ISASI FORUM

JULY–SEPTEMBER 2003

"AIR SAFETY THROUGH INVESTIGATION"

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Result of an incident occurring in New Zealand in which another aircraft was being hand-propped without someone in the aircraft. The aircraft jumped chocks and sliced into this aircraft. Readers having further information on this incident are asked to provide it to the editor at espmart@comcast.net.

ISASI FORUM

"Air Safety Through Investigation"

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Associate Editor Susan Fager
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AIR SAFETY INVESTIGATORS
INCORPORATED AUGUST 31, 1964

Working Group Concept Is Integral to ISASI

By Frank Del Gandio, President

The International Society of Air Safety Investigators is truly an international organization for air safety professionals, recognized globally for its work in promoting air safety. But ISASI is rather unique in that it is a professional society that relies on its members to manage and run the Society's activities on a voluntary basis. Ann Schull, our office manager, is our only employee and performs that vital work of running the Society's office—the heart of the Society. All the Council members, other office holders, and committee members are volunteers. In this way we can keep our operating costs to a minimum and maintain the low rate of membership dues to belong to ISASI. Our policy is to make ISASI a member's society.

An integral part of ISASI operations is the working group structure, likewise managed and administered by unpaid volunteers. The working groups are the technical specialist groups of the Society. My role and that of the Council is one of minimal oversight. We rely on members with a common interest to propose the formation of a working group and draft terms of reference for Council ratification. One of the few requirements for the working group is that the chair be a full member and that leaders of the working group be members of ISASI. The working groups are self-administered and carry out much of their discussions by correspondence, such as e-mail.

Working groups are an important part of the ISASI operations. They are forums for technical matters to be discussed and debated. They have played important roles in our seminars and meetings by chairing presentations and presenting papers on their specialized areas. They have also been extremely beneficial in developing investigation checklists such as those for air traffic control and cabin safety investigations. The documents produced to date have been sent to all ICAO member countries to use and distribute as they see appropriate.

The ISASI website has a "working groups" area where the working groups can display their contact details, work programs, and special information, such as past papers. The guidelines and checklists that have been developed by the working groups are available in the "Members Only" section of the website. A chat area for working groups is also being proposed.

The working groups have the opportunity to meet in person in conjunction with the annual ISASI seminars. The working group activities vary from year to year, depending upon availability of key members, the relevant topics, the importance and profile of current issues, and the "drive" of the members. However, the working groups are always looking for new members, so please make contact with the relevant chairs listed below. If you have a special area of interest not covered by an existing working group, try to set up a group with similarly interested people and then submit your terms of reference for ratification by the Council. If you would like guidance on how to go about this, please get in touch with Ann or Ron Schleede, ISASI's Vice-President, as he exercises the oversight role for the working groups.

I would like to take this opportunity to update you on the various working groups within ISASI. (Note: In the following listing, (R) refers to residence, (B) to business, and (F) to fax.)

Air Traffic Services
John A. Guselli, Chairman
Ladislav Mika, Co-Chairman
7 Coronet Court, North Rocks, NSW 2151, Australia
61 2 9872 3722 (R), 61 419 015684 (B), 61 2 98729565 (F)
jguselli@bigpond.net.au
mika@mdcr.cz

Cabin Safety
Joann E. Matley, Chairman
P.O. Box 344, Newport, RI 02840
401-862-2992 (R), 800-395-2732 (B), 817-540-2077 (F)
jaymat02@aol.com

Asia Pacific Cabin Safety
P.O. Box 588, Civic Square ACT 2608, Australia
David.Lattimore@airnz.co.nz

Corporate Affairs
John W. Purvis, Chairman
P.O. Box 68724, Seattle, WA 98168
206-243-8903 (R), 206-484-6288 (Cell), 206 878-1365 (F)
jwpurvis@earthlink.net

Flight Recorder
Michael R. Poole, Chairman
36 Antares Drive, Suite 850, Ottawa, ON, Canada
613-225-0070 X229 (B), 613-851-0197 (Cell), 613-225-0098 (F)
mike.poole@flightscape.com

Government Air Safety Investigators
Michael J. Cavenagh, Chairman
2/152 Fairfield Road, Fairfield, Brisbane, Queensland, Australia 4103
61 07 3217 2831 (R), 61 07 3838 9901 (B), 61 07 3832 1386 (F)
mikecav@powerup.com.au

Human Factors
Daniel Maurino, Acting Chairman
BASI c/o Dr. Michael Walker
P.O. Box 967, Civic Square, Canberra ACT 2608, Australia
61 2 6274 6469 (B), 61 2 6247 1290 (F)
mike.walker@basi.gov.au

Investigators Training & Education
Christine A. Lawrence, Chairman
9327 South Sooner Road, Guthrie OK 73044-7811
405-282-7571 (R), 405-954-9740 (B), 405-954-3431 (F)
Christine.Lawrence@tsi.jccbi.gov

Positions
Ken Smart, Chairman
4 Clandon Drive, Boyatt Wood, Eastleigh, Hampshire, United Kingdom SO5 4QQ
44 1 703 643922 (R), 44 1 252 510300 (B), 44 1 252 520050 (F)
ksmart@aaib.gov.uk ◆

C O M M E N T A R Y

COCKPIT IMAGERY: Panacea or Pandora's Box?

By Keith Hagy (MO3257) and Mike Huhn (AO3869)

One of the more recent "hot topics" in air safety and aircraft accident investigation is the installation of image recorders in the cockpits of our airliners. The issue of cockpit image recorder installation is a complex and contentious one. To the uninitiated, cockpit imaging has the deceptive allure of an inexpensive, all-inclusive solution to the cause and circumstances of every aircraft accident and incident, with reasoning similar to "If we could just see what is happening in the cockpit, we would easily solve this accident and prevent the next one." The reality is actually quite different.

On the pure investigative aspect on the use of the equipment, recall the B-737 accident at Pittsburgh that occurred on Sept. 8, 1994. In that accident the U.S. NTSB determined that the rudder had experienced a full deflection, backdriving the rudder pedals, without flight crew input. Suppose that aircraft had been equipped with a cockpit image recorder. What would have the recorded video shown? Were the pilots pushing against the rudder pedals, or were the rudder pedals pushing against the pilots?

The issue of cockpit image recorder installation is a complex and contentious one.

While cockpit imagery might prove useful in certain investigations, it is by no means the panacea that some purport it to be. Potentially, cockpit video, misread by investigators, could do more harm than good to the technical aspects of an investigation. We have to be careful about the rush to install cockpit image recorders. There will be those investigators who may want to use the imagery, instead of solid investigative techniques, as a shortcut to determining the cause of an accident.

To be positive, the benefits of a change must outweigh the detrimental effects associated with that change. With regard to cockpit imaging, the two key questions are What will be the actual air safety benefit(s) derived from such installations? and What air safety, social (privacy), and economic costs will be incurred as a result of the installation of this equipment? The decision mechanism for these answers is complex.

Much of the same rationale now used to substantiate the need for cockpit imaging was used 40 years ago to substantiate the need for cockpit voice recorders (CVRs). The ensuing experience with CVRs should be instructive in this regard. The CVR was introduced solely as a tool for accident investigation. Airline pilots, a strong air safety lobbying force, accepted the CVR as a safety benefit, and it continues to serve this purpose admirably. However, there have been numerous events that are worth remembering, and lessons that we should have learned with regard to abuses and inappropriate releases of information.

CVR information, contrary to the values of an investigation, has been impounded by civil authorities as evidence in criminal investigations and has been used for sensationalistic purposes by the media. Litigants in civil and criminal cases, without regard to investigation needs or an individual's privacy, have used the CVR information to make their cases. Employers have even used the CVR for surveillance and disciplinary purposes. So, although many accident investigation agencies have internal procedures to guard against such abuses and events, the accident investigation community has demonstrated that it is not capable of providing absolute protections for CVR information and that legal and privacy issues continue to exist.

Outside the United States, the sanctity of the CVR (and by extension, cockpit image recordings) is worse or nonexistent. Different countries have different laws, and often a different cultural perspective as to what is acceptable. This lesson has been made very clear on more than one occasion.

One significant abuse was the recent airing of the CVR from the American Airlines Cali accident on NBC's "Dateline" television program. This program airing occurred despite the circumstances that this was a U.S. crew operating an aircraft of U.S. registry, that the U.S. NTSB participated in the investigation, and that the CVR was read out and transcribed at NTSB headquarters in Washington, D.C. (The readout was conducted under the direction of the Columbian investigators responsible for managing the investigation.)

Keith Hagy, *an ISASI member since 1986, is Secretary of the Society. Hagy is an employee of the Air Line Pilots Association (ALPA) and serves as the Assistant Director of the Engineering and Air Safety Department. He Joined ALPA in 1986 as a Senior Staff Engineer.*

Mike Huhn *is an ALPA Senior Staff Engineer in the Engineering and Accident Investigation Section. He has a B.S. in aeronautical engineering and came to ALPA in 1994 after 16 years at various aerospace companies, including Douglas Aircraft, Rockwell, Northrop, and Fairchild.*

However, the release and subsequent airing of this recording was not a violation of any Colombian or U.S. laws. The U.S. NTSB participated in the investigation under Annex 13 procedures and protocols as the "accredited representative" of the state of manufacture and of the state of the operator. Some would argue that as the accredited representative, the U.S. NTSB has the legal responsibility to look after the legal rights and interests of any U.S. citizens on board the accident flight, including those of the flight and cabin crews. Certainly flight crew privacy (including inappropriate CVR release) would be included in these NTSB responsibilities.

Considering the attention that voice recorders already receive after an accident, imagine the sensational value of the release of an image recorder following an accident. We already have an example in the space shuttle *Columbia* tragedy. NASA released to the media a copy of video taken from within the shuttle even after stating that the video was of no assistance in the investigation of the accident. One has to wonder the purpose served in the release.

ICAO role

At the 1999 International Civil Aviation Organization's Accident Investigation Group meeting (ICAO AIG99), the issue of strengthening Annex 13 protective language for sensitive recorded information was advocated by the International Federation of Air Line Pilots Associations (IFALPA). The ICAO Group agreed that this information deserves protection, and that failure to provide adequate protection would have prejudicial effects on aviation safety. However, the Group could not agree on its ability as an international safety organization to override the legal schemes in each particular country. Consequently, the Group refused to take any action toward modifying existing standards and recommended practices (SARPs), leaving the sensitive recorded data functionally unprotected (e.g., the Cali incident). At the same meeting, the Group rejected the need for cockpit imaging systems because it did not believe that such devices were then technically warranted.

ABOVE: NetVision360 is a compact optical attachment that captures a 360-degree view of a network or CCTV camera. Weight 9.4 oz., height 3.85 inches, diameter 1.90 inches.
LEFT: NetVision270 displays up to a 270-degree view of space.

So, while ICAO acknowledges the need for data protection, its ability to provide it is limited. Obviously, data protection must be provided on a country-by-country basis, in the form of new or revised legislation. Even if the IFALPA-desired Annex 13 language changes are accomplished, the ICAO SARPs are not binding, and States can choose non-compliance simply by filing a "Notification of Difference." In addition, States may deviate from the SARPs without fear of sanction even though they have not filed a "Difference." Finally, not all States are ICAO signatories. Despite these shortcomings, changes to the ICAO language *do* have the potential to be one impetus for initiating changes in the individual country's legislation, and the United States and other States should continue to pursue this goal.

Clearly, in the event that imaging recorders are mandated on U.S.-registered aircraft, and even with significant changes to U.S. and NTSB regulations, all protections would cease to exist if those aircraft are involved in an accident outside the United States.

Clearly, in the event that imaging recorders are mandated on U.S.-registered aircraft, and even with significant changes to U.S. and NTSB regulations, all protections would cease to exist if those aircraft are involved in an accident outside the United States.

