was a bit more adventurous. A roaring-engined airboat skimmed the bald-cypress swamp searching for alligators, American bald eagles, colorful birds, reptiles, and unusual plants.

On Wednesday, the tour was more upscale. The group visited Bok Tower Gardens where they stepped back in time to experience the grandeur of the 1930s winter home of a wealthy industrialist. Next came a taste of elegance: the inside of Pinewood Estate with its French, Italian, and Spanish antiques from the 17th–19th centuries.



NTSB Chairman Hersman, left, chats with ISASI's 2009 scholarship recipients, left to right, Sevillian, Telya, and Dyer.

The end of Thursday's technical program concluded with President Frank Del Gandio calling the assembly to order for the annual ISASI business meeting. He discussed the normal administrative items: individual member and corporate member recruiting efforts, the 2010 budget, and committee and working group activity. He also related that the Executive Council had voted for a dues increase to \$80 per year effective 2010. He noted that dues notices, which will be mailed to the membership very shortly, will reflect the increase in dues. He also noted Curt Lewis' resignation as U.S. councillor and president of U.S. SASI. Toby Carroll has been named to fill those positions pending the results of the next election. Finally, he announced the Council's unanimous approval to establish the Asian Society of Air Safety investigators as the latest addition to ISASI.

Awards banquet

The seminar's last evening is always reserved for the acknowledgment of actions that have earned individuals specific awards of recognition. Following the social mixing and dinner, President Del Gandio stood at the lectern and surveyed the

audience. Recognizing the absolute quietness was not going to happen, he boomed an attention-getting "welcome" into the microphone and outlined the evening's proceedings. Next he asked the crowd to thank the ISASI 2009 Organizing Committee for the quality of the presentations. Committee members included Jayme Nichols, chairman; Anthony Brickhouse; Grant Brophy; Ron Schleede; Dan McCune; Sharon Morphew; Gary Morphew; Allison Markey; and Christopher Stump.

Seminars sponsors also received an appreciative round of applause, as did the organizations that sponsored booths: CAE-Flightscape; Wiegmann, Shappell, & Associates, Inc.; TSI; Applied Informatics & Research, Inc.; and the Southern California Safety Institute.

Among others who were recognized were the three students selected as 2009 recipients of the ISASI Rudy Kapustin Memorial Scholarship (see *ISASI Forum*, July–September 2009, page 3): Murtaza Telya from the University of New Zealand; Dajuan B. Sevillian from Cranfield University, UK; and Brian R. Dyer from ERAU-Dayton, Fla., USA. By special invitation, each of these students made a 20-minute



Corporate members receiving their membership plaques from President Del Gandio are, clockwise from above, Alegado, Medernach, Naylor, and Kurniadi.

presentation to the seminar assembly. They also served as the judging panel to select the “Best Seminar Paper.”

The Award of Excellence for the best seminar paper went to Professor Scott Shappell of Clemson University, Clemson, S.C., and Associate Professor Douglas Wiegmann of the University of Wisconsin, Madison, Wis., for their paper *Closing the Loop on the System Safety Process: The Human Factors Intervention Matrix (HFIX)* (see page 20).

Corporate members who joined ISASI throughout the year had their membership plaques presented at the awards banquet. Receiving plaques were the Administration des Enquestes Techniques, represented by Jean-Claude Medernach; the National Transportation Safety Committee Indonesia International, represented by Tatang Kurniadi; Pakistan International Airlines, represented by W. Cdr R. Syed Naseem Ahmed; Avisure-Australia, represented by Lindsey Naylor (serving as proxy); and Qatar Airways, represented by Jaime Alegado. Unrepresented corporate members were the Australian & International Pilots Association, Allianz Aviation Managers, Air Astana-International, and Nova Aerospace.

The ultimate event of the evening is the presentation of the Jerome F. Lederer Award (see page 16). This year, it was a dual presentation. For only the second time in



the Society’s 45-year history, two parties were selected as recipients: Capt. Richard B. Stone, ISASI Executive adviser, and the Australian Transport Safety Bureau. Of the two, Stone was the most surprised, as he had no prior knowledge of his selection.

President Del Gandio noted the Bureau’s lifetime achievements that have given it a worldwide reputation for excellence, based on its demonstrated operational independence, objectivity, and technical competence in accident investigation. “Such work, coupled with its expertise and contribution to the field of human factors, at both the individual and organizational level, make the ATSB a well-qualified recipient for the Lederer Award,” he said. Then he provided the audience with a full recital of the ATSB’s accomplishments that earned it the Award.

Capt. Stone’s applause from his front-table seat was as loud as that of the other 200 guests. When he heard the words “will Capt. Dick Stone please join me up here,” from President Del Gandio, Stone was no



doubt puzzled as he walked to the stage. When he discovered the reason for this walk, Stone’s surprise was unabashedly expressed through a hardy embrace with Del Gandio, symbolizing gratefulness to his peers for his selection. As the applause quieted, President Del Gandio said, “Capt. Stone is more than qualified to be a recipient of the ISASI Jerome Lederer Award owing to his outstanding contributions to technical excellence in aircraft accident investigation.” Del Gandio then told the crowd about those accomplishments (see page 16).

Culminating the evening’s program was the traditional “passing of the gong,” the chime used to summon attendees back into session from break times. Jayme Nichols, ISASI 2009 chair, urged all to attend ISASI 2010 being held in Sapporo, Japan, Sept. 5-9, 2010. She then, with great fanfare, passed the “gong” to Mamoru Sugimura, chairman of ISASI 2010. ♦



ISASI 2009 Chairman Nichols passes the traditional “gong” to ISASI 2010 Chairman Sugimura.

WHAT IS Next?

By Deborah A. P. Hersman, National Transportation Safety Board Chairman

(Remarks presented by Chairman Hersman in her keynote opening address to the ISASI 2009 air accident investigation seminar delegates on September 15 in Orlando, Fla., USA.—Editor)

Good morning everyone. And a special konichiwa, guten morgen, ni hao, and bonjour to the International Council members and to our international attendees.

It is my privilege to kick off ISASI's 40th annual seminar. When preparing for my speech, I spent some time thinking about this year's theme "Accident Prevention Beyond Investigation." It is a theme that encourages us to ponder "What is next?" This is a room full of people who spend their time solving puzzles, putting the pieces back together to figure out what failed and how a design can be improved, or why people made the wrong decisions in the seconds before a disaster. So the theme is a great one, "What is next for you, for me, for us?"

Seven weeks ago today, I became the 12th chairman of the NTSB. Many of you, well, maybe most of you, don't know me, so let me give you a little glimpse of "what is next" for the NTSB during my tenure. There are three attributes that I believe are critical to the NTSB's mission and work. They are transparency, accountability, and integrity. Last week, I addressed the NTSB staff as a group for the first time. I challenged them, as I am challenging myself, to raise the bar in all three of these important areas.

Some of you may be wondering, "What's next for the NTSB's relationship with our international counterparts?" I believe some of the same themes crossover to the

international arena. Today, in addition to transparency and accountability, I will also focus on cooperation.

For the past 5 years I have had the privilege to serve as a member of the United States National Transportation Safety Board alongside my colleague, Member [Robert] Sumwalt, who many of you know is a bona fide member of ISASI. During my time at the Board, I've accompanied our NTSB staff investigators on 17 major transportation accident investigations. These events have covered all modes of transportation: airliners, emergency medical service and sightseeing helicopters, business jets, private aircraft, light

rail trains, freight trains, container ships, recreational boats, school buses, and motor coaches. Allow me to express

my utmost respect for you—the professional air safety investigators and your peers who come from the various business and educational sectors associated with the transportation industry. I would like to recognize the NTSB investigators whom I have worked with in the audience—please stand (Bob MacIntosh, Frank Hilldrup, Joe Sedor, Lorenda Ward, and Scott Dunham)—and the many NTSB alumni here today. I have the privilege to be the public face for the work they do. Like these investigators, many of you have dedicated your careers to determining the causes of aviation accidents and coming up with solutions to safety problems encountered in your investigations.

Last night I had the opportunity to talk with [Truman] "Lucky" Finch, one of ISASI's founding members. I understand that this is ISASI's 40th annual seminar. And since the NTSB is just more than four decades old, I thought it might be worthwhile before we discuss what is next to look back at where we came from. Forty years ago, Embraer, Airbus, and Thierry were being conceived and birthed, as were Jimmy and David. Bombardier aerospace was just a glimmer in a snowmobile's eye. Forty years ago, Ron Schleede and Bill Hendricks will tell you they put together their accident reports by themselves using only their brilliant investigator skills, a legal pad, and a typewriter. Forty years ago, Bob MacIntosh has told me that we had to dial an operator to make an international call.



PHOTOS: E. MARTINEZ

Chairman Hersman, keynote speaker, opens her address by asking "What is next?"

WHAT IS Next?

Today we are in a world that moves fast, communicates instantaneously, and demands answers immediately. Even though the NTSB's mission remains the same, the world around us has changed drastically. Therefore, we must constantly be asking ourselves, "What is next?"

Transparency

What is next for news media relations? I know many of you were here yesterday for the tutorials on the subject of news media relations, which included one of the Safety Board's public affairs officers. As many of you know, major accidents are not covered by just local or even national press, but more and more by international correspondents. Following a major accident, we recognize that the press has an insatiable appetite for information, and the public has an understandable curiosity about the event. Yet we must try to balance the equation of providing factual data to the public without speculating on the causes of the accident. You're going to hear me mention transparency, accountability, and cooperation several times this morning, and public relations is a perfect place to start. As an agency funded by the public, the NTSB fully embraces transparency and the public's right to know about our investigations. In fact, it is through the process of showing the public that we are conducting independent, thorough investigations that we derive our ability to influence decisions that are made following an accident.

If the NTSB, as the government's transportation accident investigation agency, does not provide credible information in a developing accident investigation scenario, other sources will attempt to fill the void. And in most cases, that void will be filled with information that is unreliable, unverified, and sometimes just plain wrong. Many of the people who talk to the news media have impressive credentials, and I do not

begrudge them trying to explain to the general public highly technical situations. However, if their opinions are the only information the public receives in the days following the crash—and these opinions are rendered hundreds of miles from the scene—then the public will be ill served.

Even worse, depending on where the information comes from, it may be self-serving to the originator and damaging to the other participants in the investigation. For that reason, the NTSB spokesperson at the scene is the source of all publicly released factual information about the investigation. We try very hard to provide the public with reasonable details of the facts to assure them that the investigation is being conducted in a thorough and unbiased manner. In fact, many times we ask the public for support regarding witness information and other site details. Our purpose at an NTSB press briefing is not to provide the media with details to solve the accident, but rather to demonstrate to the public that the process of the safety investigation is being conducted in a professional manner.

President Obama has committed to making his administration the most open and transparent in history. While the NTSB is an independent agency, I believe the President's commitment is consistent with the NTSB's long history of open and visible investigations. The value we place on transparency in our investigations in order to meet the expectations of the public may be very different from the processes in place in other nations, including some that are represented here. In fact, you may *personally* disagree with our protocol, but it is hard to contend that the NTSB's open policy has not proven to be effective over time. For international participants in investigations within the United States, we have published ICAO differences in ICAO Annex 13 to keep all states advised of our policies regarding the release of factual information.