RTCA report

In late 2001, the issues involving cockpit imaging were outlined in a report developed by RTCA with industry and government participation. The RTCA Future Flight Data Collection Committee (FFDCC) worked for 18 months to develop this report. Two paragraphs and Recommendations "2" and "3" from the FFDCC report are worth citing here: "First, the provisions of ICAO Annex 13 cannot provide any security protection for recorded information unless implemented by the domestic law of the country ("State," as written in the Annex) where the accident occurred. Second, very few

States have even considered the question, much less enacted laws that restrict the access of the public, the press, and certain litigants to information related to an accident. Third, as the law of the site of the accident provides the civil and criminal law of disclosure, meaningful protection is totally location dependent.

"In an industry where international boundaries are routinely crossed, current international law does not provide adequate safeguards to protect legitimate privacy and use considerations of those recorded and their employers. Therefore, some other method of protection must be developed."

The demonstrated success of proactive safety programs such as FOQA certainly makes a strong case for the expanded collection and utilization of such "hard" data.

RTCA FFDCC Recommendation #2

Since 1992, U.S. laws protecting CVR recording release in the case of domestic accidents have been effective. Unfortunately, the same is not true internationally. The Committee recommends that effective international protections against misuse of CVR recordings from U.S. operators be developed.

RTCA FFDCC Recommendation #3

Image recording was identified as a technologically feasible method for collecting information not otherwise recorded. The Committee recommends that issues regarding security, privacy, and confidentiality be resolved, and acceptable protections be put in place prior to any action mandating image recording

Universal solution?

When it comes to improving air safety, cockpit imaging may be of assistance in some cases, but it is not the best answer. It is widely acknowledged among air safety investigators that cockpit imaging is not the universal solution that laymen believe it to be. The benefits perceived by laypersons far exceed those that trained air safety investigators recognize and acknowledge as possible. Installation of advanced flight recorders and implementation of FOQA programs are two of the most effective air safety improvements being incorporated into our air transportation system today, and these offer far more safety potential than the installation of imaging cameras.

Today's state of technology is such that we can garner far more, and much higher quality, information from properly instrumented aircraft than could possibly be derived from image recordings. Flight data recorders (FDRs) in the latest generation of transport aircraft typically record more than 100 parameters, and some record several hundred or even thousands. Enhanced recording technology, combined with proactive air safety programs such as FOQA and ASAP, will help us accurately identify and quantify airplane and airspace system deficiencies.

Such technology and programs can also identify procedural and human performance shortcomings. More sophisticated and capable FDRs, not cockpit imaging systems, are the logical development of instrumentation capabilities and accident prevention efforts. It is worth keeping in mind that even with much more primitive technology, there have been very few major accidents for which probable causes have not been determined. In addition, there is a strong concern that image data, when used as an investigative "shortcut," have the potential to undermine the investigation and prevent the accurate identification of all safety deficiencies that may have contributed to the occurrence.

In a worst-case situation, assuming cockpit imaging with CVR-like protective measures, it would just be a matter of time before the world shares, first-hand, the cockpit environment in the seconds before a disaster. Would the release of this information into the public domain enhance safety? Certainly no investigators or air safety personnel believe that.

It is for the reasons of investigative misuse, privacy abuse, and legal misapplications that, prior to the installation of *any* image recording devices in the cockpits of our airliners, it is imperative that we develop and implement the best possible protective measures for such information.

As a starting point, we, as investigators, should lobby the responsible authorities to have the following constraints placed on sensitive recorded information:

- Only accident investigation authorities would be legally or technically able to conduct readouts of the information. (Data encryption methods should render this readily feasible from a technical standpoint.)
- The recorded information should not ever be released outside the investigation.
- A narrative summary of the recorded images should be produced but not released outside the investigation.
- At the conclusion of the investigation, the recorded image information should either be destroyed or permanently retained by the accident investigation authority for its use only.

In the United States, legislation is already in place regarding how CVR information can be used in tort litigation. This legislation needs to be strengthened and extended to address criminal proceedings. Similar or more-stringent legislation should also be developed for image data. Finally, similar legal protections should be lobbied for in all ICAO signatory States.

But in the end, the imaging dilemma can be boiled down to the singular question of whether air safety would be best served by the installation of cockpit imaging equipment. While there is little doubt that image data, when used in conjunction with other investigative techniques and information, would likely aid an investigation, does it in fact provide the "best bang for the buck"? The unresolved privacy issues and the strong concern that image data can be used as an investigative "shortcut" diminish the attractiveness of the installation of such equipment. The demonstrated success of proactive safety programs such as FOQA certainly makes a strong case for the expanded collection and utilization of such "hard" data. In combination, these facts indicate that scarce industry resources would be better applied to improved FDR instrumentation, and the Pandora's box of cockpit image recorders should best be left unopened for the time being. ◆

Recorder Technology 15 Years Hence

By James R. Cash
Chief Technical Advisor
Transportation Data Recorders (TDR), NTSB

(This article was adapted, with permission, from the author's technical PowerPoint paper presentation entitled Future Flight Data Collection Committee—Recorder Technology for the Next 15 Years, *presented at the ISASI 2002 Seminar in Taipei, Taiwan, October 2002. The full presentation is available on the ISASI website at www.isasi.org. The views expressed in this article are those of the author and not necessarily the views of the NTSB.—Editor)*

On Nov. 3, 1999, the RTCA then FAA Administrator Jane Garvey and NTSB Chairman Jim Hall requested that the RTCA establish a committee to address future airborne-data recording needs on commercial aircraft. The result was the formation of the RTCA Future Flight Data Collection Committee (FFDCC), which was to explore future data-collection methods that would help to determine quickly and accurately the factors that cause accidents and incidents and to suggest ways to use data proactively to avoid accidents and incidents and to support continued airworthiness.

The Committee was tasked with envisioning the recorded data needs 15 years into the future that would assist in accident investigation and to take into account future technologies and resources that would be available. Planners envisioned that this Committee would identify recording needs to the industry in advance so that they could be incorporated early in new aircraft designs and minimize event-driven rulemaking.

Representatives from the FAA, the NTSB, and Airline Transport Association led the effort and eventually divided into three working groups. Meeting sessions lasted through December 2001 and were open to the public, and industry was encouraged to become involved. Representatives from aircraft, engine, flight data acquisition unit (FDAU), flight recorder manufacturers, regulatory agencies, investigative agencies, air carriers, unions, military, and general aviation participated.

In addition to the original chartered activities, the FAA asked that as part of its work, the Committee evaluate the merits of the NTSB safety recommendations regarding the use of imagery in the cockpit. Additionally, deployable flight recorders were also evaluated.

The three working groups were Data Needs, Technology, and Data Use and Protection.

The Data Needs Working Group was charged with examining projected changes in the aviation industry and determining future recording requirements, extant in the year 2015, that would improve operational efficiency, aviation safety, and aircraft accident investigation. The Technology Working Group was to determine the technological feasibility of the data needs presented by Group 1 and for examining existing and projected technologies, flight recording standardization, and data security methods. The Data Use and Protection Working Group focused on the use of the collected flight data and for identifying privacy concerns and cost issues.

FFDCC released its final report on Dec. 12, 2002. It contains three sections detailing data needs, technology, and data use/privacy issues. This information is reduced to seven recommendations

James Cash, *in addition to being Chief Technical Advisor, TDR, is Chief, Vehicle Recorders Division, the NTSB. As Chief Technical Advisor, he is involved in establishing NTSB policy concerning on-board accident investigation recorders. A 20-year NTSB veteran, Cash has examined more than 1,500 CVR recordings. He has an electrical engineering background and served in the United States Air Force as a fighter pilot for 7 years.*

Discussions focused on image recording security, privacy, and confidentiality protections that must be in place prior to any regulatory action mandating image recording.

that summarize the important issues and changes that the Committee believes need to be considered in the area of flight data collection over the next 15 years. The report also contains a timetable of relevant airborne recorder actions, both domestic and international, and recommendations concerning the suggested enhancements. The report also contains a chapter on deployable recorder technology.

Image recording was identified as a technologically feasible method for collecting information not otherwise recorded. In the view of labor and operators, the advantages of image recording have not been shown to outweigh the disadvantages. However, accident investigators strongly believe in the value of image recording for accident investigation purposes. Discussions focused on image recording security, privacy, and confidentiality protections that must be in place prior to any regulatory action mandating image recording.

Recommendations

The following seven recommendations summarize the work of the Future Flight Data Collection Committee:

1. Rather than continuing the historical practice of rewriting DFDR parameter requirements, the Committee recommends that current requirements and additional information, present on digital data buses and used in the operation of future aircraft and their systems, be recorded in a crash-survivable system.
2. Since 1992, U.S. laws protecting the release of CVR recordings in the case of domestic accidents have been effective. Unfortunately, the same is not true internationally. The Committee recommends that effective international protections against misuse of CVR recordings from U.S. operators be developed.
3. Image recording was identified as a technologically feasible method for collecting information not otherwise recorded. The Committee recommends that issues regarding security, privacy, and confidentiality be resolved, and acceptable protections be put in place prior to any action mandating image recording.
4. Several data design, maintenance, access, and validity issues have been identified that impact the ability to quickly and accurately use recorder information for accident investigation and prevention purposes. The Committee recommends that methods be developed to dynamically store data map information in the recorder, to cost effectively transfer data from the recorder media to analysis systems, and to reduce and document data latency for all systems.
5. The Committee identified several existing conditions that hamper the use of a single set of recorded data for both voluntary programs and accident investigation. Although policy exists that would allow an applicant to develop user-modifiable software, this is not widely understood and/or applied in the community. Similarly, MEL repair windows as presently applied discourage frequent validation of the DFDR functionality. The Committee recommends that regulators and the aviation community address these issues, as appropriate, to develop guidance material and to provide regulatory relief.
6. There is no standard to be used in exchanging recorded data and aggregate information (trends, events, Meta-Data, etc.) that have been collected. The Committee recommends that common naming conventions and standard definitions be developed for data exchange.
7. The Committee recommends that a group should convene periodically to determine if additional recording needs exist. (A copy of the Future Flight Data Collection Committee report is available from RTCA, 1828 L Street, NW, Suite 805, Washington, DC 20036; phone 202-833-9339; Internet www.rtca.org.) ◆

Addressing Human Factors

By Ken Smart (CM3269)
Chief Inspector of Air Accidents,
United Kingdom

(This article was adapted, with permission, from the author's keynote address before the ISASI 2002 Seminar in Taipei, Taiwan, October 2002. The full address is available on the ISASI website at www.isasi.org.—Editor)

E. MARTINEZ

Ken Smart delivers his human factors keynote address to ISASI 2002.

At the 2002 annual seminar held in Taipei, I had the honor of opening the final session of the event. The subject was human factors (HF). It was an appropriate position for the subject because in many respects it embraced all that has gone before at this seminar. Whether or not anyone in attendance appreciated it, every one of the previous speakers had addressed, in one way or another, human performance issues. The final session, however, concentrated on the HF subject unhampered by any other agenda. More specifically, the papers presented concentrated on one particular aspect of human factors—social psychology.

But before commenting on the topic of social psychology in more detail, let's look at the topics that fall within the general heading of human factors:

- *Human physiology*—We all have a good appreciation of the fact that our performance can vary dramatically with how well we are feeling, particularly whether or not we are subject to any of the common aliments that would affect our performance in any particular task.
- *Human psychology*—This deals with how we process information and how our understanding and training affects our response to particular situations—how we react under stress and other effects, such as the disruptions caused by time zone changes.
- *Human-centered design*—The design and man/machine interface issues that are generally lumped under the heading of ergonomics, a topic that embraces the whole concept of human-centered design.
- *Social psychology*—The impact of personality on our interaction with others in team-based activities, which in most cases is what public transport operations are all about.

This list of topics embraces all the complexities and frailties of individuals and organizations. It involves what we generally perceive to be our strengths and weaknesses as individuals; it's concerned with our impact on the management of organizations, and it affects what we generally refer to as the culture of an organization and the culture of our industry.

Nothing new

As I prepared my material for ISASI 2002, I reflected on an old truth that for all I know may well be based on a Chinese proverb. That is that "there is nothing new under the sun." We have been talking about human factors now for several generations. As a personal example, I discovered some years ago that the AAIB's investigator guidance documentation from the 1940s contained advice on how to set about the human factors issues that were covered as part of our investigations at that time.

My point is that we already know what most of the safety issues are—we have experienced them in the form of accidents and incidents many times in recent years. Aviation safety databases, however, do not reflect these issues as a general rule. There are a number of taxonomy working groups developing systems for gathering human factors data, but it is proving to be a difficult task. The

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__Ken Smart__ is the United Kingdom's Chief Inspector of Air Accidents and Head of the United Kingdom's Department of the Transport, Air Accidents Investigation Branch (AAIB). The Royal Aeronautical Society awarded him the Society's Wakefield Gold Medal for his contribution to aviation safety in 1995, and he was honored by Her Majesty the Queen with a CBE in 1996. He is a Fellow of the Royal Aeronautical Society, a member of the Board of Trustees of the U.K. Confidential Human Factors Incident Reporting Programme (CHIRP), and currently the European President of the International Society of Air Safety Investigators (ISASI).

root of the problem is that the investigations that we conduct in this area do not yield tangible, factually based evidence. The subject does not present itself in the form of things that we can hold up and demonstrate clearly. Like many of the "soft sciences," the evidence and our analysis of it resides in the area of hypotheses and proposition, areas that are almost certain to generate differences of opinion among the "experts."

It may be helpful to consider our role as investigators at this point. The role of investigator is described in many different ways. Almost every organization and professional body has its own idea of what an investigator is expected to achieve. Let me share with you my definition. In my view, the role of an air safety investigator is all about influence. An investigator has to influence change. It doesn't matter if you have conducted a very elegant investigation, if at the end of it there has been no discernible change to prevent that accident from happening again. The more enlightened accident investigation organizations make considerable efforts to ensure that the investigators they hire have not only the technical/professional qualifications needed for the task, but also have the necessary personal qualities to enable them to fulfill this vitally important influencing role.

Members of the Human Factors Panel respond to questions during ISASI 2002. Left to right: Dale Harris, Sue Burdekin, Thomas Fakoussa, and Ladi Mika.

E. MARTINEZ

"An investigator has to influence change. It doesn't matter if you have conducted a very elegant investigation, if at the end of it there has been no discernible change to prevent that accident from happening again."
—*Ken Smart*

Throughout the 1970s and 1980s, the subject of human factors was discussed in a pseudo-academic way. Psychologists and researchers developed "models" to assist our understanding of human factors. Our training at that time was very much based on the assumption that an understanding of the theory would prevent human-factors–related accidents from occurring. However, accidents continued to occur, and it was not until practical tools were developed in the mid/late 1990s that the subject of human factors started to become embedded into everyday operations rather than being treated as an "add on."

HF tools

FOQA programs have allowed us to gain an early identification of some of the issues raised by human performance in line operations. This in turn has led to the development of Line Operations Safety Audits (LOSA) and Mission Operations Safety Audits (MOSA), a military version of the LOSA program. In succeeding pages of this magazine, EVA Airway's approach to the subject of LOSA and an initiative by the Australian Defense Force, which has developed a MOSA program, are presented.

Another area of intense activity in the human factors arena has been crew resource management (CRM). CRM training, which is effectively an appreciation of social psychology, was initially based on the 80s/90s academic approach to the subject. It was apparent, almost from the start of CRM training, that the "one-size-fits-all" approach to CRM did not always fully address the individual airline's needs. Over time however, this training has been adapted to meet the needs of individual airlines and now takes into account factors such as national characteristics and culture.

The controlled flight into terrain (CFIT) education and training aid developed by ICAO, the Flight Safety Foundation, and industry was one of the first attempts to develop tools to address specific categories of human-performance–related accidents. This highly successful approach led to the Approach and Landing Accident Reduction Tool Kit, which addresses the second most prevalent category of accident causes. This Tool Kit is now available to airlines, and I would recommend that all airlines should consider this industry-best practice. Also in later pages, there is presented specific human performance issues associated with go-around events.

There are similar approaches and tools being developed in other areas of airline operations, and this is very encouraging. The main point that I wish to make, however, is that it is for those with direct responsibility for transport operations to accept the role of ensuring that these tools are used as a means of embedding best practice into your everyday airline operations. This responsibility cannot be delegated to the psychologists and researchers. They are there to help develop the tools and to assist with aspects of training, but they are not in a position to drive through initiatives in this area. That is the responsibility of managers and trainers in the airlines. I know that it's a temptation for airlines and organizations to "contract out" human factors training. In my view, however, this is an area where airline managements have to demonstrate their commitment by leading these initiatives and ensuring that best practice is firmly embedded into their everyday operations. ◆

HUMAN FACTORS

GO-AROUNDS: A Problem for Certain Pilots?

"We must take all that we have learned from past mistakes and apply those experiences to shaping transportation in the future. Only then does each tragic accident become an investment in safety." Jim Hall, former NTSB Chairman

By Ladislav Mika (MO4226), Czech Republic, and
Thomas Fakoussa (FO3366), Awareness Training, Germany

(This article was adapted, with permission, from the authors' technical paper entitled Go-Arounds—A Problem for Certain Pilots? *presented at the ISASI 2002 Seminar in Taipei, Taiwan, October 2002. The full paper is available on the ISASI website at www. isasi.org.—Editor)*

Philosopher George Santayana said more than 90 years ago: "Those who cannot remember the past are condemned to repeat it." In keeping with this spirit, investigators offer recommendations aimed at preventing similar accidents. Why then do the same sort of accidents repeatedly occur? Some of the reasons are 1)Failure to recognize and identify the hazards correctly, 2) Failure to identify root causes in depth, 3) Failure to act appropriately to the causes, and 4) Failure to inform others in a more motivating way.

Few other industries have spent and spend as much money and effort pursing absolute safety as has the aviation industry. The modern airliner is a marvel of technology, often composed with multiple redundancies in its control and management systems, using space-age materials in its construction and complex computer controls to ensure the safe and orderly functioning of the whole. We require those who are part of the industry to be highly qualified professionals approved by the state. And yet we still lose aircraft in all-too-frequent accidents.

Again, the question is Why should this be the case?

Today we recognize that the major determinant of safety in the air will be the behavior of the human beings involved in the total task—from designers to operators at all levels. The past shortsighted defensive attitudes toward mishaps must now give way to a new attitude of acceptance and rational recognition that we, who are part of the aviation business, are all capable of making mistakes and contribute to the unacceptable accident rate. All this for no other reason but that we are all human, no matter what the nationality, no matter what the title or rank.

Analysis of hull-loss accidents shows that more than 70 percent of accidents result from flight crew errors. In approximately 41 percent of accidents, the crew deviated from basic operational procedures. From the very first flight, pilots are taught to aviate, navigate, and communicate. In that order. Pilots must be aware of the plane, the path, and the people (crew, passengers, air traffic controllers). Likewise, we, as an industry, need to monitor and evaluate these three objectives now, and also anticipate what's going to happen in the future and consider contingencies.

Albert Einstein said, "Problems cannot be solved at the same level of consciousness that created them." If Einstein was right, training has to do more than instruct and teach skills and knowledge: it has to create a level of consciousness that enables the trainee to recognize problems that will be met in the real working environment. At the same time, training has to avoid imprinting certain attitudes that are problem creators themselves. Training, whether initial or recurrent, is one of the more traditional ways to reduce mistakes, by instilling disciplines that make rule breaking, or disregard of standard operating procedures (SOPs), less likely. Notably, many flying training schools now offer CRM and aviation psychology training as an integral part of the curriculum. The question that remains is Have the many forms of human factor training, particularly directed at the cockpit crew, achieved the expected outcome of knowledge transfer from the training school to the workplace?

Go-arounds

A look at the "go around" (GA) issue may shed some light on the question. But first let's define our term: *The go-around*—a procedure where a pilot aborts a landing on short final. It is intended to give pilots a safe way "out" in the event that something goes wrong during the landing phase. Go-around procedures are specified in SOPs, and pilots must be familiar with recommended procedures and brief the go-around in the pre-landing checklist. The GA differs considerably from the *missed approach*—the procedure to be followed if the approach cannot be continued.

The following examples give insight

***Ladislav Mika** is a 1971 graduate of the*

Transport University in Zilina and has been with the Czech Ministry of Transport and Communication since 1978. Prior to that, he was with Czechoslovak Airlines Chief of the Office of the Flight Director. He has been serving as Second and First Vice-Chairman of the European Air Navigation Planning Group and as a member of the ECAC Group of Experts on Accident Investigation. He joined ISASI in 1997.

***Thomas Fakoussa** is the founder of ATF,*

Awareness Training Fakoussa, a company that uses a very different philosophy about the training of awareness and its influence on life (primarily flight safety but also job, family, and other activities). He has enjoyed a long career as a commercial airline pilot and has been heavily involved in training of flight crews and related industry professions. Today he still flies actively while running seminars and private research programs on flight safety and it links with flight training.

CLASSIFICATION OF PILOT'S RELIABILITY

(Kolouch Jan M.D. 1985)

	Knowledge and Level of Professional Skills			
	BELOW AVERAGE	**AVERAGE**	**ABOVE AVERAGE**	
PREVAILING QUALITY OF SELF-EVALUATION (self-critique) for the professional activity (with respect to the awareness of risks)	Inappropriate to demands of type of flights and working positions	Appropriate to demands of type of flights and working position.	Level enabling excellent meeting of tasks at flying and in position with reserves to additional improvement.	**Group's** characteristic of the development-control of risks.
SELF-ASSURANCE **>** is greater than **UNCERTAINTY**	**Group R_3 3%** *Presumable development:* "Accident," unable to pilot with self-discipline. Prevention: to find out related factors in time with help of psychophysiological expertise in cooperation with practical evaluation.	**Group R_2 9%** *Presumable development*: Unless he distances himself earlier through an air extraordinary event there is a chance of team experience; at strong leading and regular flying probable movement to S2 group.	**Group R_1 3%** *Presumable development*: "Mr. Pilot" unless he, due to own indiscipline, comes to an unsolvable air extraordinary event, upon strong control, continuous training and on basis of own and others' experience can be moved to S1 group.	• Hidden trend to neglect awareness. • Prevailing subjective predicting of the situation development naïve optimism, underestimating, no rational risk assessment. • Risk of health development: increased probability of dependence on alcohol.
SELF-ASSURANCE **=** is equal to **UNCERTAINTY** (realistic self-critique)	**Group S_3 9%** *Presumable development*: Intended personal choice of an appropriate position of a slower type and less demanding corresponding to the abilities.	**Group S_2 52%** Individuals creating basis of all flying staff of the aviation company.	**Group S_1 9%** Individuals creating basis of all flying staff on the aviation company.	• Basic trends in behavior: disciplined in meeting the tasks, instructions, and rules. • Subjective predicting of the situation development: rationalism, objective consideration of possible risks.
SELF-ASSURANCE **< is lower than** **UNCERTAINTY** (fear of risks) **S**=Reliable **R=**Risky **U**=Scrupulous	**Group U_3 3%** *Presumable development*: Individuals having this type of reactions are soon excluded from flying; obvious tendency to anxious depressive decompensations, enhanced risk of dependence development.	**Group U_2 9%** *Presumable development*: Increased ability of being excited provokes psychosomatic problems; movement to slower types can support the movement to a more positive group.	**Group U_1 3%** *Presumable development*: Hesitance, mistakes of delay when making decisions; relaxation procedures (self-training) can remove the problems; if he acquires self-assurance, he can be moved to S1 group upon regular flying.	• Hidden tendency to behavior: unaware negligence. • Unable to control the situations for wariness oscillation, worse decision-making, possible compens acquiring self-assurance; by way of increased risk of attempts. • Prevailing subjective predicating of situations: pessimism, risk, overestimating. • Risk of health development: dependence on alcohol, psychosomatic diseases.

to these questions: If pilots get threatened with punishment for GAs (still valid for some airlines), what will the pilot do in a real flight situation? Why are decisions for GAs made so late? Why don't SOPs prevent wrong GA decisions? What can a cockpit design do to support the pilot's decision? What is the influence of the pilot's self-esteem in GA decisions?