What's next regarding how we com-



Chairman Hersman, keynote speaker. Looking on is ISASI Frank Del Gandio.

municate with the public and our stakeholders?

The Internet and other electronic tools are changing and expanding at breathtaking speed. I would like to see the NTSB make better use of those tools to bring our message faster and with more content to the news media, to Congress, and, most importantly, to our stakeholders. Recently we took the step of opening our dockets to the public via our website. We not only hold our Board meetings and investigative hearings in full view of the public, but we webcast them so that anyone can watch. What this means is that these meetings are more transparent than ever before—available not just to stakeholders and the news media, but also to international viewers without any expensive travel costs or inconveniences.

This year our Office of Aviation Safety has already scheduled four investigative hearings, one on the safety of helicopter emergency medical services (2008 was one of the worst years on record for the HEMS industry, with nine accidents resulting in 29 fatalities), one on the US Airways dual-engine failure following an encounter with multiple Canada geese and subsequent forced landing in the Hudson River; one on the fatal Colgan accident in Buffalo, N.Y., on February 12; and finally, next week, I will be chairing a hearing on the Empire Airlines domestic cargo flight for FedEx that landed short of the runway in Lubbock, Tex., in freezing drizzle conditions.

While all of this work raises the bar on

transparency, we aren't doing it alone. We had the participation of international representatives at each of our hearings. American Eurocopter and Canadian Helicopters were witnesses at our HEMS hearing. Airbus and EASA were witnesses at the Hudson hearing, with BEA serving as an accredited rep on our technical panel. Bombardier and Transport Canada sat as witnesses at the Colgan hearing, with the TSB serving on the technical panel as an accredited rep. And next week, we will be joined by ATR and EASA at the hearing on the Empire accident. Even though our system may be different from yours, we are working together to achieve a transparent and seamless aviation system, and we rely on the support we receive in our investigations from our partners that serve as accredited representatives, and those who represent labor unions, regulatory authorities, and manufacturers. Aviation is a global endeavor. If you take away one thing from my talk this morning, I want to make it clear that we recognize the value of working with and learning from our international counterparts—this is the only way that we will succeed. We are working together to accomplish this, so what's next?

I'd like to briefly touch on the other subject of the tutorials, criminalization. I can be brief and to the point. The NTSB's relationship with the U.S. Department of Justice is excellent and well established. Unless the Attorney General and I, as the chairman of the NTSB, agree that circumstances reasonably indicate that an accident may have been caused by an intentional criminal act, our NTSB investigators have unimpeded authority to conduct the investigation. The NTSB has priority over any judicial or other agency's investigation for aviation accidents. We control the accident site, and our investigators are free to pursue the fact-gathering process as necessary. We recognize that our position in accident investigations may be different from that

of investigative agencies in other nations. Frankly, we are grateful that the U.S. Congress provided the NTSB with primary jurisdiction over most aviation accident investigations. However, we all have to work within the system that exists in the state of occurrence. This demands effective coordination and communication at every level of the investigation as well as understanding and respect for the conditions that our investigative counterparts are facing.

Accountability

When I asked our staff last week to raise the bar on our accountability, I know I was asking for a lot from a group of dedicated professionals whose work days are already very full. We investigate about 1,600 accidents per year. In 2008, the NTSB responded to 28 air carrier events; the 20 in scheduled service were all, fortunately, non-fatal. Last year our vehicle recorders laboratory received and read out more than 200 recorders. In addition, we received 178 foreign notifications of accidents or serious incidents involving U.S. operators or products. As a result, NTSB accredited representative teams traveled to 27 accidents in foreign countries to assist the local investigation authority.

Raising the bar on accountability will require the NTSB to be strong and nimble in its accident investigations in order to serve the American traveling public and to meet our international commitments. I would like to build on the technical strengths of our very competent professional staff to place our investigators at the forefront of technology. Certainly we will retain the investigative skills [needed for the] early-generation jet transports like the DC-9 and the B-737-200 and the Cessna, Beech, and Piper designs of the 1980s. As Frank [Del Gandio] mentioned in his opening, new technology is being assimilated into every sector of the aviation

industry, like synthetic vision of a cockpit heads-up display and ADS-B for air traffic management. The aircraft coming off the production line are a new breed, filled with these innovations. Boeing, Airbus, Embraer, Bombardier, Gulfstream, and all the general aviation manufacturers now offer leading-edge technology, and engine manufacturers are satisfied only with the highest levels of efficiency in their new designs.

Implementing electronic flight control systems; optimized powerplant management; advanced composites; basic electrical and environmental engineering support systems; and navigation options, such as the electronic flight bag and surface moving maps, requires that our technical staff and other participating investigators are constantly learning to stay current with this technology. The rapid changes in technology provide challenges, but they also hold the keys to solutions we couldn't have imagined 40 years ago. So with respect to technology, it is very exciting to think about what's next.

In the past 5 years that I have served on the Board, I have noticed that today's fast-moving and capacity-filled environment demands that we do things with reasonable urgency. When I first started my professional career, we didn't have e-mail addresses, and if you had a phone, you needed to carry it in a bag and have an antenna for it. When I came to the Safety Board just more than 5 years ago, we had pagers. Today our blackberries can work internationally, and they provide us with content-filled messages and access to the web. All of these developments have enabled us to be more efficient and respond more quickly. But along with these improvements has come a commensurate expectation that we can work better, faster, and stronger. As we complete the field portion of an investigation, you will continue to see our investigators conduct component examinations as an immediate follow-on activity. We will communicate with participants to our investigation at Internet

WHAT IS Next?

speed. We cannot accept weeks and months of reviews and slow-crawl responses as we complete each step in our investigative process. Similarly, when we identify a safety deficiency, we can't wait for a recurrence to address it. If the failure has been identified, documented, and analyzed, then what is next? Waiting for months to issue the final report? No—in some cases we may need to act quickly to issue a recommendation; so if the situation merits it, we will go forward with recommendations even before we complete the final report.

The NTSB has an obligation to alert the transportation community to acute safety problems, whether or not the problems may have played a causal role in the accident. Recommendations we issue during the course of an investigation do not signal that we have determined the cause of the accident. They simply point to a safety vulnerability that deserves immediate attention.

In recent weeks, we've issued recommendations on the still on-going investigations of the Hudson River midair collision, the crash of a corporate jet in South Carolina, and, in a surface mode, on the collision of two transit trains in Washington, D.C. I will continue to encourage such timely action by our investigative staff in the future.

I will also push recipients of our safety recommendation letters to raise their bar on their own accountability. We simply cannot accept "we're working on it" as a satisfactory response from a regulating agency about an identified safety risk. What we will accept is corrective action implemented and the risk mitigated—or at the very least, a clear forecast of when corrective action will be completed. I have been encouraged by new FAA Administrator Randy Babbitt's recent efforts to act quickly on safety problems. Just a couple of weeks ago, the FAA announced changes to the airspace in the New York area following the mid-air collision over the Hudson River last month. The Safety Board will analyze the FAA's action to see

how closely they comport to our recommendations. But this is an example of the regulator asking, "What's next?" and then acting on the answers it received when it asked the question.

Can we attain a stronger and more nimble posture without affecting the quality of our work? Can we modernize without affecting the quality of our NTSB products? Yes, we can and we will. The 21st century is well under way, and it requires new thinking. We hear the chorus of support for the integration of safety management systems (SMS) and a realignment of responsibility and accountability for operators as we move toward a more performance-based approach to safety. While we hope that SMS will prevent many accidents, we recognize there is a key role that accident investigation will continue to play in the identification and mitigation of safety deficiencies even in the SMS environment.

So what is next for us? While I am challenging staff members to increase their efficiency, I am also calling for continuous review by the management team—this is our own version of SMS. Our investigators have recently showed us that they are looking beyond causal factors. In a fatal Citation bird strike accident in Oklahoma City, they identified organizational and oversight failures that, while not causal, created a poor safety culture. In recent HEMS recommendations, we "followed the money" so to speak, and issued recommendations asking the government agency that controls reimbursement for HEMS operators to establish safety standards and audit operators. You should also know that we are also holding parties to our investigations accountable to their obligation just as we are being held accountable to our constituencies. Today, while I am here with you, Vice-Chairman Hart will be testifying on the Hudson mid-air collision before the Senate, and tomorrow morning I will be delivering the same testimony to the House. This reckoning on the status of



our investigation comes approximately one month after I launched to the accident with our team. We must provide some answers to lawmakers' questions as they look to us with the question of "What's next?"

After watching our staff members in action for the past 5 years, I have every confidence they are up to the job, and I will support them in every way I can to raise the bar for both the NTSB and those who participate in our investigations. By ensuring that investigators maintain their technical competence, issuing recommendations as soon as they are warranted, and improving our internal processes, the NTSB will be a more nimble and more accountable organization.

Cooperation

Now to cooperation, coordination, and support between the NTSB and accident investigation authorities from other countries. Our partnerships with multinational organizations such as the European Aviation Safety Agency (EASA) and the Interstate Aviation Committee (IAIC) of the former Soviet Union have provided many valuable contributions to worldwide safety improvements. Some of these improvements reflect directly on our U.S.-manufactured products. For example, we recently issued coordinated recommendations with the Spanish CIAAIC on the MD-80 takeoff warning system related to the Spanair accident in Madrid, with the

UK AAIB related to the British Airways B-777 dual power loss at Heathrow, and with the Canadian TSB and MAK of Russia on the issue of the Cessna 208 flight in icing conditions.

It is no revelation to this body that aviation investigations are more and more becoming global affairs. The crash of Air France Flight 447 in June involved a multinational search effort. I will defer to Paul [Arsenault] to discuss their investigation tomorrow, but our support and good will are extended to both the BEA and the people who have lost loved ones in this accident.

I would also like to note that we have been participating for more than a decade with the U.S. Department of Transportation "Safe Skies for Africa" program. This initiative has now expanded into the ICAO Safety Roadmap in Africa and we remain fully engaged. We believe it is important to further our relationships with partners like EASA, MAK, and the regional safety initiatives around the world because these relationships are critical to teamwork, consultation, and cooperation necessary in every investigation and ultimately to the overall credibility of the ICAO Annex 13 process.

Before I close, I would like to say a word about the families of accident victims, our most vulnerable stakeholders. Since 1996, the NTSB has been charged by the U.S. Congress to coordinate federal resources for family members. At an accident scene, our Office of Transportation Disaster Assistance has developed a system with the airlines to provide a dedicated location for those family members to gather away from the prying eyes of the press, as well as a process to keep them informed on the progress of the investigation, even after we leave the accident scene. This has been a positive development, and we will endeavor in the next 2 years to further develop our relationships with family members and enhance our system of keeping them informed and also hearing what they have to say. I'm happy to see that other nations have

been moving in a similar direction, and I sincerely hope that the trend continues.