Example 1: A crew handling error that made the aircraft stall on approach to landing caused the July 3, 2001, TU-154 M crash at Irkutsk. The copilot, who was the pilot flying the aircraft at the time, had "inexplicably raised the angle of attack." The crew's actions were normal until they received an audio warning from the aircraft's flight control system that the angle of attack was too high. At that point the copilot turned the aircraft sharply and pulled back the control column too far, causing a stall and spin. As it entered what was to be a 22-second spin, the captain took control. Applying full power to all three engines, the aircraft and its systems were working properly at the time of impact. The aircraft hit the ground in a virtually flat attitude. All nine crew and 136 passengers on board were killed. The crew was in its highest stress during this final phase of the flight, while the approach was actually made in good weather.

Question: Why did the captain hesitate with his decision to stabilize the flight situation and to go around? Was it an economical issue and some form of punishment? (One added circle is 500 liters of fuel, which means approximately US$250 must be paid from the crew's pocket.)

Conventional wisdom holds that, in aviation, safety is first. Consequently, human behaviors and decision-making are considered to be totally safety oriented. However, all production systems—and aviation is no exception—generate a CHANGE of behavior under the imperative of economics. Therefore, to be efficient, people tend to operate at the edges of the system's safety area.

A more realistic approach is to consider operational behavior and decision-making as a compromise between production and safety. Efforts must focus on ways to change the system, rather than punish the individual.

Example 2: A fatal crash during final approach to Zurich Kloten Airport on Nov. 24, 2001, came just a month after a new noise-abatement procedure began forcing pilots to use a non-precision (VOR/DME) approach to the airport (flight was at night in poor weather in the snow).

The aircraft struck treetops and crashed on the extended centerline while attempting to land. Twenty-one of 28 passengers and three out of the crew of five died. The radio altimeter warned the crew when they reached 500 ft (150 m) and then 300 ft above ground level, but the crew had still not reported the airfield in sight. The captain, who was the pilot flying, called for a GA 1 second before impact.

Questions: Why was the Avro RJ 100 "too low" for that stage of its approach?

Why did the 57-year-old captain—one of Crossair's most experienced captains—decide too late to go around? And what about the self-esteem of this captain?

Example 3: Cockpit design must be easy to digest for our sensory system. In today's airplanes, we use only three senses, the eyes, the ears, and touch or feeling. Most information in glass cockpits is given visually, so that the visual senses are overloaded with digital information. Information in the form of pictures is faster to digest, but less valid for awareness. The aural signals are sometimes easy to confuse, especially under stress. Most tactile information, like moving throttles, stickshakers, trim systems, etc., are being moved out of the hands of the pilots. In addition, training concentrates more on computers and the delayed output for reaction. Take the case of an A320 overrun in Warsaw after having landed in the middle of the runway. If body awareness would be part of modern training, a tailwind would be easy to feel even in a jumbo-sized airplane.

So the cockpit design has to support our senses and should not obstruct or mislead them. Also, the setting of a radioaltimeter in a non-precision approach in a mountainous area makes no sense. So why did the Zurich pilot use it for that kind of approach? That is the wrong use of a correct cockpit design.

Self-esteem

Then there is the question of the influence of the pilots' self-esteem in GA decision-making.

If we find that the same GA accidents occur in different cultures (also cockpit design culture) and in different companies but that a different behavior occurs, then the reason for the missing skills and the missing awareness is neither the SOP nor the cockpit design, but the personality of the pilots in this cockpit. If they are not acting as a well-oiled team and supporting each other in flying the GA, a crash becomes possible. If the pilots do not feel well, then their decisions are not good and that leads to wrong actions.

Any GA means that "I cannot achieve the required target, so I lose my face." If in addition to this basic psychological inhibition to attempt a GA early, the company has rules of reporting or punishing pilots for GAs, then the inhibition barriers are even higher. Initiating a GA should not be a question of "losing face"; for safety's sake it must be a mandatory procedure and pilots trained to overcome psychological barriers. So why is that not a part of the pilot's training?

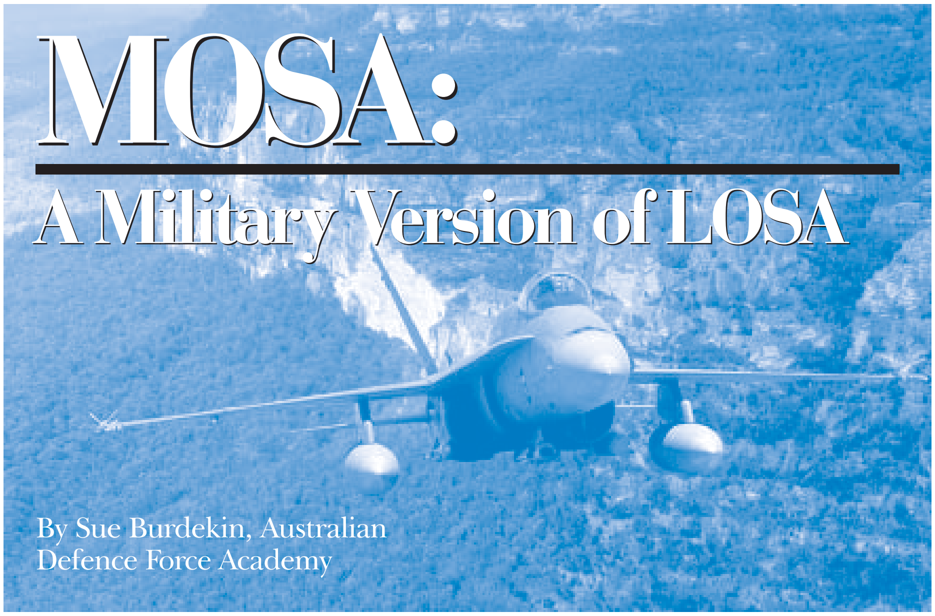
Investigating GAs with mistakes is reactive, and investigating GAs without mistakes is proactive. During investigations, air safety investigators need to search out the pilots' feelings and their "self-esteem" in daily operations and in GA situations. Indeed, awareness training of how feeling and self-esteem may affect correct decision-making should be a focus of investigators.

But, if accident investigators are resistant to a behavioral change in accident investigation, why should pilots be asked to change? Why should manufacturers change their design? Why is everybody waiting for everybody else to change before they move a bit? Are these groups afraid of losing face? Would it be a GA for the investigators to start digging a lot deeper into the human factors of pilot training?

In a recent analysis of 120 accidents from ICAO statistics, two represented very clearly the basic problems of most GAs. The first showed manual skills and awareness problems. Accident investigators always ask for more training and more procedures after an accident. Is that a valid request? Not when the same sort of "wrong" pilot behavior also happens in companies with good procedures and with good pilot training. Situational awareness (SA) is a very personal thing. SA depends on one's state of mind on certain days and at certain locations and with certain tasks. So, situational awareness changes. But does pilot training include how to control one's own personal SA? No!

The second accident showed, again, that most pilots get into a stressed, non-rational state of mind when performing GAs (with and also without engine failure). They very often hit the wrong button or make the wrong motoric movements on the controls. Mentally they make wrong decisions. So, it seems that pilots during GAs are mentally blocked (by hormones), which can only happen if they consider GAs as a challenging or frightening task. Secondly, it looks as if pilots are not able to do several things at the same time. This is a general and global problem of most men. If pilots are told all the time during training to concentrate on one thing/one task, then it should not be astonishing that multitasking, like a GA, later causes a problem for them.

The basic problem as a root cause for the late decisions is the competitive spirit of pilots or men in general, who do not wish to admit a mistake or misjudgment. Losing one's face still seems to be a major topic not just of the Asiatic world. So, the accident investigator needs to look for the "feelings" of pilots in GA situations with and *without* mistakes. Pilot training has to include the training of the correct feelings as a basis for correct decisions, which are the foundations for correct actions. ◆



MOSA:

A Military Version of LOSA

By Sue Burdekin, Australian Defence Force Academy

Seeking a way to gather behavioral data by pilot self-report ratings, the Australian Defence Force borrows from LOSA to achieve its MOSA.

HUMAN FACTORS

(This article was adapted, with permission, from the author's technical paper entitled Mission Operations Safety Audits (MOSA): A Military Version of LOSA *presented at the ISASI 2002 Seminar in Taipei, Taiwan, October 2002. The paper was based on experimental research that was conducted by the author and Dr. Judith Slee of the Department of Psychology at the Australian National University. The full paper is available on the ISASI website at www.isasi.org.—Editor)*

The Australian Defence Force (ADF) recently commenced the delivery of a new threat and error management CRM (crew resource management) bridging course aimed at achieving a base line level of standardized training prior to the introduction of a fully integrated CRM program. In line with civil organizations around the world, the ADF needed to adopt a methodology that enabled visibility of operations in the field in order to update the CRM program and to evaluate the program's effectiveness.

Two major CRM assessment development projects are presently under way in the civil aviation sector. Researchers in the European Union are in the latter stages of developing a program of CRM assessment known as NOTECHS (non-technical skills). NOTECHS is an individual pilot assessment tool that may ultimately determine the benchmark for an individual pass/fail CRM assessment. However, it was not the intention of the ADF to enforce a method of individual assessment but rather a measure of overall CRM training effectiveness.

ICAO is currently promoting LOSA as an operational auditing method to be used under normal flight conditions. It was thought that LOSA could be developed into a CRM evaluation tool if before-and-after measures were taken. Both NOTECHS and LOSA use established behavioral markers to rate CRM skills.

The term "behavioral markers" is defined by R. Flin and L. Martin, in their 1998 *Behavioral Markers for Crew Resource Management: A Report Prepared by the Department of Psychology, University of Aberdeen,* as "a prescribed set of behaviors that have been identified as indicative of some aspect of skilled human performance. The typical behaviors or 'markers' are listed in relation to the component skills and are then used for selection, training, and competence assessment. In the case of CRM, the focus is on the pilot's non-technical skills rather than the technical skills required to operate the aircraft."

To update the ADF CRM program and evaluate its effectiveness, a high-level ADF Tri-service CRM Steering Committee was formed under the chairmanship of the Deputy Chief of Air Force (DCAF), and it, in turn, appointed a Crew Resource Management Working Group (CRMWG) consisting of Navy, Army, Air Force, and specialist civilian members.

The CRMWG reviewed NOTECHS and LOSA with a view to adopting a CRM evaluation process that would be flexible enough to cater to its varied flight operations and to obtain relevant operational data to feedback into CRM. Since both of these methods involve the collection of data by observers, neither of them was found to be suitable. This was because many aircraft operated by the ADF could not carry an observer due to limited space, restricted use of personnel, and/or financial considerations.

In addition, military operations are not "normal" in the same sense as civil operations. High speed, rapid maneuver terrain flight under hostile conditions is quite different to delivering passengers from A to B in comfort and style. Therefore, another method of collecting CRM behavioral data was required.

MOSA

A major problem facing the ADF was how to collect behavioral data from pilots flying single-seat aircraft. While flight simulators have been proven to provide quality training, the ADF does not have a simulator for every aircraft type in its fleet. So a more generalized method of collecting behavioral data needed to be utilized. A solution was to have the pilots rate their own performance.

In designing the research, two major issues were raised: would subjective self-reports elicit the same behavioral ratings as those of an objective observer, and would the nature of the self-report ratings change under a condition of high workload?

***Sue Burdekin** lectures in aviation safety and human factors within the School of Aerospace and Mechanical Engineering at the University of New South Wales (UNSW)—Australian Defence Force Academy (ADFA) in Canberra. She consults to the Australian Defence Force (ADF) and is a civilian member of the ADF Crew Resource Management (CRM) Working Group. She is a commercial pilot with a background in civil aviation management, including an appointment as a national manager with Hawker Pacific.*

Self-assessment is used widely in the workplace, but the small body of research pertaining to its reliability is somewhat problematical. One issue involves the correlation between impartial observers, primarily because of disparity in individual rater status. That is, raters may have different levels of definition and measurement of performance. Another issue centers on the underlying premise of self-raters' egocentric bias. This theory, put forward by M. Harris and J. Schaubroeck in 1988, postulates that the self-rater would enhance his/her evaluation for reasons of personal defensiveness.

Despite potential difficulties associated with the use of pilot self-report data in assessing CRM programs, such data are essential when programs involve single-pilot aircraft. Fortunately, there was one circumstance in which pilot self-reports might possibly be reliable. The Harris & Schaubroeck meta-analysis of studies of self-reporting in 1988 suggested that its reliability is positively related to the vocational skill of the self-reporter. Participants in the present ADF study are highly skilled: their selection has been the result of an extremely competitive process, and they have undergone intensive training over many years. Thus, on the basis of this conclusion, it was argued that the pilots in question have the potential to rate their own performance reliably. The present study addressed the question of whether participants could actually do so under two conditions of workload.

The second issue raised during the design of this study was whether the nature of the self-report ratings would change under a condition of high workload. Pilots, flight engineers, and navigators would rarely encounter conditions requiring a degree of physical work. However, during the course of a "normal" flight a variety of cognitive functions, such as decision-making, problem solving, and reasoning would ensure that the crew would encounter varying degrees of mental workload. In this study, the interest was whether the ability to recognize performance error, as indicated in self-report ratings, varied as a function of variation in workload.

Simulator Hornet cockpit used in the workload experiments.

Means and Standard Deviations for Total Medium- and High-Workload

Workload	Mean	Standard Deviation	N
Medium-Observer	3.66	.55	14
Medium-Pilot	3.22	.51	14
High-Observer	3.53	.58	14
High-Pilot	3.12	.45	14

A basic characteristic of the human information processing system is that, at the conscious level, processing capacity is limited. Should the amount that can be processed in a given time be exceeded by an increase in mental workload, error is the likely result.

In this study, the interest was in whether an aircrew member was able to recognize that an error had been made, and rate his/her performance accordingly under different levels of workload.

The experiment

The experiment called for 31 male F/A-18 Hornet endorsed and active military fighter pilots from the 81 and 78 Wing, Royal Australian Air Force, based at Williamtown Air Force Base to participate in a simulated flight, which lasted no longer than 1 hour.

To balance the design, each pilot flew at random one of two possible flight profiles. The profiles consisted of three phases of flight—departure, on-task, and recovery.

Profile 1 was designed with a high workload in the on-task phase of the flight. It required pilots to take up a heading north east of the field climbing to a point over the ocean at 28,000 feet (FL280). From this position it was possible for the pilot to see on radar two enemy aircraft (bogeys) flying low at slow speed. Once the pilot had detected the aircraft, the controller, for the purpose of identification, requested a tactical intercept. This meant that the pilot had to maneuver the Hornet from FL280 in a high-speed controlled descent to visually identify the bogeys.

However, the profile was designed so that a visual intercept could not be achieved due to low cloud. Therefore, the entire descent had to be conducted under IMC (instrument meteorological conditions). Immediately following the intercept, the pilot was given a right air-frame-mounted auxiliary drive (AMAD) failure, which constituted an emergency and required him to break off the intercept and immediately take action to secure the safe return of the aircraft to the field. The pilot had to identify the emergency, refer to the emergency manual, decide on a course of action, initiate that action, and make an emergency radio transmission. As a consequence of the emergency, the pilot had to consider dumping fuel so that the aircraft was not landing in a heavy configuration.

Profile 2 was designed with a medium workload in the on-task phase of the flight. It required pilots to take up a heading north west of Williamtown climbing to a point over land at FL280. They also were presented with two bogeys and were asked to identify them; however, this profile did not have an emergency and was considered to be a straightforward, rehearsed maneuver, which was classified as medium workload.

In the first profile, the recovery back to the home airfield, Williamtown, was a straightforward, trained-for recovery and was considered to be a routine exercise. The second profile was designed with a high level of workload for the recovery phase of flight. It required the pilot to recover the aircraft at short notice to another air force base using a difficult and rarely used instrument approach. The pilot was advised that the runway at Williamtown was not available because of a civil aircraft mishap, which had rendered the runway unserviceable. Due to restrictive weather conditions, the pilot's only option was to accept a TACAN approach on Runway 10 at Richmond. This approach was considered to provide a high level of workload because it required the pilot to achieve a demanding descent profile into Richmond over the mountains from the west. The pilot would also have to consider the weight of the aircraft and decide whether to dump fuel.

Rating protocols were identical for both flight profiles. The only difference between the pilot (self-report) rating form and the observer rating form was the demographic section attached to the self-report form.

The rating protocols were divided into three sections (phases of flight): departure, on-task, and recovery. The departure phase of flight (low workload) in both profiles was not analyzed, because this study was primarily looking at whether pilots were able to recall and self-report their own behavioral performance maintaining high agreement with an independent observer under conditions of high workload. Provision for a written comment was provided under all phases of flight. Each section contained a statement that explained when that particular phase of flight commenced and concluded, and an identical performance rating scale against eight behavioral criteria. The rating scale was 1-to-5 with 1 representing unsatisfactory and 5 representing highly effective performance. A comprehensive explanation of each performance rating was included on the front cover of the rating form.

The behavioral criteria were designed in consultation with subject matter experts and experienced operational personnel. In addition, established LOSA behavioral markers, including monitor/crosscheck, workload management, situational awareness, automation management, evaluation of plans, inquiry, assertiveness, and emergency/abnormal, influenced the criteria. The emergency/abnormal criterion was added to the LOSA criteria because the operational nature of military flying is different from civilian transport operations. The marker definitions were also adapted to demonstrate relevance in a military operational environment.

Author Sue Burdkin, left, observing the simulated flight measuring workload.

Procedure The horizontal situation indicator (HSI) and head-up display (HUD) with accompanying audio transmissions were recorded onto videotape, which was available to be reviewed by the observer at a later time. In addition to these tapes, three video-monitoring cameras were installed in the cockpit. One camera was positioned so that a wide view of the cockpit instruments was visible. The second and third cameras were focused on the pilot so that his hand and leg actions were displayed while he was maneuvering the aircraft, along with his facial expressions. No video footage was recorded, but the vision from the cameras could be monitored during the session and this helped the observer gain a greater insight into the behavior of the pilot as he performed various duties during the flight.

A ground control interception (GCI) controller also played the role of air traffic controller (ATC). Each of the pilots received the same GCI and ATC instructions according to the profile that they were flying.

The experimental observer was a civil commercial pilot, a human factors specialist, a member of the CRMWG, and a co-designer of the experiment, in consultation with operational Hornet pilots. She was fully briefed by Hornet instructors and conducted two pre-trails using the Hornet simulator prior to the commencement of the data-collection process. In order to establish the reliability of the observer, the first 10 flights were also observed by a senior Hornet flight instructor.

Prior to the flight, each pilot participant was given a briefing document that explained that the mission was to be flown as a single ship and how the aircraft was to be configured for an air-to-air mission. No details of the enemy aircraft, the emergency, or the recovery were given to the pilot at this time. Once airborne, he was given at random air traffic control instructions for one of the two mission profiles.

The researcher rated each pilot's performance as the flight was being conducted in real time. The videotapes were reviewed later to confirm a judgment or if there was doubt over a pilot's performance on a particular phase of flight.

The pilot was asked to rate his own performance immediately following the conclusion of his flight. This meant that each pilot would have to remember how he performed in each of the three phases of flight against each of the eight behavioral criteria. However, if this form of self-report were to be adopted by the ADF, pilots would have to answer questionnaires after the completion of flights. Therefore, this experiment was considered to be an approximate simulation of the self-report of a "real" mission scenario.

Experiment results

The purpose of this study was to test an alternative means of collecting behavioral information from ADF pilots who fly aircraft that cannot accommodate an observer. The overall aim is to develop a CRM evaluation process that will determine if CRM training has transferred from the classroom into the cockpit.

A preliminary analysis was conducted on the ratings of the first 10 participants to establish the reliability of the experimenters' (Observer 1) ratings. A comparison between Observer 1 and another experienced observer would determine the ability of Observer 1 to judge each participant's performance against the behavioral markers. The preliminary analysis carried out between Observer 1 and Observer 2 screened out any criterion that the observers could not agree upon. The only criterion that was not significantly correlated between observers was "inquiry."

The main analysis addressed the two research questions: 1) can pilots achieve a high level of agreement with an independent objective observer by recall and self-report of their own behavioral performance, and 2) will the relationship of the self-report and observer ratings change under conditions of different workload?

Results showed that pilot and observer ratings did achieve a significant level of agreement over both conditions of workload. Surprisingly, the ratings were more highly correlated for high workload than for medium workload.

This study demonstrates that F/A-18 pilots are able to recall and self-report their own behavior following an operational flight in the simulator and that their self-reports correlate significantly across the sample with ratings of the same behavior made by an independent observer. The finding supports the Harris and Schaubroeck (1988) theory that suggested the level of vocational skill of the self-reporter is positively related to the reliability of the report. The F/A-18 pilots who participated in this study were members of the RAAF, highly skilled, comprehensively trained, and combat ready. The level of commitment and behavior required of these pilots is well-defined, and because of this they were able to make an informed appraisal of their own actions and reactions according to the operational circumstances they encountered during the flight.

Perhaps due to this heightened awareness, the pilots were more critical of their own performance in both conditions of workload compared with the independent objective observer. The comments made by the pilots on their rating sheets were also consistent with the realization that they were well aware of which behavior was worthy of harsh criticism and conversely which behavior was deserving of praise.

An interesting result was obtained when workload was manipulated. Pilots' self-reports were more highly correlated with the observers' ratings in the high-workload condition than during the medium-workload condition. Much of the literature indicates that the results should have been reversed. That is, due to limited cognitive resources, the ability of a pilot to recall and self-report his own behavioral performance might be impaired while operating under high workload. J. Rasmussen (1986) referred to this condition as the "cognitive tunnel effect."

The fact that the participant pilots are highly experienced may play a role in their ability to remember how they performed under high workload. Developing strategies to cope with abnormal and emergency procedures is a major component of RAAF pilot training. During the high-workload phase of flight, pilots would have been extremely focused on the task at hand; but due to their experience, this focus might not have exhausted their cognitive capacity.

Although RAAF subject matter experts amended each flight profile to an acceptable medium- and high-workload standard, an experienced pilot may have perceived a condition of high workload as an interesting challenge rather than an exercise that absorbs cognitive capacity. The abnormality or emergency may have even enhanced the pilot's ability to remember and make a qualified judgment of his own behavioral performance, because he would have devoted conscious information processing capacity to solving the problem in the high-workload condition, compared to what he perceived as the routine behavior experienced in the medium-workload condition. This situation could be likened to that of driving home from work. A routine journey home would hardly rate a second thought, whereas most details of a near accident would be remembered and readily recalled at a later time.

Where to from here?

In conclusion, it is acknowledged that although the present study indicates that F/A-18 pilots can be used as reliable observers for rating their own behavioral performance in a flight operational context, the study does not predict that F/A-18 pilots will reliably self-report if they are not under observation. The next step in this project is to test if pilots will self-report their own behavioral performance after a "real" flight in the aircraft. Confirmation of the reliability of these reports could be obtained by review of the HUD tapes, flight data recorder, and cockpit voice recorder.