This conference [ISASI 2009] is a perfect example of what the next 40 years hold for global aviation and accident investigation. Although the U.S. is hosting this year, more than half of the attendees are guests from 32 other nations. This forum is a great opportunity to meet with and work with your colleagues; I saw impres-

The people who rely on you to do your work do not represent the U.S., South Africa, China, or Britain, they represent humanity.

sive signs of cooperation last night with Tom [Dolt] and Thierry [Thoreau] of rivals Boeing and Airbus putting their heads together and residents of China, Hong Kong, and Taiwan discussing aviation safety at the same table. All kidding aside, I have shared some of my priorities with you, so I ask our international partners, what's next, how can we support you?

In the news media we've been hearing much about civility—in the Congress, on the tennis court, but not here. To the international community, I would like to recognize your graciousness. As many of you know, last Friday was the eighth anniversary of 9/11. My first meeting that morning was with ICAO Secretary General Raymond Benjamin, then I met with a delegation of air safety officials from Brazil, and later in the afternoon I had a phone call with representatives of ATR (who will be participating in our hearing next week). One gentleman was French and the other was Italian. Each meeting was opened with an expression of remembrance and support (in English, I might add) for the American people on the anniversary of 9/11. This acknowledgement was appreciated and so considerate.

Danke, tak farid, muchas gracias, mange tak, and thank you.

In closing, I would like to express my personal appreciation for the cooperation and support the aviation community has offered me. I am not an aviator, but I have been humbled by the many well wishes from each of you, as I know many of you care deeply about this agency I am entrusted with. Thank you for inviting me

here today, and also for everything you've done to improve aviation safety around the world. I look forward to working with you during my term as chairman.

So, what do the next 40 years hold for ISASI and aviation investigations? Can we be more transparent, accountable, and cooperative? International borders still exist, but they, too, are becoming more transparent and are no longer boundaries. The Internet has connected us all. The world is preparing for the next flu pandemic that can travel through time zones as rapidly as an overnight package. The aircraft that bring us together, whether designed by Embraer or Airbus, are made with parts that are manufactured all over the world. The people who rely on you to do your work do not represent the U.S., South Africa, China, or Britain, they represent humanity. In the end, as leaders, as safety professionals, as human beings, we have been given a noble charge; we are our brother's keepers. I'm optimistic that, with your support, we can build on the enthusiasm and dedication fostered here to continue the historic period of air safety we've experienced, and to strengthen the ties of the international air safety community. ♦

Two Receive 2009 Jerome F. Lederer Award

The International Society of Air Safety Investigators (ISASI) has for only the second time in its 45-year history awarded its coveted Jerome F. Lederer Aviation Award to two recipients. Named as year 2009 recipients are Capt. Richard B. Stone and the Australian Transport Safety Bureau (ATSB).

The Award is given for outstanding lifetime contributions to technical excellence in furthering aviation accident investigation and achieving Society objectives. ISASI is an organization dedicated to enhancing aviation safety through the continuing development and improvement of air accident investigation techniques. To this end, its membership is made up of persons from 57 countries who are actively engaged in the investigation of aircraft accidents or in prevention activities that identify, eliminate, or control aviation hazards before accidents result.

Presentation of the Lederer Award is a major highlight of the Society's annual seminar. Generally, the recipient is announced on the opening day of the seminar; however, this year President Frank Del Gandio also broke from tradition and withheld the individual's name until the awards dinner banquet, held on the last evening of the seminar. Indeed Stone, himself, had no inkling of his selection. The ATSB, however, did have advance word of its selection to ensure that it would have a representative present to accept the Award. Still, none in the audience were aware that two parties had been selected.

With ATSB representatives Richard Batt and Stewart Ross on stage, President Del Gandio noted the Bureau's worldwide reputation for excellence, based on its operational independence, objectivity, and technical competence in accident investigation. He said its expertise and contribution to the field of human factors, at both the individual and organizational level, is acknowledged as world class. (Prior to

By Esperison Martinez
Editor

1999, ATSB's predecessor was the Bureau of Air Safety Investigation (BASI). Herein both are referred to as the "Bureau.")

Del Gandio then went on to outline the Bureau's "lifetime" of achievements in this field. He said: "In 1983 the Bureau became

(ICAO), and in the 1990s was highly influential in the adoption by ICAO of the requirement for air safety investigations to include an examination of relevant organizational and management aspects, using the Reason model of systems safety as a guide.



one of the world's first civil aviation safety investigation organizations to recruit a human performance specialist. Subsequently, a core team of human performance specialists developed the Bureau's capability in human factors, systems safety, and research and was instrumental in fostering the role of human factors in Australian aviation safety. In 1989, the Bureau became the first aviation safety investigation organization to have a specialist human factors practitioner as its head. As a result, the Bureau became a world leader in proactive accident prevention and safety enhancement, as well as core accident investigation. Subsequently, the Bureau became more active in the International Civil Aviation Organization

"Since the mid-1990s, all Bureau investigators have received human factors awareness training as a component part of their professional development. This quality course has continued to be enhanced and is highly sought after by external participants worldwide. Bureau personnel are currently delivering human factors training in Indonesia as part of the Indonesia Transport Safety Assistance Package (ITSAP).

"Further, the Bureau was the first accident investigation body worldwide to incorporate the formal analysis of human and organizational factors into standard investigation methodology. It did this in its 1993 investigation report into a near



Award recipients are shown left to right: Capt. Richard B. Stone, Richard Batt, President Del Gandio, and Stewart Ross.

collision between a DC-10 aircraft and an A320 aircraft in 1991 at Sydney Airport and in its 1995 report of a fatal CFIT accident in 1993 involving Monarch Airlines. These reports outlined the Reason model to highlight the role of systemic factors in the development of the occurrences. The Monarch Airlines report was a catalyst for major structural changes within the then Civil Aviation Authority.

“In 2003, the Bureau’s report into Ansett maintenance safety deficiencies and continuing airworthiness issues worldwide was awarded the 2003 Flight Safety Foundation Cecil A. Brownlow Publication Award ‘for a significant contribution to aviation safety awareness.’ This report reinforced the concept of ‘organizational mindfulness.’ While the Bureau has since adapted the Reason model to better suit its purposes, the use of this methodology’s principles continues to underlie all investigation analysis and report writing.

“At the same time as the Bureau was developing modern methods of investigation analysis, it was also producing world-class research reports. Two such reports received the Chartered Institute of Transport in Australia’s Qantas Award for Transport Excellence. The first report to receive this Award was the *Limitations of the See-and-Avoid Principle* (1991). The second was the *Human Factors in Aircraft Maintenance* report (1995).

“From its inception as a multimodal

agency on July 1, 1999, the ATSB has continued to develop and apply improved methods of accident investigation and analysis to enhance transport safety in Australia and internationally. The ATSB website, with more than 1 million new users and 40 million ‘hits’ in 2008, is a testament to the Bureau’s influence.

“The quality of a safety investigation’s analysis activities plays a critical role in determining whether the investigation is successful in enhancing safety. However, this has been a neglected area in most organizations that conduct safety investigations. One of the Bureau’s leading human factors specialists tackled this professional void and, through a process of benchmarking and wide consultation, has developed a rigorous best-practice analysis framework for transport safety investigations. This approach is detailed in the Bureau’s 2008 publication *Analysis, Causality, and Proof in Safety Investigations* and is a fundamental functional element of the Bureau’s Safety Investigation Information Management System, introduced in 2007. Both have attracted the significant interest of the chairmen and CEOs of independent investigation body members of the International Transportation Safety Association (ITSA).

“The Bureau’s ongoing commitment to the behavioral science of human and organizational factors in transport safety is at the heart of its credibility and underlies its reputation as a leading safety inves-

tigation agency in the world arena. This reputation has enabled it to contribute strongly to the amendments to Annex 13 recommended by the 2008 ICAO AIG Divisional meeting and also to a new code for international marine investigation agreed to at the IMO in 2008 and increasingly to rail safety investigation.”

In accepting the Award, Richard Batt said: “It’s my great honour to accept this Award on behalf of the Australian Transport Safety Bureau. It is a particular honour to accept the Award as it commemorates the remarkable life and safety achievements of Jerry Lederer, and it is a particular honour given the past recipients of the Award, both individuals—some of whom are here this evening—and organizations.

“As we know, in any air safety investigation the crucial first step is a thorough operational and technical investigation to establish what happened in the accident or incident, but it is typically only by then looking at human factors—at both the individual and organisational level—that we can understand how and why the accident or incident occurred.

“More than 20 years ago, Dr. Rob Lee, a human factors specialist, was appointed as director of the Bureau—the first time anywhere in the world that someone with a human factors background had been appointed to lead a national civil aviation safety body. And from that time, under successive directors, human factors has been a prime focus of the ATSB. I think it is interesting, when we reflect on the many excellent presentations we have seen this week, how many of them have had a human factors theme.

“So, on behalf of the ATSB, I would like to express our sincere appreciation on receiving this year’s Jerome F. Lederer Award.”

The seminar delegates showed their agreement with ATSB’s selection with a thunderous and standing applause. And as the banquet hall quieted, President

Lederer Award Selection Process

Presentation of the Jerome F. Lederer Award is the culmination of a thorough consideration of a nominee's experiences by the 12 member ISASI Awards Committee, chaired by Gale Braden. The selection task is not taken lightly and involves multiple steps that begin with an early announcement of the open nomination period, which begins with the close of the annual seminar and goes through May 31 of any given year.

Chairman Braden shares the selection process steps in the hope that it will entice a greater number of nominations for the prestigious Award. He urges members to begin their nomination consideration now and to watch for the nomination submission procedure in the January-March issue of the *ISASI Forum*, which is also available on the ISASI website. From time to time, through the *Forum*, he reminds the membership of the opportunity to submit nominees.

"When I receive a nomination letter, I evaluate it against the criteria and accept or reject it. If I reject it, I respond to the nominator and explain the reason for the rejection. Most often the rejected letters fail to discuss any degree of accident investigation activity. After explaining that accident investigation is the focus of the Award, the nominator will often rewrite the letter and make it acceptable.

"Our Committee consists of 12 members, including the chair. Six are from the USA and six are international. When the nominating season closes, I copy each letter and add a notation to it indicating if it is a 1st, 2nd, or 3rd consideration. I then mail it along with a ballot listing each nominee, a copy of the selection criteria, and a cover letter to each member reminding them to vote for three nominees by placing a 1, 2, or 3 beside their name on the ballot.

"The votes are weighted in the following manner, a number 1 vote is worth 5 points, number 2 is worth 3 points, and number 3 is worth 1 point. Thus, each member's vote is worth 9 points spread over any three nominees. When there are three or more nominees, a tie is almost impossible; but with only two nominees, a tie can occur. In such cases, the ISASI president has the prerogative of casting a tie-breaking vote. In both instances in which a tie vote occurred, the president determined both parties were deserving and allowed the multiple presentations."

The scoring criteria for selection used by Committee members follows:

- Selection of award recipient: Emphasis should be placed on original and remarkable contribution and personal effort beyond normal duty requirements. Mechanics, engineers, and others not at the top administrative or research levels should be considered for any outstanding contributions to accident investigation.

The nominee's manner of operating, the duration and persistence of his (her) efforts, and his (her) standing among peers shall be considered. A nominee shall not be eliminated because of lack of popularity. Nationality, creed, sex, or race shall not be considered.

- In general, the contribution should be important to aviation safety, or if from another field of safety endeavor, one that could be applied to the aviation field.

Advancement should be clearly attributable to the person or associated group nominated (in case of many developments, it is often difficult to determine an individual who is responsible.)

- The dedication of the nominee to safety and aircraft accident investigation is a guiding criteria, such as his (her) imagination in working beyond the requirements of his (her) job to direct his (her) efforts to safety and accident investigation on his (her) own initiative. These efforts may be multifaceted.

- The contributions should have relatively broad application to the investigative area and may stem from a particularly effective manner of pursuing accident investigation objectives. The contribution need not be of recent origin so long as it has improved accident investigation. ♦

Del Gandio said into the microphone, "Will Capt. Dick Stone please join me up here." It was only then that Stone and the audience learned that there were two recipients of the Lederer Award. Surprise was evident in Stone's demeanor, as was the gratitude he was feeling for the honor bestowed upon him by his peers.

President Del Gandio continued, "Capt. Stone is more than qualified to be a recipient of the ISASI Jerome Lederer Award owing to his outstanding contributions to technical excellence in aircraft accident investigation.

"He began his aviation career more than five decades ago as a U.S. Air Force pilot and began his civil aviation career with Northeast Airlines in 1957, which was later absorbed by Delta Air Lines, from which

he retired in 1992. He has remained active in aviation as a consultant for various government and industry aviation interests until the present day.

"Throughout his civil aviation career, Capt. Stone was deeply involved in aircraft accident investigation and prevention for the Air Line Pilots Association (ALPA) for more than two decades, most of which was performed as a volunteer. His strong interest in human factors led him to establish ALPA's Human Performance Project in 1977. He was a member of the ALPA National Accident Investigation Board (1977–1987), chairman of the ALPA Human Performance Technical Committee (1983–1987), and chief accident investigator for the Delta Air Lines Master Executive Council

(1984–1987). He also served as ALPA's executive chairman for aeromedical resources for many years.

"He has been as deeply involved with ISASI, joining us in July 1969, and has been extremely active in its programs every since. He has served as the ISASI U.S. councilor (1984–1988), ISASI president (1994–1996), ISASI Executive advisor (1996–present), and chairman of the ISASI International Working Group on Human Factors (1996–present). He became a Fellow of ISASI in 1994. As Executive advisor, Capt. Stone has provided extremely valuable guidance to the ISASI Council and acts as the ISASI news media spokesman.

"Capt. Stone represented ISASI at the International Civil Aviation Organiza-



Richard Batt says “thank you” on behalf of the ATSB.

tion (ICAO) Accident Investigation and Prevention meeting in Montreal, Quebec, Canada, in 1999 (AIG/99). He also assisted the ISASI team with developing its input to the ICAO AIG/08 meeting in 2008 and has also participated as an instructor for ISASI Reachout workshops.

“He was the general and program chairman for the 1987 ISASI annual interna-



Capt. Stone makes his acceptance remarks.

tional seminar held in Atlanta, Ga., and will duplicate that position for ISASI 2011 to be held in Utah. He has served on several technical committees on various aviation safety topics, including human factors, and he has presented several technical papers before a wide variety of audiences, including testimony before the U.S. Congress. In summary, Capt. Stone exceeds all of

the requirements to be honored with the Jerome Lederer Award.”

The audience agreed and welcomed Capt. Stone to the lectern with great applause.

In his soft-spoken voice, he said: “I am humbled by this Award, especially since it has Jerry Lederer’s name on it. Thanks to the folks who, somehow, unearthed my experiences and put them on paper in sufficient order to gain this honor.

“When I look out at this audience I see many investigators I have worked with. They are some of my best friends. What we have in common is a strong connection to ethics in accident investigation.

“I ran into this principle in one of my first accident investigations. I was helping the Mohawk pilots who were an interested party in the Nov. 11, 1969, FH-227 accident at Glen Falls, N.Y. Each night the pilot investigators gathered to share their findings that day. Before the meeting two of the Mohawk investigators approached me with concern. They had found a pilot’s flight bag in the wreckage and it contained some medications. They had hidden the bag in nearby woods and wanted to know what to do about it. I said, ‘We ought to talk to the other pilot investigators about it.’ When the subject was out in the open at our meeting, I asked, ‘What are we doing as investigators here?’ They quickly responded that we were here to try to prevent similar type accidents. I asked, ‘Would hiding the bag help in finding the cause of the accident?’ They all agreed that the proper action was to bring the bag into the accident investigation.

“After the bag was brought in and thoroughly searched, it was determined that it belonged to a passenger who was a physician. I was very proud of these pilot investigators who realized that all facts must be brought before the accident investigation body if we are to protect safety of flight operations.

“Thank you all for selecting me to receive the Lederer Award.” ♦

Past Lederer Award Winners

- | | |
|---------------------------------------------------|------------------------------------------------------------------------|
| 1981—Dr. S. Harry Robertson | 1996—Burt Chesterfield |
| 1982—C.H. Prater Houge | 1997—Gus Economy |
| 1983—C.O. Miller | 1998—A. Frank Taylor |
| 1984—George B. Parker | 1999—Capt. James McIntyre |
| 1985—Dr. John Kenyon Mason | 2000—Nora Marshal |
| 1986—Geoffrey C. Wilkinson | 2001—John Purvis and the Transportation Safety Board of Canada |
| 1987—Dr. Carol A. Roberts | 2002—Ronald L. Schleede |
| 1988—H. Vincent LaChapelle | 2003—Caj Frostell |
| 1989—Aage A. Roed | 2004—Ron Chippindale |
| 1990—Olof Fritsch | 2005—John Rawson |
| 1991—Eddie J. Trimble | 2006—Richard H. Wood |
| 1992—Paul R. Powers | 2007—Thomas McCarthy |
| 1993—Capt. Victor Hewes | 2008—C. Donald Bateman |
| 1994—U.K. Aircraft Accidents Investigation Branch | 2009—Capt. Richard B. Stone and the Australian Transport Safety Bureau |
| 1995—Dr. John K. Lauber | |

AWARD OF EXCELLENCE WINNER

Closing the Loop on the System Safety Process: The Human Factors Intervention Matrix (HFIX)

(In publishing the winner of the “Best of Seminar” Award of Excellence technical paper, presented at ISASI 2009 in Orlando, Fla., on September 15, Forum is departing from its usual style format and is publishing it in its “technical paper” format as accepted by the ISASI 2009 seminar Technical Committee.—Editor)

In recent years, the aviation industry has focused more and more on the evaluation and assessment of human factors associated with accidents and incidents. This may be because the percentage (and absolute number) of aviation accidents attributable solely to mechanical failures has decreased remarkably over the past 40 years, but the percentage of aviation accidents due to human factors has remained between 70% and 80% (O’Hare et al., 1994; Wiegmann & Shappell, 2003).

To address the human component of aviation safety, many in the field have turned to a system safety for answers. While there are several variations to the basic approach, most models of system safety include the following components: data acquisition, hazard identification, hazard assessment, identification of intervention strategies to address specific hazards, an assessment of those strategies, intervention implementation, and system monitoring. Ideally, this is a dynamic process involving the real-time identification of hazards, identification and implementation of interventions, and some process for monitoring changes in the system.

General aviation hazard identification and assessment

In 1999, the FAA began using the Human Factors Analysis and Classification System (HFACS) as a tool to examine human factors associated with general

By Dr. Scott Shappell, Professor; Clemson University, Clemson, S.C., and Dr. Douglas Wiegmann, Associate Professor; University of Wisconsin, Madison, Wisc.

aviation (GA) accidents. Based, in part, upon Reason’s (1990) “Swiss cheese” model of human error, HFACS is a theoretically derived model of human error that describes human factors at each of four levels: 1) unsafe acts of operators (e.g., aircrew, maintenance personnel, and air traffic controllers), 2) preconditions for unsafe acts, 3) unsafe supervision, and 4) organizational influences. A brief description of each category is included in Appendix A. For a complete description of the HFACS framework, see Wiegmann and Shappell, 2003.

Originally developed for use with the United States Navy/Marine Corps, HFACS has since been employed in a variety of military (e.g., U.S. Army, U.S. Air Force, Royal Dutch Air Force, Hellenic Air Force, and Indian Air Force) and civilian aviation settings (e.g., Australian Transportation Safety Board, Air Canada, and Alaska Airlines), as well as other high-risk industrial environments like rail, mining, oil, and medicine. Particularly germane to this report is a series of investigations of GA accident data conducted by the FAA over the last several years (Detwiler et al., 2006; Shappell & Wiegmann, 2001, 2003a, 2003b, 2003c, 2004; Shappell et al., 2006; Wiegmann & Shappell, 2001a, 2001b, 2003; Wiegmann et al., 2005).



President Frank Del Gandio presents the Award of Excellence Plaque to Sheena Dickerson, who accepts on behalf of Drs. Shappell (top right) and Wiegmann (above right). Dickerson, a 2006 ISASI scholarship selectee and a master’s degree candidate at Embry-Riddle, works with Wiegmann and Shappell Associates as a class project.

Identification of GA hazards

Representative of the body of work referenced above was the examination of more than 14,000 GA human-factors-related accidents occurring between 1990 and 2000, described by Wiegmann et al., 2005. Using the HFACS framework, several interesting findings emerged (see Figure 1).

Second, skill-based errors were the most prevalent form of human error associated with GA accidents—having been implicated in roughly four out of every five accidents since 1990. This is not to say that poor decisions did not figure prominently in GA accidents. After all, nearly a third of all fatal GA accidents were associated with at least one decision error and a little less than 20% were associated with violations of the rules. In contrast, perceptual errors (often due to visual illusions and spatial disorientation) were associated with considerably fewer accidents. Moreover, this pattern of human error was evident whether one looked at all human causal factors or just the first human cause factor in the temporal chain of events leading to the accident.

Finally, while the percentage of fatal and non-fatal accidents associated with skill-based, decision, and perceptual errors was relatively equal, the proportion of accidents associated with violations was considerably higher for fatal accidents. In fact, the data suggest that pilots who violate the rules and are involved in an accident are four times more likely to perish or fatally injure someone. This latter finding was particularly striking since

pilots are repeatedly told that the “rules are written in blood”—a lesson apparently true even today.

Assessment of GA hazards

The next logical step was to *assess the hazards* within each HFACS error category (e.g., skill-based errors, decision errors, perceptual errors, and violations) and which errors were most common. A summary of the GA hazard assessment is presented in Table 1. The numbers alone would seem to imply that the largest threat to GA safety are skill-based errors like directional control on the ground (e.g., ground loops) as well as concerns regarding control of airspeed and flight controls leading to inadvertent stalls/spins. Equally important, however,

were inflight planning and decision errors, as were violations associated with visual flight rules (VFR) flight into instrument meteorological conditions (IMC), particularly given the emphasis within the FAA on reducing fatal GA accidents

(FAA, 2006). Notably, while the loss of directional control on the ground occurs quite frequently, it typically does not result in fatalities. By comparison, stalls/spins, errors associated with inflight planning/decision-making, and VFR flight into IMC may not occur as frequently but are often fatal when they do.