The ADF is fully committed to the total integration of CRM concepts throughout its aircrew operations and training, including air traffic control. Furthermore, the ADF is considering future plans to incorporate CRM concepts into its aircraft maintenance operations. The need to gather information on current, relevant operational issues for CRM training purposes, to flag unsafe practices before they mature, and to evaluate the effectiveness of the training will continue to be essential for the future success of these programs. Therefore, an evaluation methodology needs to be developed to address these criteria. The CRMWG believes that MOSA, although still in the experimental stage, could evolve into an evaluation tool versatile enough to meet its needs. ◆

An unidentified military lab technician at the simulator monitoring station.

LOSA: An EVA Airways

The Psychology Department and the University of Texas Human Factors Research Project under the direction of Dr. Robert L. Helmreich in the mid-90s developed the Line Operations Safety Audit (LOSA), a new approach to flight safety.

By Capt. Dale M. Harris, EVA Airways

HUMAN FACTORS

(This article was adapted, with permission, from the author's technical paper entitled The Line Operations Safety Audit—LOSA: An EVA Airways Perspective on a New Approach to Flight Safety, *presented at the ISASI 2002 Seminar in Taipei, Taiwan, October 2002. The full paper is available on the ISASI website at www.isasi.org.—Editor)*

The Line Operations Safety Audit was developed by the University of Texas Human Factors Research Project in conjunction with major airlines in the United States as a means of collecting normal data on crew performance during line flights. LOSA data may be used for research as well as organizational safety initiatives and training. Although it was first presented by Dr. Helmreich in 1999, it has changed significantly in scope and acceptance since that date.

LOSA consists of a family of methodologies applied to normal flight operations to assess their strengths and weaknesses. At the heart of LOSA is a non-jeopardy, systematic assessment of operational threats and cockpit crew errors and their management, done from the jumpseat. The tabulation of threats and errors is augmented by assessment of cockpit resource management (CRM)-related behaviors, associated with effective and ineffective flightdeck management behavioral markers. In the future, plans are being developed to link LOSA observations with FOQA (Flight Operational Quality Assurance) data while still preserving the essential, non-jeopardy nature of the methodology.

Current LOSA practice combines the observed data with flight crew interviews regarding safety issues and also a survey of attitudes regarding safety practices, safety and organizational culture, and cockpit management using a specialized version of the University of Texas *Flight Deck Management Attitudes Questionnaire.*

The key to obtaining useful data is the reassurance to pilots that the observations are without jeopardy to them. With this trust, a picture of flight operations is quite different from that obtained by a check airman conducting a line check or an FAA inspector riding on a jumpseat. The fact that the LOSA observers note numerous instances of procedural and regulatory violations attests to the achievement of trust with the pilots observed.

The crew interview, survey, and line observations all help provide both objective and subjective data on strengths and weaknesses associated with the professional, organizational, and safety climate of the airline. These data also include problems in the ATC system, aircraft design and automation problems, and the level of support provided to crews by ground operations, maintenance, and dispatch.

As of this date [October 2002], 17 LOSAs have been completed or are in progress. The initial five involved only assessment of crew performance relating to CRM-related behavioral markers, technical proficiency, and overall crew effectiveness. The significant shift to include recording of threats and crew errors together with the crew's ability to effectively manage them was initiated by Capt. Bruce Tesmer at Continental Airlines.

Daniel Maurino of the International Civil Aviation Organization (ICAO) has been a strong supporter of normal flight operations monitoring. ICAO has named LOSA as its primary human factors initiative for the years 2000-2005 and has published a LOSA handbook. Also Costa Periera, Secretary General of ICAO, sent a formal letter to Jane Garvey, FAA Administrator, in June 2001 regarding LOSA. "LOSA acquires direct, firsthand data on the successful recovery from errors by flight crews during normal line flights. It is aimed at collecting data on successful human performance, and this is indeed a first in our industry, since aviation has traditionally collected data on failed human performance, such as an accident or incident investigation."

Threat and error management model

The complex data developed through LOSA are best understood when applied to a dynamic environment of the aviation system that reflects not only external threats and errors (for example ATC errors) but also airline organizational threats and errors such as rostering practices or maintenance and load sheet errors.

Capt. Dale M. Harris *is presently a consultant at EVA Airways. He was born in Houston, Tex., and received a B.S. degree from the University of Texas in 1962. He has more than 23,000 hours of no accident, no incident, and no violation flying that span 40 years. He was previously Chief Pilot at Eastern Airlines and EVA Airways.*

Perspective

Understanding the safety system

An understanding of flight safety can be gained only from valid, empirical data about normal operations. There are several sources of such data, each incomplete. However, in combination they can provide a good understanding of the strengths and weaknesses of operations. Aside from proficiency checks of technical competence, usually conducted in the simulator, sources of data include the following:

- **Accident investigation.** Exhaustive analysis of factors surrounding accidents has been a primary source of safety information in aviation. However, accidents are infrequent events that usually reflect the most obvious factors and fail to uncover the normal and unsafe operational practices.
- **Incident reports.** These are useful because they provide insights into a far later database of saves and near misses. They suffer, however, because of their voluntary nature and the resultant fact that the actual base line of occurrence of various categories of events is unknown. Despite efforts to assure pilots and other aviation personnel of the non-jeopardy nature of the reports under initiatives such as the U.S. Aviation Safety Action Partnership, these programs do not elicit complete reporting. This is due to embarrassment at acknowledging error and the fear of being sanctioned. Nevertheless, programs such as ASAP do provide invaluable information and allow organizations to take needed safety action prior to serious accidents and incidents.
- **Line checks.** Although required by civil aviation regulators in most countries, line checks generally lack in the diagnosis of pilot proficiency, especially in countries such as the United States where grading is on a pass-fail basis. Also, in most airlines fewer than 1 percent of all line checks is deemed unsatisfactory. Because of this, there is little human factor information gained at a significant cost (one major airline cites a cost of US$1,000 per line check). Pilots are certainly displaying their best behavior during a line check and not necessarily their ***normal*** behavior.
- **Flight data recorder monitoring.** Flight Operational Quality Assurance (FOQA) has become almost routine in new-generation aircraft to utilize flight recorder data to monitor exceedances in performance of the aircraft and to use this data for safety analysis, normally without jeopardy to the flight crews. While FOQA data can provide essential information about what happens in terms of deviations from organizational expectations, the data do not provide any insight into ***why*** the deviations occurred.
- **Normal flight monitoring—LOSA.** LOSA data may be used for research as well as organizational safety initiatives and training. ◆

For safe operations, in addition to the technical task of flying, crews must accomplish four safety tasks: (1) use proactive strategies to avoid committing errors, (2) effectively manage threats, (3) manage crew errors, and (4) manage aircraft deviations.

Across all LOSA observations, threats were recorded in 79 percent of all flights. In Asia, every flight had at least three threats, a much higher number than observed in the United States. This included environmental factors such as terrain, weather, and equipment malfunctions, but also errors external to the cockpit such as ATC or ground loading. Error is an inevitable result of human limitations, such as fatigue and other physiological factors, limited memory and processing capacity, external stressors, poor group dynamics, and cultural influences. Errors were noted in 64 percent of flights observed. Aircraft deviations (undesirable aircraft states) were observed in 32 percent of all LOSA observations. These are defined as wrong aircraft configurations, speed, heading, etc.

Safety tasks in cockpit management are important because they are defined as threat and error countermeasures used by the crew. They are comprised of *error avoidance, threat management, error management, and undesired aircraft state management.* When a cockpit crew has put an aircraft in an undesirable state (for example, the wrong speed or altitude), the primary task is recovery from the undesired state. From LOSA, the following CRM skills are observed to accomplish this task. They fall into four categories and are *(1) Team Climate, (2) Planning, (3) Task Execution,* and *(4) Review and Modify*. Team climate behaviors such as active leadership and establishing a team environment are critical for all four safety tasks. Planning, in contrast, is most related to error avoidance and threat management. Review and modify countermeasures, which include evaluation of plans, and inquiry and assertiveness, are most relevant to threat management and undesired aircraft state management.

Through LOSA observations, it was found that crew errors could be classified into five types. These are

- Procedural errors where crews are trying to follow procedures but execute them incorrectly (for example, making incorrect entries in the FMC).
- Communication errors in which infor-

"I was dubious of LOSA in the beginning. I now personally endorse LOSA and am convinced that it is the first scientific, as well as a human factors, breakthrough in improving safety during the years ahead."
—Capt. Dale M. Harris

Table 1

PHASE OF FLIGHT	THREATS	ERRORS
Pre-Departure/Taxi	30%	25%
Takeoff/Climb	22%	22%
Cruise	10%	10%
Descent/Approach/Landing	36%	40%
Taxi/Park	2%	3%

mation is improperly or incompletely communicated, withheld, or misunderstood.

• Proficiency errors where tasks are improperly executed because of a lack of skill or knowledge.

• Decision errors involving situations not covered by procedure or regulation in which crews take actions that unnecessarily increase risk.

• Intentional non-compliance when crews knowingly violate company policy or regulations.

Errors are termed *non-consequential or consequential.* By consequential, I mean errors that resulted in an *undesired aircraft state*.

The highest percentage of errors involve intentional non-compliance or violations, but only 6 percent of these led to an undesired aircraft state. In contrast, only 5 percent of errors reflected a lack of proficiency, but more than 60 percent of these were consequential. Similarly, decision errors were infrequent, but more than half of those that occurred were consequential.

The danger phase

LOSA data have shown that the approach and landing phase of the flight is the area that contains the most threats as well as the most errors. Table 1 (above) illustrates the danger areas and consequently the safety concerns of an airline.

LOSA data indicate that the highest number of both threats and errors occur during the descent, approach, and landing phase of a flight. This *most dangerous* phase of flight has led to a special focus in flight operations that the University of Texas has labeled "*The Blue Box.*" "Blue Box" data reveal that more automation and decision errors occur during this phase. This is also the time when threats (and errors) associated with ATC are the most difficult to manage. Twenty-eight percent of errors occurring in the Blue Box resulted in undesired aircraft states, with the most frequent being incorrect aircraft configurations, vertical deviations, and speed too high. Blue Box data provide guidance for airlines to manage threats as well as crew errors.

LOSA data have three major uses—research, airline safety initiatives, and the development of training curricula.

• Research: LOSA data have shown that crew performance was significantly better if the captain served in a PNF (pilot-not-flying) role in complex flying operations. In operations of a more benign nature, the person flying made no difference. Also, crews with a more positive safety attitude were more likely to "trap" more errors and the errors that they did commit were more likely to be inconsequential.

• Safety attitudes: LOSA data provide airlines with concrete information on line operations. This then provides the basis to make procedural changes as well as to give guidance to crews regarding high-threat operations.

• Training development: LOSA data provide insights into areas in need of special training, such as captain leadership, workload management, or unstable approach parameters.

LOSA at EVA Air

LOSA was conducted at EVA Air and UNI Air during July and August 2001. A total of 208 flights were observed and data collected. These flights were on domestic as well as short-haul and long-haul international segments. EVA Air and UNI Air LOSA data fell into the same statistical ranges as the other airlines that had previously done threat and error LOSAs.

The one area that was different was the abnormal number of threats in the southeast Asia theater of operations. Where previous LOSA data showed that a typical flight would experience two threats, EVA and UNI data showed that flights in this area experience more than three threats per flight. In 10 percent of the flights, there were five or more threats.

EVA Air is now going through a LOSA implementation phase of development. Task groups made up of both ground staff and pilots are examining the LOSA data, categorizing it, and working on solutions. These are in the form of recommendations to management to implement changes to procedures, training, and safety concerns. Also, crew behavior is being studied to improve our current CRM threat and error course module. We have been very pleased with LOSA to date and plan to schedule another LOSA audit in 2004. This will give the airline valuable information as to safety improvements that have been made using the LOSA data collected in 2001.