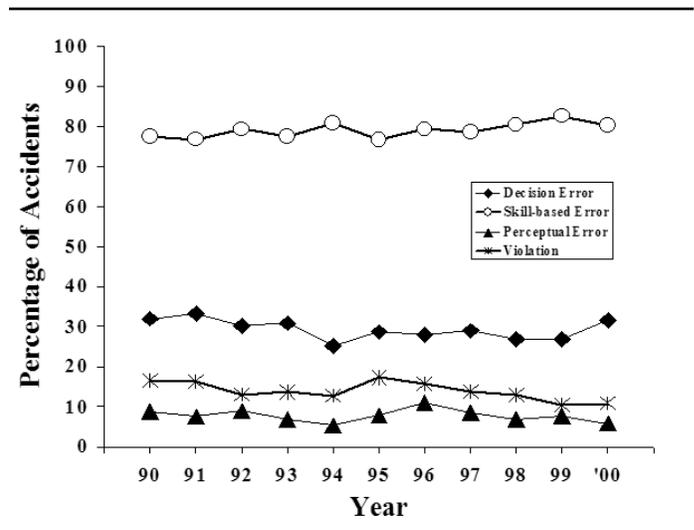


Figure 1. Percentage of accidents associated with at least one instance of a given unsafe act. Note that because each accident can be associated with multiple causal factors, the percentage of accidents for a given year will not equal 100%.

GA intervention identification and assessment

It would appear that with the addition of tools like HFACS within the human factors system safety process, we might be better able to identify and assess hazards associated with GA operations using existing NTSB accident records. The next step in the human factors system safety process is to identify and assess current, planned, and other potential interventions to address the hazards identified above. One system safety tool that may assist in that process is the Human Factors Intervention Matrix (HFIX; Shappell & Wiegmann, 2006).

The HFIX tool contrasts the causal factors identified within HFACS against five approaches to accident intervention and mitigation identified in the literature (see Figure 2). While a complete description of HFIX is beyond the scope of this review, in general HFIX employs five broad areas around which interventions can be developed: 1) organizational/administrative, 2) human/crew, 3) technology/engineering, 4) task/mission, and 5) operational/physical environment. Each is briefly summarized in

Award of Excellence

Dr. Scott Shappell and Dr. Douglas Wiegmann earned the ISASI Award of Excellence for their paper *Closing the Loop on the System Safety Process: The Human Factors Intervention Matrix*, which was judged to be “Best Seminar Paper” of those papers presented at the ISASI 2009 seminar on aviation accident investigation held in Orlando, Fla., Sept. 14-18, 2009.

The Award was established through an anonymous donation by an ISASI member who wished to acknowledge a paper at the annual seminar that made an outstanding contribution to the advancement of technical methodologies in aircraft accident investigation. The

Excellence selection carries a US\$500 prize. The authors have announced that they are contributing the \$500 to the ISASI Rudolph Kapustin Memorial Scholarship Fund.

The ISASI 2009 judging panel was composed of the three selectees to receive the 2009 ISASI Scholarship Award: Dajuan B. Sevillian, Brian Dyer, and Murtaza Telya. The three were selected to serve as judges to bring a youthful, fresh perspective to the judging process. The Award is judged on applicability to the seminar theme, oral presentation, graphic support of the paper, and presentation within the time allotted. ♦

Table 2. For a more complete description, please see Shappell & Wiegmann, 2006.

In effect, by mapping prospective interventions onto the HFIX matrix, it would be apparent to senior officials within the FAA the breadth of a proposed safety program (i.e., is the program uni- or multidimensional?) and the exact aspects of human behavior that were targeted. Given that

In addition, the raters were instructed to identify *any* HFACS unsafe acts categories (i.e., skill-based errors, decision errors, perceptual errors, and violations) they felt the intervention would impact. This latter task could involve multiple categories, since many interventions addressed more than one aircrew unsafe act.

The findings demonstrated that as with an earlier examination of NTSB recommendations (Wiegmann & Rantanen, 2003), roughly a third of the JSIT recommendations involved organizational/administrative interventions. Likewise, many (22.2%) of the recommendations involved technological/engineering approaches. However, unlike the NTSB where relatively few recommendations directly targeted changes with the human/crew, nearly a third of those obtained from the JSITs did so.

As for what types of aircrew unsafe acts were targeted, it was not entirely surprising that interventions aimed at decision errors were associated with nearly three out of every four JSIT recommendation examined. In contrast, skill-based errors were associated with roughly half of the recommendations followed by perceptual errors (37.6%) and violations (26.9%). These numbers are noticeably different from the percentage of accidents associated with each type of error where skill-based errors account for nearly 80% of the GA accidents examined. Indeed, while

roughly a third of the accidents were associated with decision errors, 72.6% of the interventions appeared to target pilot decision-making.

This is not to say that there should be a one-to-one relationship between the percentage of accidents associated with a given error category and the percentage of recommendations targeting their reduction. After all, it may take more effort

HFIX could be used proactively to determine which areas an organization has “covered” and where gaps exist given current trends in the error data.

to address one error form than another. Besides, more interventions may naturally address pilot decision-making. Likewise, human errors are not necessarily orthogonal. That is, one type of error may lead to another (e.g., a bad decision can set a pilot up for a skill-based error). Regardless, the global analysis presented here suggests that additional review of this apparent incongruity may be warranted.

Perhaps more important, however, was the mapping of each intervention within

	Organizational/ Administrative	Human/ Crew	Technology/ Engineering	Task/ Mission	Operational/ Physical Environment
Decision Errors					
Skill-based Errors					
Perceptual Errors					
Violations					

Figure 2. The Human Factors Intervention matrix (HFIX). For simplicity, only the four unsafe acts are illustrated.

human error is, by its very nature, complex and multidimensional, it seems reasonable that any strategy for addressing it would likewise be multidimensional and represent a “strategy” or “program,” rather than an individual intervention, per se.

In addition, HFIX could be used proactively to determine which areas an organization has “covered” and where gaps exist given current trends in the error data. For instance, if decision-makers knew that the largest threat to GA safety was skill-based errors (as was shown above), followed by decision errors, violations, and perceptual errors, HFIX could be used to determine if proposed and future interventions have the potential to address those needs and which areas are currently being targeted. Furthermore, it would be possible to refine intervention identification and assessment if one knew exactly what type of skill-based error or other unsafe act was to be addressed.

To assess these proposed safety programs, 18 graduate students with aviation experience and graduate-level human factors training independently classified more than 600 Joint Safety Implementation Team (JSIT) recommendations into *one* of the five HFIX intervention approaches.

As for what types of aircrew unsafe acts were targeted, it was not entirely surprising that interventions aimed at decision errors were associated with nearly three out of every four JSIT recommendation examined. In contrast, skill-based errors were associated with roughly half of the recommendations followed by perceptual errors (37.6%) and violations (26.9%). These numbers are noticeably different from the percentage of accidents associated with each type of error where skill-based errors account for nearly 80% of the GA accidents examined. Indeed, while

Aircrew Unsafe Act	Frequency (Percentage)
Skill-Based Errors	
Directional control on the ground	2,345 (12.9%)
Airspeed	2,008 (11.1%)
Stall/spin	1,400 (7.7%)
Aircraft control in the air	1,359 (7.5%)
Compensation for wind conditions	1,179 (6.5%)
Total Skill-based Errors Committed	18,136 (100%)
Decision Errors	
Inflight planning/decision-making	1,061 (18.2%)
Takeoff/landing from unsuitable terrain	431 (7.4%)
Preflight planning/making	393 (6.7%)
Refueling	367 (6.3%)
Go-around	354 (6.1%)
Total Decision Errors Committed	5,845 (100%)
Violations	
VFR flight into IMC	269 (10.7%)
Operating with known deficiencies	269 (10.7%)
Failure to adhere to procedures/directives	260 (10.4%)
Flight into known adverse weather	223 (8.9%)
Aircraft weight and balance	162 (6.5%)
Total Violations Committed	2,503 (100%)

¹ Perceptual errors are not shown due to the low frequency.

Table 1. Specific Types of Errors Associated with General Aviation Accidents¹

both the intervention approach and the HFACS unsafe acts category (Figure 3). As can be seen, three of the 20 possible elements within the HFIX framework (organizational/administrative by decision error, human/crew by decision error, and human/crew by skill-based error) contained 20% or more of the JSIT interventions. As before, the percentages within the matrix will not add up to 100% because each intervention can be judged to affect multiple HFACS unsafe acts.

On the surface, this appears to reflect a somewhat narrow rather than a broad approach to accident intervention/mitigation by these committees. Not that the interventions contained within these categories would not be effective, just that other, potentially equally viable, interventions may have been overlooked.

It is also interesting to note that if one examines the elements that contained between 10-20% of the possible interventions, nearly all of the remaining boxes among the organizational/administrative, human/crew, and technology/engineering approaches were included. What were not accounted for were human/crew and technology/engineering approaches dealing with the willful disregard for the rules and regulations (i.e., violations). Likewise, administrative approaches for addressing perceptual errors were below 10%.

Equally notable was the general lack of interventions targeting the specific task/mission of the aircrews or the environ-

Organizational/Administrative

Human Resource Management: Adequacy of staff in specific situations, the need for additional personnel, and the evaluation of individual skills of employees.

Rules/Regulations/Policies: Issuing, modifying, establishing, amending, and/or reviewing policies, rules, or regulations.

Information Management/Communication:

Improvements in disseminating, storing, archiving, and publishing information. Also included are recommendations regarding collection of data, issuing information, and reporting activity.

Research/Special Study:

Conducting research to determine the impact of recent technological advances or call for special studies to review processes, develop/validate methodologies, etc.

Task/Mission

Procedures: Amending, reviewing, modifying, revising, establishing, developing, and validating procedures.

Manuals: Reviewing, revising, issuing, and modifying manuals, bulletins, checklists, and other instructions or guidance.

Technology/Engineering

Design/Repair: Specific manufacturing changes including the design of parts. Also included is the modification, replacement, removal and/or installation or repair of parts and equipment.

Inspection: Maintenance inspections, overhauling, detecting damage including such day-to-day operations as inspecting fuel, oil level, and recommended safety checks.

Operational/Physical Environment

Operational/Physical Environment: Modifications to the operational environment (e.g., weather, altitude, terrain) or the ambient environment, such as heat, vibration, lighting, and eliminating toxins to improve performance.

Human/Crew

Training: Reviewing, developing, and implementing training programs. Also included is the training of personnel in handling emergencies.

Table 2. Brief description of HFIX intervention categories

ment they were faced with. Perhaps a closer examination of the type of operations GA aircrew are engaged in or the environments they are exposed to would prove fruitful in the development of additional interventions. Regardless, these findings suggest that there may have been options that were not considered as important by these select committees.

technology, systems, design, and procedures that directly support six of the agency's principal operational and regulatory responsibilities: acquisition, air traffic services, certification of aircraft and aviation personnel, operation and certification of airports, civil aviation security, and environmental standards for civil aviation. Of particular interest to this analysis were those R, E, & D programs with potential use within GA.

Examination of current safety programs

While the HFIX analysis of JSIT data examined future safety programs, a similar analysis of the FAA's National Aviation Research Program (NARP) would provide the best estimate of current safety programs. That is, the NARP describes current research, engineering, and development (R, E, & D) programs aimed at the development and validation of

In much the same manner as the study examining future safety programs, 42 FAA aviation safety inspectors (n=33), air traffic controllers (n=3), and managers (n=6) attending a weeklong Department of Transportation-sponsored human factors accident investigation course were asked to independently classify 273 separate R, E, & D programs funded between 1999-2005 into one of the five HFIX intervention approaches. In addition, the participants were instructed to identify any HFACS unsafe acts categories they felt the intervention would impact. The one notable difference between the studies was that in this study the data set was randomly parsed so that at least five (but as many as nine) respondents independently reviewed each R, E, & D program. A simple majority was required for any category to be counted.

Another important difference was that

		INTERVENTIONS				
		Organizational/ Administrative	Human/ Crew	Technology/ Engineering	Task/ Mission	Operational/ Physical Environment
HFACS UNSAFE ACTS	Decision Errors	25.9%	26.9%	13.4%	5.7%	0.8%
	Skill-based Errors	13.8%	20.7%	12.5%	2.4%	0.2%
	Perceptual Errors	9.0%	12.7%	12.4%	2.4%	1.1%
	Violations	14.3%	7.8%	2.8%	1.3%	0.7%

Figure 3. The percentage of JSIT recommendations classified by intervention approach and HFACS unsafe act. Note that while the percentage of recommendations across intervention approaches will add up to 100%, those across categories of unsafe acts will not. See the text above for an explanation.

rather than targeting GA safety alone, many of the R, E, & D programs were aimed at both GA and air carrier aviation. Instead of trying to distinguish which particular type of operation a given program currently targeted, all human factors programs were considered. This was done because many successful air carrier safety

the HFACS unsafe acts were surprisingly similar to those proposed by the JSITs. The overwhelming majority (71.8%) of the R, E, & D efforts targeted pilot decision-making with decidedly fewer targeting skill-based errors (40.3%) and perceptual errors (34.4%). Perhaps most surprising in the analysis of R, E, & D programs was the

finding that very few (less than 15%) were aimed at violations of the rules. Remember, the SMEs were permitted to identify all the unsafe acts that they felt would be affected by a given R, E, & D program.

When mapping the NARP R, E, & D programs onto both the intervention approach and HFACS unsafe acts category some similarities with the JSIT data emerged (see Figure 4). For instance, organizational/administrative approaches that target pilot

decision-making accounted for a large percentage (21.6%) of the R, E, & D efforts examined. However, nearly a third of the R, E, & D efforts focused on some sort of technology aimed at improving pilot decision-making—some 17% higher than that seen with the JSIT recommendations. Surprisingly few interventions targeted violations of the rules—less than 10% across the board and less than 5% if organizational/administrative approaches were not considered. As with the JSIT interventions, very few R, E, & D programs examined targeted improvements associated with the task/mission or the operational/physical environment.

		INTERVENTIONS				
		Organizational/ Administrative	Human/ Crew	Technology/ Engineering	Task/ Mission	Operational/Physical Environment
HFACS UNSAFE ACTS	Decision Errors	21.6%	13.2%	30.4%	3.3%	3.3%
	Skill-based Errors	11.7%	10.6%	13.2%	3.7%	1.1%
	Perceptual Errors	7.0%	3.7%	19.8%	2.6%	1.5%
	Violations	7.3%	2.6%	2.2%	0.7%	0.4%

Figure 4. Percentage of R, E, & D programs classified by intervention approach and specific HFACS unsafe act addressed. Note that while the percentage of recommendations across intervention approaches will add up to 100%, those across categories of unsafe acts will not. See the text above for an explanation.

programs, like LOSA and FOQA, have potential uses within GA.

As with the JSIT (future program) analysis, nearly a third of the R, E, & D programs involved organizational/administrative approaches that focused on such things as developing non-precision global positioning sensor (GPS) routes for emergency medical facilities and establishing certification standards for GA auto navigation and control systems using pilot performance data and flight simulation. Considerably fewer R, E, & D efforts were human-centered (15%) while decidedly more utilized technology (more than 40%) to improve safety. Obviously, technology that provides pilots better weather information in flight can increase aviation safety. However, developing programs that train pilots to recognize hazardous weather and make judicious inflight decisions might also be of use. Like the JSIT interventions, few R, E, & D efforts targeted changes within the task/mission or operational/ physical environment.

The R, E, & D efforts associated with

decision-making accounted for a large percentage (21.6%) of the R, E, & D efforts examined. However, nearly a third of the R, E, & D efforts focused on some sort of technology aimed at improving pilot decision-making—some 17% higher than that seen with the JSIT recommendations. Surprisingly few interventions targeted violations of the rules—less than 10% across the board and less than 5% if organizational/administrative approaches were not considered. As with the JSIT interventions, very few R, E, & D programs examined targeted improvements associated with the task/mission or the operational/physical environment.

Intervention generation and evaluation using HFIX

One area of particular interest to the FAA

		INTERVENTIONS				
		Organizational/ Administrative	Human/ Crew	Technology/ Engineering	Task/ Mission	Operational/Physical Environment
HFACS UNSAFE ACTS	Decision Errors	24.5%	22.6%	18.6%	5.0%	1.6%
	Skill-based Errors	13.2%	17.6%	12.7%	2.8%	0.5%
	Perceptual Errors	8.3%	9.9%	14.6%	2.5%	1.2%
	Violations	12.2%	6.2%	2.6%	1.1%	0.6%

Figure 5

Intervention	Effectiveness	Acceptability	Feasibility	Cost	Average
Standardize initial flight training that covers VFR into IMC.	4.8	4.2	4.6	4.0	4.4
Require spatial disorientation training for all pilots.	4.6	4.4	4.4	4.0	4.4
Make VFR into IMC training a special emphasis on the biennial flight review.	4.4	4.0	4.6	4.2	4.3
Conduct awareness training within ground school that demonstrates flight in weather (e.g., videos of A/C exceeding structural capabilities).	4.4	4.4	4.2	3.8	4.2
Include training on the importance of communication and radio calls for items that may seem trivial or embarrassing (e.g., informing ATC that unfamiliar with the area).	4.0	3.6	4.6	4.4	4.2
Require that instructors are able to complete all the maneuvers they teach.	4.4	3.8	4.2	4.2	4.2
Add a weather update to the enroute checklist.	3.8	3.6	4.0	5.0	4.1
Create an incentive program that teams with insurance programs.	4.2	4.0	3.6	4.0	4.0
Mandate minimum standards and training for all equipment used in an aircraft.	4.2	4.0	4.2	3.4	4.0
Include training on decision-making versus skill in dealing with the hazards of flying in IMC.	4.0	3.6	3.8	4.2	3.9

Table 3. Top 10 Interventions by Average on a Scale of 1 “Worst” to 5 “Best”

is flight into adverse weather. During the last 20 years, nearly 40,000 general aviation (GA) aircraft have been involved in accidents—of which roughly 20% involved fatalities (Shappell & Wiegmann, in press). Tragically, many of those fatal accidents involved encounters with adverse weather (Detwiler, Boquet, Holcomb, Hackworth, Wiegmann, & Shappell, 2006; Wiegmann, Boquet, Detwiler, Holcomb, Faaborg & Shappell, 2005; NTSB, 2005).

To illustrate how HFIX can be used in an intervention generation mode rather than simply an intervention evaluation mode we enlisted the support of several aviation experts. In the first phase (intervention development), 218 participants with expertise in a variety of aviation specialties (i.e., pilots, flight instructors, student pilots, aerospace engineers, air

traffic controllers, mechanics, aviation administrators, government regulators, and aviation faculty) were enlisted from five locations: Embry-Riddle Aeronautical University (ERAU), the Canadian Helicopter Corporation (CHC), the Transportation Safety Institute (TSI), the Federal Aviation Administration (FAA), and Alaska Airlines.

At each location, participants were split into five groups of similar sizes. Each group was assigned a particular approach and instructed to generate as many interventions within that particular approach as possible. For instance, if assigned to the human/crew approach participants were instructed to generate programs that would reduce the likelihood that a pilot would initiate flight into adverse weather only by changing the

behavior of the aircrew. Ideas such as “conducting annual training to review/enhance knowledge of the adverse effects of weather on flying” and “creating a mentoring program for all new pilots” were typical of these groups.

The interventions were then given to five pilot-SMEs for prioritization. All had served previously as pilot-SMEs during the coding of human causal factors using the HFACS framework in the studies reported earlier. Using a scale of 1 to 5 with 1 representing “low” or “poor” and 5 representing “high” or “excellent” each pilot-SME was asked to rate each prospective intervention on each of four dimensions: effectiveness, feasibility, acceptability, and cost. These dimensions were chosen because they have been used successfully in the past by the JSIT. Clearly, factors such as *effectiveness* (i.e., What is the likelihood that it will reduce GA accidents?), *cost* (i.e., Can the organization afford the intervention?), *feasibility* (i.e., How easy will it be to implement the intervention or does it actually exist?), and *acceptability* (i.e., Will the pilot community accept the proposed intervention?) are all important to the successful employment of safety interventions. Likewise, *cost* is of tremendous concern among many organizations—particularly during times of fiscal austerity.

There are many ways to analyze the intervention rankings using the four dimensions (feasibility, acceptability, cost, and effectiveness). For instance, one could treat each dimension equally and merely sort the potential interventions based upon the overall average of the four ratings. By treating each dimension equally, a “top 10” list of interventions was identified and is presented in Table 3.

What is apparent from the list is that many involve some degree of training. Whether that training deals with preventing pilots from flying into instrument conditions (i.e., information regarding the hazards associated with VFR flight into IMC beyond current levels) or how to survive once one gets there (e.g., spatial disorientation training and the importance of communicating with air traffic control and flight service stations when in adverse weather), many of the higher rated interventions seem almost intuitive. Indeed, many are already being considered at some level within the GA (continued on page 30)

Dr. Scott Shappell is a professor of industrial engineering at Clemson University. Before joining the faculty at Clemson, Dr. Shappell was the Human Factors Research Branch manager at the Civil Aerospace Medical Institute. In addition, he has served for more than 16 years in the U.S. Navy as an aerospace experimental psychologist. He has published/presented more than 200 papers, books, and presentations in the fields of accident investigation, system safety, spatial disorientation, sustained operations, and fatigue. Dr. Shappell received a B.S. in psychology (1983) from Wright State University graduating summa cum laude with honors in psychology and a Ph.D. in neuroscience from the University of Texas Medical Branch in 1990.