As an airline pilot with more than 35 years of experience, I was dubious of LOSA in the beginning. I now personally endorse LOSA and am convinced that it is the first scientific, as well as a human factors, breakthrough in improving safety during the years ahead. (References used in preparation of this material include Helmreich, R.L.; Klinect, J.R.; and Wilhelm, J.A. (1999). Models of threat, error, and CRM in flight operations.) ◆

Council Takes Wide-Ranging Actions

PHOTOS: E. MARTINEZ

(Adapted from minutes of the International Council Meeting recorded by Keith Hagy, Secretary.—Editor)

The spring ISASI International Council Meeting, held on May 2, 2003, in Herndon, Va., addressed a full slate of subjects including the donation of the Society's technical library, final actions on the newly created memorial fund, financial health, image recording, and the venue for ISASI 2005.

President Frank Del Gandio opened the meeting and called for the report of action items from the September 2002 meeting. Curt Lewis, U.S. Councillor and U.S. Society President, reported the status of donating the ISASI library material to Embry-Riddle Aeronautical University (ERAU). He said ERAU was very interested in having access to the historical material from ISASI. ERAU would store hardcopy material at the ERAU Prescott Campus, but would convert the material into an electronic format and make the donated material available to ISASI members via the Internet. ERAU is an international organization with "campuses" based in various regions around the world. The Council approved the donation of the library material to ERAU. Keith Hagy and Curt Lewis will coordinate with ERAU the packing and shipping of the material.

TOP: The International Council begins its spring session in Herndon, Va. ABOVE: John Darbo, Dallas/Forth Worth Regional Chapter, presents the Chapter's case to sponsor ISASI 2005.

Richard Stone, Executive Advisor, reported on the ongoing work with the ISASI Memorial Fund, approved at the May 2002 meeting. In addition to detailing the method of administering the fund by the two named executors of the fund, the ISASI Executive Advisor and Vice-President, he proposed that the fund be officially named the "ISASI Rudy Kapustin Memorial Scholarship Fund" in honor of the former Mid-Atlantic Region Chapter President and long-term ISASI member. The Council unanimously adopted the proposal. Details of the fund's administration are outlined in this issue's "ISASI RoundUp."

Stone also reported that operating procedures for the ISASI Membership Services Directory proposal approved at the September 2002 meeting had been completed but that initiation of the program is being held in abeyance pending completion of work relative to its website provisions.

Curt Lewis presented as a draft of an ISASI electronic newsletter, a copy of the U.S. Society newsletter that he produces and distributes electronically. The ISASI newsletter, he said, "could be distributed via e-mail using his e-mail distribution list that contains more than 3,000 addresses." Such a newsletter would complement the *ISASI Forum* magazine. After discussion, the Council endorsed the concept and at its next meeting will discuss editorial content and editorial oversight responsibility.

Officer reports

In his report, President Frank Del Gandio praised the success of the Reachout program under the leadership of Jim Stewart and Caj Frostell and the positive visibility the program has brought to ISASI. In addition, he reported his attendance with Jerry Lederer at the 45th Annual Aerospace Laurel ceremony sponsored by *Aviation Week & Space Technology*. Jerry was recognized as a "Laurel Legend," along with Orville and Wilbur Wright, President Jimmy Carter, and William Schneider, Jr. Jerry was honored by the magazine for being the "father of aviation" and for his dedication to the ideal that no lives need to be lost unnecessarily while involved in space or flight activities.

Council members, left to right, President F. Del Gandio, B. Dunn, and R. Chippindale review the ISASI 2005 proposal.

President Del Gandio also, again, expressed concern over the lapse in membership renewal of individual and corporate members. In this regard, the Council thoroughly discussed both the recruitment and retention issues. The efforts made regarding these issues included enhancement of the website, development of an ISASI presentation board and its promotional use of aviation safety-related events such as the Cabin Safety Conference and Flight Safety Foundation annual seminar, increased participation at ICAO, and the ongoing Reachout program. As a new service to attract new members, the Council discussed the possibility of initiating an ISASI "Investigator Certification" program. Also discussed was the possibility of using seminar registration as an "automatic" signup for ISASI membership. The new concepts will be more closely reviewed at the next meeting.

Treasurer

Treasurer Tom McCarthy provided a detailed written report of the financial status of ISASI. He noted that the office condo purchased several years ago continues to prove itself as a good investment for ISASI. By renting a portion of the office space to other business, the condo results in almost a no-cost item to the Society. In addition, the appreciation growth rate of real estate in the Washington, D.C., area makes the condo a strong asset. Upcoming expenses include a special $3,500 assessment applied to property maintenance; the office heat pump will also be replaced.

He also reported that the cost to publish the 2002 *ISASI Proceedings* publication was $6,500. He noted that it is distributed via CD-ROM (for ICAO Member States and ISASI members upon request) at virtually no cost and that a minimal number of booklet paper copies are available at a cost of $150 each. The *Proceedings* are made available at no charge to the membership via the website. In reviewing the costs of the publication, the Council was reminded that due to the mixed format in which seminar presentation papers are submitted, editing, and layout design are necessary to produce a compact and concise professional product. It was debated whether the editing and design tasks could be accomplished by the local seminar committee. Council consensus was that while some seminar committees may possess the expertise and time to accomplish the tasks, not all would. The Council determined that the seminar *Proceedings* is of importance to the Society and its members. As a result, the Council voted to continue publication of the seminar *Proceedings* using the current process.

McCarthy also reported that to date, no financial information had been received from the Taipei Seminar Committee with regard to the seminar held in September 2002.

Councillors /National Societies

Australian Councillor Lindsay Naylor thanked Qantas Airlines for the complimentary travel to attend the Council meeting and reported the Australian Society has 123 active members and 16 delinquent, with eight new individual members and one new corporate member. He expressed his concern that the upcoming Australasian seminar, which was scheduled to held in June, would be heavily impacted by the SARS issue, as well as the current financial situation of the aviation industry.

Canadian Councillor Barbara Dunn reported that all refunds from the Victoria ISASI seminar have been paid, and presented a check for $11,700 to Treasurer McCarthy representing the rest of the seminar proceeds to ISASI. In total, the Canadian Society has provided approximately $21,700 to ISASI from the Victoria seminar. She was congratulated on the successful completion of the seminar in the face of the events of Sept. 11, 2001. Dunn also reported the Canadian Society membership at 84 active members and seven delinquent in dues and that nine new members signed up since the September 2002 Council meeting. To help recruitment, she noted that the Canadian Society was considering a 50 percent reduction in dues for members who include an application of a new member in their renewal submission. Among other Canadian Society actions reported were the revision of its membership application and availability of a bloodborne pathogen training package, at a nominal cost, upon request.

She concluded her report with a review of the draft revision to the *ISASI Seminar Policies and Procedures Manual* prepared by herself, Kevin Darcy, and Dick Stone.

European Councillor Max Saint-Germain reported that the European Society has held two meetings: The first was in conjunction with the 2002 seminar in Taipei, and the second was held on April 23, 2003, at the Rolls-Royce facility and was attended by 20 members.

New Zealand Councillor Ron Chippindale reported that representatives of the New Zealand Society were assisting with preparations for the Australasian seminar that was scheduled for June. The Society, as a benefit to its members, is providing financial assistance to members wishing to attend the 2003 and 2004 annual ISASI seminar. The financial assistance would consist of funds toward airfare and the cost of the seminar registration fee. He also reported that membership status for the New Zealand Society stands at 50 with three new members joining recently.

United States Councillor Curt Lewis summarized his detailed written report of his activities since the September 2002 meeting. Highlights included developing the U.S. Society and DFW Chapter websites, developing the U.S. Society newsletter, assisting in the development of the DFW proposal for the 2005 ISASI seminar, conducting a late winter meeting of the DFW Chapter (next chapter meeting was planned for late May or early June), attending and speaking at the ERAU Student Chapter meeting in February 2002, and working with ERAU-CASE (Center for Aerospace Safety Excellence) regarding the donation of the ISASI library.

International Councillor Caj Frostell reported that his activities since the last Council meeting focused on working with Jim Stewart conducting Reachout seminars.

Latin American Society President Marco A. de M. Rocha ("Rocky") did not file a report.

ISASI Forum report

Editor Esperison (Marty) Martinez summarized his written report submitted to the Council. He noted that since 1997, 27 articles written for and published in *Forum* have been republished in other safety-related publications.

He also reported that a different format was used to publish the 2002 Annual Report, and that the format appreciably reduced the number of pages required, thus resulting in a good savings. He recommended Council adoption of the new format, which consists of using financial data only. The Council adopted the concept.

Other *Forum* recommendations adopted by the Council included adding the membership application to *Forum* as a way of adding new members; distributing copies of *Forum* at other industry safety meetings as a way of increasing ISASI exposure; and on occasion adding as an insert to the *Forum* the "Benefits of Membership" material, as a way of attracting new members.

Committee reports

Membership—Chairman Tom McCarthy reported 1,385 current individual members and 233 members delinquent in dues payments; 107 corporate members in good standing and 20 delinquent.

Seminar—Kevin Darcy reported the possibility of holding an annual seminar in the Czech Republic. He also noted that the relationship of the tutorial sessions with the annual seminar was being reviewed and sought input from Council members. Most members believed that the current scheduling and attendance options for the pre-seminar tutorials should continue. He also reported that for future seminars the Committee was going to require the use of Microsoft PowerPoint software as the seminar "standard" for slide presentations.

Reachout—Jim Stewart reported that since established by ISASI, Reachout seminars have been conducted in seven locations. He noted the high level of support and sponsorship provided by ICAO and ALPA. Because of the program's popularity and growth, four additional Reachout leaders have been appointed. Stewart further stated that safety management systems and air traffic services training modules have been developed for Reachout. These modules are available on request for future Reachout seminars. He also reported that Reachout has been invited to west Africa for the January-February 2004 time frame and that the workshop would be conducted in French. In addition, he said that three additional Reachouts are being considered for 2004: China, South Africa, and Jamaica.

No committee reports: Audit, Awards, Bylaws, Technical Library, Board of Fellows Nominating, Code of Ethics and Conduct, and Ballot Certification.

Working group reports

Air Traffic Services—Darren Gaines reported on behalf of John Guselli who was unable to attend. Gaines reported that the ATS Working Group had developed an ATS training module that is being offered during Reachout workshops. Development of this training module was coordinated with the Reachout Committee. Gaines also reported that the ATS Working Group had developed a website that is now linked to the main ISASI website.

Positions—Ken Smart was unable to attend the Council meeting but submitted a written report, which outlined a new draft position regarding cockpit image recorders (inflight video recordings) based on discussion at the September 2002 Council meeting.(See details of the proposal in this issue's "ISASI Roundup.") In addition, Smart reported that the Positions Working Group had received proposals from the New Zealand Society for ISASI Positions on the subjects of unlawful interference, family assistance, and natural causes. (These proposals and drafts may be seen in the "RoundUp" section of this magazine.—Editor.) Council members where asked to review the material submitted by the Positions Working Group and provide any comments by May 16, 2003. No comment indicates concurrence on the Working Group proposals.

Annual seminar

Lindsay Naylor updated the Council on preparations for the 2004 seminar to be held on the Australian Gold Coast near Brisbane. The update included a review of the seminar venue, proposed seminar theme, and anticipated social program.

Representatives from the DFW Regional Chapter and the Pacific Northwest Regional Chapter each gave presentations on their proposals to host the 2005 seminar. The presentations included venue overview, anticipated cost, and thoughts on technical and social programs.

At the conclusion of the proposals, the Council held a short discussion and selected the DFW Regional Chapter's bid to host the 2005 seminar. ◆

PWG Actions Show Procedural Effects

Recent action by the Positions Working Group (WG) aptly demonstrates the procedural effectiveness of the working group system employed by ISASI. At the May meeting of the International Council, Ken Smart, Chairman of the Positions Working Group, submitted the draft results of the Group's efforts in developing, for the Society, a new "Position" dealing with cockpit image recorders (inflight video recordings).