Dr. Douglas A. Wiegmann is an associate professor of industrial and systems engineering at the University of Wisconsin. Before joining the faculty in Madison, Wisc., he was a National Institutes of Health Roadmap Scholar at the Mayo Clinic College of Medicine where he also served as the director of human factors and patient safety research within the Division of Cardiovascular Surgery at Mayo. A private pilot, Dr. Wiegmann has also been an associate professor of human factors at the University of Illinois in Urbana-Champaign. Dr. Wiegmann received his Ph.D. in cognitive psychology in 1992 from Texas Christian University and formerly served as an aviation psychologist and accident investigator for both the National Transportation Safety Board and the United States Navy.

Int'l Council Approves Formation of AsiaSASI

The ISASI International Council gave unanimous approval to form the Asian Society of Air Safety Investigators (AsiaSASI) at its recently held meeting prior to the ISASI 2009 seminar in Orlando, Fla. During the seminar, President Frank Del Gandio announced the news at the annual business meeting for assembled ISASI members. All



PHOTOS: E. MARTINEZ

Preparing to address the ISASI International Council are, left to right, Y.P. Tsang, representing CAD of Hong Kong, and Ikuo Takagi, representing Japan Transport Safety Board.

ISASI members in Asia are automatically AsiaSASI members, and there is no separate membership fee for AsiaSASI.

Development of AsiaSASI was several years in the making. During the ISASI 2007 seminar, held in Singapore in August 2007, many ISASI members in Asia surfaced the idea of forming an Asian regional chapter of ISASI, to be called the Asian Society of Air Safety Investigators. Working in consultation with Caj Frostell, ISASI international councillor, the group moved forward with its idea.

In March 2009, the Air Accident In-

vestigation Bureau of Singapore (AAIB Singapore) took the step of approaching a number of ISASI members in Asia to ascertain their interest in forming AsiaSASI. The response was extremely encouraging. Eighteen ISASI corporate members and four ISASI individual members in Asia agreed to be founding members of AsiaSASI and nominated the AAIB Singapore to be the organizing secretary to work with ISASI to create AsiaSASI.

With the full support of ISASI, the AAIB Singapore began developing its internal infrastructure and organizing an AsiaSASI election exercise. Unlike other ISASI societies that have individuals as its officers, AsiaSASI will have organizations serve in that capacity. The following members were elected by the founding members, and they will hold office for 2 years:

- President—Civil Aviation Department of Hong Kong (HK CAD)
- Vice-President—Japan Transport Safety Board (JTSB)
- Secretary—Air Accident Investigation Bureau of Singapore

AsiaSASI will work together with ISASI and other regional societies to advance the cause of ISASI in Asia. Norman Lo, director-general of HK CAD, on behalf of HK CAD as president of AsiaSASI has spelled out the following major aims for AsiaSASI:

- to promote the free exchange of safety information and the sharing of experience on aircraft accident investigation.
- to establish the investigation resources network and relationship among aircraft accident investigation bodies in the region.
- to strive for international recognition of the expertise and professionalism of aircraft accident investigators.
- to develop the continual competence of aircraft accident investigators.

The three AsiaSASI office holders met in Japan on October 9 to discuss the future direction and activities of AsiaSASI. ♦

U.S. Councillor Resigns; Toby Carroll succeeds



Just prior to ISASI 2009, U.S. Councillor Curt Lewis submitted his letter of resignation as U.S. councillor to ISASI President Frank Del Gandio. Named to succeed him is Toby Carroll, a long-term ISASI member and director of air safety for Continental Airlines.

Toby Carroll, U.S. councillor

In his letter, Lewis said, "At this time I wish to resign...due to increasing demands for my time from my business commitments and a new full-time academic position I have accepted with Embry-Riddle Aeronautical University. I have enjoyed working with the International Council. I plan to continue my membership, support, and participation in the Society."

The Council, at its September meeting, expressed its appreciation for Lewis's efforts and contributions to the successes of the U.S. Society and the Dallas-Ft. Worth Chapter of which he served as president. Lewis held the office of U.S. councillor since his first election win in 1998. ♦

ATS Working Group Gets New Chair

The Air Traffic Services Working Group held its formal annual meeting during the ISASI 2009 seminar. A quorum of members attended and considered the way forward for the Working Group into the coming year.

The meeting welcomed the appointment of Scott Dunham (NTSB) to the role of chairman of the ATS Working Group. Scott will take the Group into the future with refreshed perspectives and professional diversity.

ISASI 2010 CALL FOR PAPERS

ISASI's 41st annual seminar will be held in Sapporo, Japan, Sept. 6–9, 2010. Our Japanese hosts have chosen the theme of "Investigating ASIA in Mind—Accurate, Speedy, Independent, and Authentic." Papers are invited that address investigative or analytical methods, issues, or past findings that illustrate timeliness, technical competence, and intellectual integrity that is free of political constraints. Topics may address any segments of the air carrier industry or general aviation. An expression of interest in delivering a paper should be sent by e-mail no later than Feb. 1, 2010, to bob.matthews@faa.gov or to kakimoto-yukiko@gmail.com. Please include a working title for your presentation. Abstracts must be submitted by April 1, 2010, from which final papers and presentations will be invited for submission by June 15, 2010. ♦



Scott Dunham,
ATS Working
Group chair

Principal topics for discussion related to issues associated with the worldwide challenge of future ATS re-equipment programs in the medium term. The meeting attendees debated optimum methods of alignment and determined that an approach to the Civil Air Navigation Services Organization (CANSO) represented the most effective means to achieve this end. This action will begin shortly, and the membership will be advised of progress on this front.

The meeting concluded with John Gusselli officially stepping down from the role of chairman in order to concentrate on chairing the ISASI Reachout Committee. He has held this position since 2002. ♦

Cabin Safety WG Meets in Orlando

The Cabin Safety Working Group met at the ISASI 2009 seminar in Orlando. The meeting was led by Ruth Ann Bledsoe, the safety, health, and security chairperson for Alaska Airlines in Anchorage and the Association of Flight Attendants Council 30.

The Group viewed the new Alaska Airlines ergonomic safety video "Think Before You lift!" which addresses the growing number of crewmember injuries caused by flight attendants assisting customers who are cramming overweight and oversized luggage into the overhead bins on passenger aircraft.

This problem is aggravated by the recent proliferation of charges for checked bags. There appears to be little or no enforcement of size and weight restrictions for hand-carried baggage. Often flight attendants need to provide assistance in storing the bags. The "Think Before You Lift!" video provides specific ergonomic guidelines on how to handle this overloaded and ungainly situation while avoiding permanent damage in a classic on-the-job injury.

A lively discussion on recent slide malfunctions during emergency egress situations followed the video. Participants Juan Sendagorta of Sener Engineering Systems and Christopher Dann of Transport Canada focused on egress injury and survivability issues associated with upper deck slides from the B-747 and the new A380.

Eric Savage of the Robertson Aviation Safety Center offered to provide a detailed briefing on this topic for the Group at next year's ISASI seminar in Sapporo. Bledsoe thanked all of the par-



CSWG members viewing the "Think Before You Lift" video are, from left, Juan Sendagorta, Ruth Ann Bledsoe, and Christopher Dann.

ticipants for their continuing efforts to make the Cabin Safety Working Group a viable and enthusiastic contributor to the overall aviation safety process. ♦

Corporate Working Group Gains New Chair

After several years as chairman of the Corporate Working Group, John Purvis has resigned his position to concentrate on other things, specializing in retirement. During the Orlando seminar, ISASI President Frank Del Gandio appointed Erin Carroll, manager of flight safety investigations for Southwest Airlines, as the new chairman of the Working Group. She will be assisted by Andrew Sachs of Alaska Airlines and Jeremy Katt of Parker Aerospace as required. Erin can be reached at erin.carroll@wnco.com.



At the Corporate WG meeting held during the Orlando seminar, 12 corporate members were present. In addition, President Frank Del Gandio and Adviser Dick Stone attended. Del Gandio addressed the Group and pointed out how their support has always been vital to the success of ISASI's mission. After thanking the Group for its backing and sponsorship, he asked, "What more can ISASI do for you?" In response, some interesting and helpful comments were received, especially about the timing of invoices. ♦

European SASI Sets Annual Seminar Dates

Following the success of its seminar last year, the European Society of Air Safety Investigators announces that its third air safety seminar will be held in Toulouse, France, April 29–30, 2010, with

ISASI ROUNDUP

Continued . . .

an optional technical visit on April 28.

With emphasis on current European issues in the investigation and prevention of accidents and incidents, the 2-day seminar is aimed at accident investigation professionals and will provide an opportunity to update professional knowledge and skills, as well as to meet other active air safety investigators. Presentations will address current issues in the European environment and the challenges of modern air safety investigations.

The 2-day program will be held at the École Nationale de l'Aviation Civile (ENAC) situated in the south of Toulouse. Hotel accommodations have been



Members of ESASI discuss the 2010 seminar.

arranged at the Mercure Toulouse Saint Georges with a discounted room rate.

For bookings and further details, please contact ESASI Councillor Anne Evans, Tel: +44 (0) 1252 510300, e-mail: aevans@aaib.gov.uk or ESASI Secretary John Dunne, Tel: +44 (0) 7860 222266, e-mail: j.dunne@btinternet.com. ♦

contact David Lim or Chong Chow Wah via e-mail at MOT_IAI_FORUM@mot.gov.sg. ♦

Reachout Committee Report

The Reachout Committee was well represented during the Orlando seminar and individual members met with a number of strategic stakeholders, critical to the success of the Reachout concept.

This active networking was supplemented by a formal seminar presentation by Chairman John Guselli. His presentation titled Does Charity Begin At Home? provoked delegates to consider the plight of some less-fortunate states that operate hand-in-hand with all the stakeholders in our industry.

Practical examples of the imbalance of resources and the continuing implications for global air safety were presented and reinforced with statistics. Delegates were advised that the strategic position of the Committee remains aligned to consolidation, in preparation for the eventual recovery of the industry.

The Reachout page on the website Error! Hyperlink reference not valid has recently been updated to indicate the profiles and capabilities of the Committee membership. In the near future, this page will be supplemented with similar data related to the many volunteers, past and present, who have offered time and expertise to assist this worthy cause. ♦

MOVING? Please Let Us Know

Member Number _____

Fax this form to 1-703-430-4970 or mail to ISASI, Park Center
107 E. Holly Avenue, Suite 11
Sterling, VA USA 20164-5405

Old Address (or attach label)

Name _____

Address _____

City _____

State/Prov. _____

Zip _____

Country _____

New Address*

Name _____

Address _____

City _____

State/Prov. _____

Zip _____

Country _____

E-mail _____

*Do not forget to change employment and e-mail address.

Singapore AAIB Hosts Accident Investigation Forum

The Air Accident Investigation Bureau of Singapore (AAIB) of the Ministry of Transport and the Singapore Aviation Academy (SAA) of the Civil Aviation Authority of Singapore will jointly host an International Accident Investigation (IAI) Forum at the SAA April 21–23, 2010.

While many international investigation conferences have a high level of technical content, the IAI Forum aims to focus on organizational, infrastructural, and management issues faced by government officials who have a responsibility for discharging their countries' investigation obligation under Annex 13 to the Convention on International Civil Aviation.

ICAO, ISASI, the European Civil Aviation Conference, the Flight Safety Foundation, French BEA, Japan JTSB, Korea ARAIB, and the U.S. NTSB have expressed support for the IAI Forum. For more information on the IAI Forum,

Lederer Winner Bateman Addresses PNR

Don Bateman, the 2008 Lederer Award recipient, spoke to the Pacific Northwest Regional Chapter at its technical meeting held at the Boeing Longacres training facilities last August. Don is best known for his work with ground proximity warning systems but is currently working on technology to reduce runway incursions. During the meeting, Don showed the technology involved in the various systems being developed and then spent considerable time answering questions from the audience.

PNRC plans to continue its technical meetings on a regular basis. Guests from other regions are always invited to attend any of the Chapter meetings. Details on the exact times and locations for these presentations may be obtained directly from Chapter President Kevin Darcy at kdarcy@safeserv.com. ♦

Corporate Member SCSITrains Botswana Groups

The Southern California Safety Institute (CP0098) recently completed an extended training program in Gaborone, Botswana. SCSI's aviation safety course combined an in-depth course of instruction in both aviation safety management systems

DUES NOTICE

Members will note in their dues notice that the International Council approved a dues increase to \$80 annually. Invoices for the Jan. 1–Dec. 31, 2010, year have been mailed. All individual members are asked to check individual identification information and update it, if necessary. Members are reminded that the deadline for payment is Jan. 31, 2010. A fee of \$20 will be assessed for late payments. Credit card payment may be made. See the mailed invoice for details. Checks should be made payable to ISASI and forwarded to ISASI, 107 E. Holly Avenue, Suite 11, Sterling, VA, USA 20164-5405. ♦

(SMSs) and aircraft accident investigation for the Botswana Police Service (BPS) Air Support Branch and the Botswana Defence Force (BDF) Air Arm.

Thirty students representing these organizations spent 8 weeks in class studying aircraft accident investigation techniques, aviation physiology, aeromedical aspects of investigation, aviation psychology and human factors, communication skills, safety management systems, and safety technology, including aerodynamics, aircraft material factors, and aviation physics.

The objective of the training program was to establish a foundation of aviation safety for the Botswana Police Service, which is implementing a new Aviation

Support Branch for the BPS. It also was designed to increase the aviation safety capabilities of the Botswana Defence Force, enhancing its existing aviation safety program.

SCSI instructors for this effort—all ISASI members—included Gary Morphew; Tarek Sardana, M.D.; Chris Hallman; Steve Preteska; and Richard Perry. Organized by the BPS, the course was conducted in a classroom set up in the BDF's Sir Seretse Khama barracks officer's mess. ♦

Corporate Members Receive Membership Recognition

Ten new corporate members were recognized during the awards banquet at the close of the ISASI 2009 seminar at Orlando, Fla., USA. Unfortunately, not all new members were able to have representatives present to receive the specially designed membership plaque that is awarded at the banquet (see page 10).

Representatives present received their plaque from President Frank Del Gandio. They included the Administration des Enquestes Techniques, represented by Jean-Claude Medernach; the National Transportation Safety Committee Indonesia International, represented by Tatang Kurniadi, chairman; Pakistan International Airlines, represented by Wing Cdr. Syed Nassem Ahmed; Avisure-Australia, represented by proxy Lindsay Naylor; and Qatar Airways, represented by Jaime Alegado. Qatar was a Wright Brothers sponsor of ISASI 2009.

Organizations recognized but which had no representative present included the Australian & International Pilots Association, Allianz Aviation Managers, Air Astana International, Air Safety Investigations ESASI, and Nova Aerospace. ♦



Students attend the SCSI training program.

Award of Excellence Winner, *continued from page 25*

community. In those cases, this analysis may provide some additional support for continuing existing efforts. In contrast, where the interventions identified here are novel, it may provide those charged with GA safety a fresh approach to a historical problem.

While considering all four dimensions equally has some appeal, many organizations are more interested in one characteristic (e.g., effectiveness) than another (e.g., cost). For instance, if the organization was most interested in whether a given intervention would be effective, the top-rated interventions may change. Depending upon how one weighs a given characteristic, different interventions may come to the top.

Discussion

There is no denying that system safety concepts have proven very beneficial within the aviation domain. However, its utility within human factors has yet to be fully leveraged within the aviation industry.

At a minimum, the studies presented here suggest that it is possible to integrate system safety concepts within GA human factors. In doing so, safety professionals and decision-makers within the FAA

have been provided a unique glimpse at the roots of many GA accidents—human error. Beyond that, existing and proposed interventions have been organized within a single matrix that integrates human error theory and human factors approaches to accident/incident prevention.

By combining both, it may now be possible for the FAA to put the intervention pieces together in such a way that they can obtain a “quick look” at the strengths and weaknesses of their safety initiatives.

Additionally, it provides decision-makers within the FAA the ability to ensure that a broad spectrum of interventions has been considered.

Where gaps exist, HFIX provides a means to “fill the gaps” and assess those interventions that are most likely to address a perceived human factors need.

In the end, it is hoped that tools like HFACS and HFIX will ensure that *human factors* system safety will become a reality and that ultimately GA accidents attributable to human error will be reduced. ♦

(Space limitations precluded use of cited references which, at a later date, may be found in Proceedings 2009 on the ISASI website.—Editor)

WHO'S WHO

Continued from page 32

cusses how to do a “gaps analysis,” the safety risk control process, and creating and understanding an ICAO-based SMS organization with its four pillars and 12 elements.

The SMS-workshop requires attendees to bring to class their own preliminary gaps analysis—where practical—so they can start learning how to close the gaps. The OC-workshop and ORM course then complete the core courses in the Program. The OC-W addresses successful tools, techniques, and best practices to introduce change in organizations, while avoiding the typical barriers and “booby traps” that can impact the pace, receptiveness, and thoroughness of organizational changes. ORM provides a proactive approach to hazard

identification, associated levels of risk, and mission impact.

For many years, SCSi has hosted the annual International Aircraft Cabin Safety Symposium. The IACSS, now in its 27th year, brings cabin training and safety professionals together to the only forum dedicated to the safety and health of the aircraft cabin environment both for passengers and crew.

Because SCSi's training is geared toward working professionals around the world, the company has designed flexibility into its programs. Students can attend a regularly scheduled course at an SCSi location, online via its virtual classroom or self-paced distance learning programs, or at a client-selected location anywhere in the world. ♦

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Finnair Oyj
Finnish Military Aviation Authority
Flight Attendant Training Institute at Melville College
Flight Safety Foundation
Flight Safety Foundation—Taiwan
Galaxy Scientific Corporation
General Aviation Manufacturers Association
GE Transportation/Aircraft Engines
Global Aerospace, Inc.
Gulf Flight Safety Committee, Azaiba, Oman
Hall & Associates, LLC
Hellenic Air Accident Investigation
& Aviation Safety Board
Honeywell
Hong Kong Airline Pilots Association
Hong Kong Civil Aviation Department
IFALPA
Independent Pilots Association

Int'l Assoc. of Mach. & Aerospace Workers
Interstate Aviation Committee
Irish Air Corps
Irish Aviation Authority
Japan Airlines Domestic Co., LTD
Japanese Aviation Insurance Pool
Jeppesen
JetBlue Airways
Jones Day
KLM Royal Dutch Airlines
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Board
Kreindler & Kreindler, LLP
L-3 Communications Aviation Recorders
Learjet, Inc.
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National Business Aviation Association
National Transportation Safety Board
NAV Canada
Nigerian Ministry of Aviation and Accident
Investigation Bureau
Northwest Airlines
Parker Aerospace
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Pratt & Whitney
Qantas Airways Limited
Qatar Airways
Qwila Air (Pty), Ltd.
Raytheon Company
Republic of Singapore Air Force
Rolls-Royce, PLC
Royal Netherlands Air Force
Royal New Zealand Air Force
RTI Group, LLC
Sandia National Laboratories
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Saudi Arabian Airlines
SICOFAA/SPS
Sikorsky Aircraft Corporation
Skyservice Airlines, Ltd.
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SNECMA Moteurs
South African Airways
South African Civil Aviation Authority
Southern California Safety Institute
Southwest Airlines Company
Southwest Airlines Pilots' Association
Star Navigation Systems Group, Ltd.
State of Israel
Transport Canada
Transportation Safety Board of Canada
U.K. Civil Aviation Authority
UND Aerospace
University of NSW Aviation
University of Southern California
Volvo Aero Corporation
WestJet ♦



WHO'S WHO

SCSI: Southern California Safety Institute

(Who's Who is a brief profile of, and prepared by, the represented ISASI corporate member organization to enable a more thorough understanding of the organization's role and functions. —Editor)

SCSI, the Southern California Safety Institute, is an aviation safety training organization specializing in the fields of aircraft accident investigation, safety management systems, and human factors in aviation. Now in its third decade of operations, SCSI has trained more than 10,000 students worldwide from commercial carriers, manufacturers, investigative agencies, regulatory bodies, and military organizations. The Institute offers Certificate Programs in aircraft accident investigation, aircraft cabin accident investigation, and safety management systems and has the only open enrollment course in human factors in aviation maintenance (HFAM) that is modeled on the FAA-approved HFAM program.

Recognizing the increasing need for well-trained and qualified accident investigators throughout the aviation industry, as well as the challenges of new regulations and ever-changing electronics

and technologies, SCSI has developed the Certificate Program in aircraft accident investigation (AAI). This Certificate Program has been carefully designed by SCSI's instructors and covers the core areas of knowledge and training required in accident investigation. The certificate



in AAI formally acknowledges that the recipient has a depth and breadth of training to succeed in the aircraft accident investigation profession.

The central course in the Program is the aircraft accident investigation (AAI) course, which comprises a combination of class lecture, case studies, and hands-on investigation training of actual wreckage in SCSI's aviation crash laboratory. The second required course is human factors for accident investigators. Students may then complete the Certificate Program by taking any three electives of

their choosing. The list includes investigation management, accident prevention through safety recommendations, aircraft maintenance investigation, air traffic control investigation, and electronic systems investigation, among others.

Utilizing many of the same electives as the AAI Certificate Program, SCSI also has a Certificate Program in aircraft cabin accident investigation. With the additional core course of cabin accident investigation (CAI), this Program also incorporates attendance at the annual International Aircraft Cabin Safety Symposium as an elective choice.

SCSI's other headline Certificate Program is in safety management systems, which was originally developed in 2002 at the forefront of the "SMS wave." The four required courses in the Program are SMS-essentials, SMS-workshop, organizational change workshop (OCW), and operational risk management (ORM.) Students then choose two electives to complete the Certificate Program.

Designed for those creating an SMS program from "scratch" or those refining or updating an existing program, the SMS-essentials course presents and dis-

(continued on page 30)