The Council accepted the draft proposal, and it is expected that individual Council members shall respond to the draft language with changes each feels serves the interest of the Society the best. The WG's draft language was developed as a result of discussions at the previous Council meeting at which the Group was directed to study the subject and issue recommendations.

Among the matters the WG considered in arriving at its recommendation and proposed inflight video recorders position were that the EUROCAE Committee ED112 had completed setting its detailed specifications for flight deck image recorders (FDIR) and that IFALPA, the pilots international umbrella group, voiced strong concerns about the misuse of FIDR recordings. Ultimately, the Group concluded that ISASI should extend the general ISASI position on inflight video recordings (Position 9.7) to include FDIR and extend provisions to protect against misuse.

Following is the proposed draft "Position" submitted to the Council for consideration:

Flight Deck Image Recorders

9.8 The use of flight deck image recorders (FDIR) is encouraged provided that their introduction is accompanied by legal and or technological measures designed to protect the recordings from inappropriate disclosure and misuse.

Following Council discussion at its next meeting, the Working Group will complete its effort on its draft work and prepare a final proposal to the Council for approval.

NZSASI submissions

A yet additional method of securing additions or changes to Society "Positions" was followed by the New Zealand Society, which submitted five proposals directly to the Working Group. The WG, in turn, studied the NZSASI proposal and submitted its view on the subject and, where applicable, developed draft Position language for the Council's consideration and comment as follows:

INVESTIGATIONS—The investigation of "accidents" that are established to have resulted from unlawful interference.

(i) Once unlawful interference has been established, what parties should be involved in the investigation?

(ii) What is the definition of unlawful interference?

(iii) Is an occurrence still considered to be an "accident" when unlawful interference is established?

Positions Working Group View: ISASI should have an established position on this subject.

Draft Position XX—Unlawful Interference:

XX. Unlawful interference is defined as any unlawful act that has been or may have been committed during the operation of an aircraft. When it is suspected that unlawful interference has taken place then the police and judicial authorities should be notified. Any aviation safety issues should continue to be investigated and through the normal processes while maintaining liaison with the police and judicial authorities.

FAMILY ASSISTANCE—The involvement of the investigating authority in "family assistance"

(i) To what extent should the IIC be involved?

(ii) To what extent should the aircraft accident authority be involved?

(iii) At what stage of an investigation should the accident investigation authority become involved with "family" members?

Positions Working Group View: ISASI should have an established position on this subject.

Draft Position YY—*Family Assistance:*

YY. The accident investigating authority should make every effort to ensure that survivors and bereaved families are kept informed of the progress of investigations from the earliest stage, to a level appropriate to the circumstances of the investigation and in accordance with their wishes. The basic principle should be to treat survivors with respect and sensitivity and in a way that we would all wish to be treated if we were subjected to the same tragic circumstances. Where possible the IIC and members of the investigation team should be directly involved in this process.

NATURAL CAUSES DEATH—The ICAO definition of an accident excludes death or injury from "natural causes."

(i) What does ISASI consider to be a "natural cause"?

(ii) Do circumstances influence the determination of natural causes?

In Memoriam

Paul Bray Jr. (MO2072), Westport, Conn., May 2003. (Plane crash at Monmouth Executive Airport in Monmouth, N.J.)

Aage A. Roed (LM0946), Kungsaengen, Sweden, January 2003. (Pneumonia.) Aage received the Jerry Lederer Award in 1989.

2002 Annual Seminar Papers Now Available

Active members in good standing and corporate members may acquire, on a no-fee basis, a copy of the *Proceedings of the 33rd International Seminar*, held in Taipei, Taiwan Sept. 30-Oct. 30, 2002, by downloading the information from the appropriate section of the ISASI web page at www.isasi.org. The seminar papers can be found in the "Members" section. Further, active members may purchase the *Proceedings* on a CD-ROM for the nominal fee of $15, which covers postage and handling. Non-ISASI members may acquire the CD-ROM for a US$75 fee. **A limited number of paper copies of *Proceedings 2002* are available at a cost of US$150.** Checks should accompany the request and be made payable to ISASI. Mail to ISASI, 107 E. Holly Ave., Suite 11, Sterling, VA USA 20164-5405.

The following papers were presented in Taipei:
- **Session I Keynote Address** *by John Hammerschmidt, NTSB, USA*
- **The Technical Investigation on the Concorde F-BTSC Accident** *by Bernard Bourdon and Yann Torres*
- **Lessons Learned From the Concorde Investigation—U.K. Perspective** *by Robert Carter*
- **Lesson Learned on Near-Miss Accident** *by Hidemasa Takahashi*
- **Session II Keynote Address, Aircraft Accident Investigations in Developing Countries** *by Oetarjo Diran*
- **Effective FOQA Program** *by Samson Yow-Ching, Yeh*
- **Australian Initiatives on Safety Improvement** *by Kym Bills*
- **Regional Differences in Accident Rates and their Global Implications for Improving Aviation Safety: Social, Economic, and Political Factors in Aviation Safety** *by Robert Matthews*
- **From Data Comes Knowledge that Leads to Action** *by Richard Breuhaus*
- **An Outlook on Operational Risk Management and Operational Safety in Chile** *by Claudio Pandolfi*
- **Session III Keynote Address, Global Challenges to Accident Investigation and Safety Improvement** *by Stuart Matthews*
- **Air Accidents Over Water** *by John P. Fish and H. Arnold Carr*
- **Future Flight Data Collection Committee—Recorder Technology for the Next 15 years** *by James Cash and Robert MacIntosh*
- **Air Transport Safety Information** *by George Joseph and Anthony Concil*
- **Identifying Survival Factors Issues in Incident/Accident Investigations** *by Cynthia Keegan*
- **Using Processes Learned in Accident Investigations to Systemically Train Investigators** *by Keith McGuire*
- **Considering Maintenance, Human, and Organizational Factors and Related Errors During Accident and Incident Investigations** *by Bart J. Crotty*
- **Session IV Keynote Address, Global Challenges to Accident Investigation and Safety Improvement** *by Kuo-Cheng Chang*
- **Criminal Liability and Aircraft Accident Investigation** by *Capt. Lindsay Fenwick and Michael C. Huhn*
- **Midair Collision B-757-200 and TU154M on July 1, 2002, near Ueberlingen, Germany** *by Joerg Schoeneberg*
- **Corporate Responsibility and Accountability and their Role in Defense of Air Carriers and Air Agencies in FAA Enforcement Proceedings** *by Michael L. Dworkin*
- **Managing Conflict During Major International Accident Investigations** *by Ronald L. Schleede*
- **Session V Keynote Address, Human Factors** *by Ken Smart*
- **Go Arounds—A Problem for Certain Pilots?** *by Ladislav Mika and Thomas Fakoussa*
- **Mission Operations Safety Audits (MOSA): A Military Version of LOSA** *by Sue Burdekin*
- **The Line Operations Safety Audit—LOSA: An EVA Airways Perspective on a New Approach to Flight Safety** *by Capt. Dale Harris*

Positions Working Group View: In Annex 13 to the Chicago Convention, the term "natural causes" as used is used in the context of the "death" not being associated with the aircraft or its systems. This does not preclude any investigation body conducting an investigation into the circumstances of the death if it was felt that there were flight safety connotations arising from it. The Positions Working Group considers that it is not necessary for the International Society to establish a "Position" on this issue.

ACCIDENTS AND SERIOUS INCIDENT—The ICAO definition of an aircraft accident limits the occurrence to an event that occurs when the intention for flight exists and one or more persons is aboard the aircraft for that flight.

(i) Does ISASI believe accident investigation authorities should refrain from investigating accidents involving aircraft that are not occupied by any person with the intention for flight?
Positions Working Group View: Although the ICAO definition of an accident requires persons to be on board with the intention of flight, this should not preclude any accident investigation authority from conducting an investigation where it is felt that safety lessons could be learned. Position 3.1 should be amended to encompass this intent.

Amended Draft Position 3.1
Accidents and serious incidents should be investigated whether or not they fall within the strict definition of Annex 13 to the Chicago Convention so that safety lessons can be learned. All accidents and serious incidents should be investigated by qualified air safety investigators.

SECURITY—Does ISASI consider "security" as a separate issue or a vital element of flight safety that should form part of any accident investigation.
Positions Working Group View: In many cases where security issues are associated with the circumstances of an accident, it will fall into the context of "unlawful interference." Where there are issues of direct relevance to aviation safety, then they should be addressed as described in Draft Position XX above.

These five NZSASI initiated subjects and the related WG view or recommendation(s) will be discussed at the August International Council meeting. Action to complete the work on the positions will follow by the Positions Working Group. ◆

Mid-Atlantic Chapter Holds Spring Meeting

The clash between accident investigation needs and criminal investigation needs following an aircraft accident was the focus of the spring Mid-Atlantic Regional Chapter meeting's main speaker Jim Hall, former NTSB Chairman.

More than 70 Chapter members and guests attended the May 1 meeting held at the Crystal Gateway Marriott Hotel, in Arlington, Va. As is the MARC meeting tradition, the meeting was preceded by a "say hello" social hour, followed by a full buffet dinner.

Chapter President Ron Schleede opened the meeting with welcoming remarks in which he explained that the meeting is scheduled to coincide with the spring meeting of the ISASI International Council to provide cross-talk opportunity with Council members by persons attending the Chapter meeting. ISASI President Frank Del Gandio led the Council delegation. Also attending was Mark V. Rosenker, newly designated Vice-Chairman of the NTSB; John Goglia, Member NTSB; David Campbell, NTSB Managing Director; and Col. Donovan Bartolini, Secretary General for the Cooperation Between the Air Forces of the Americas. The colonel made a $50

ABOVE: Left to right, Jim Hall, Frank Del Gandio, and Mark Rosenker shown in light conversation following the Chapter meeting. LEFT: Ron Schleede congratulates Col. Donovan Bartolini on his door prize selections.

contribution to MARC to further its safety efforts. Members of the news media present at the gathering included Stephen Powers, *The Wall Street Journal*; Alan Levin, *USA Today*; and David Evans, PBI Media.

President Del Gandio addressed the group and introduced the Council members. He also noted that ISASI has representatives from 56 countries within its active individual membership of 1,383, and corporate membership of 107. Del Gandio welcomed John Darbo of CAVOK International, Inc., to the corporate membership and recapped the outstanding success of ISASI's Reachout program aimed at providing affordable training in accident investigation processes to developing systems in the international community.

Guest speaker Jim Hall, addressing the conflict between accident investigation and criminal investigations, noted that due to the tragedy of 9/ll, creation of the Homeland Security Administration, and the wars in Afghanistan and Iraq, aviation community sensitivity to possible criminal involvement or terrorist activity in aviation accident investigation has dramatically increased. He cited examples of accident investigations that put criminal and accident investigators at odds.

"The question of how to share documents between safety investigators and criminal investigators; who shall have priority; who has ultimate authority; and what role Homeland Security plays in aviation investigations of the future are all questions and challenges that will face us in coming years," he said.

One of the remedies, he believes, is to have "more complete data from the aircraft and quicker access to the data…[e.g.,] better initial data, both in quantity and quality…the quickest, surest way to do this is to overhaul the flight data recorder regulations." He noted that the NTSB asked for "expanded parameters for flight data recorders" in 1995 but that nothing has yet been done in that regard.

He went on to highlight reasons why recorder improvements are necessary and how it could be done. Among the latter, he touted the virtues of a military-developed deployable black box technology that combines digital FDR, CVR, and emergency locator transmitter within a single unit. He said the technology "has been adapted to meet the needs of the commercial industry and presents an obvious way to maximize our ability to ensure the survivability and recoverability of flight recorders."

In closing, he lauded accident investigators for their past efforts, noting that it will take "continued commitment and persistence of all of us to continue to advance aviation safety." ◆

SCSI Conducts Course In Czech Republic

As a direct result of ISASI's Reachout training effort, the Czech Republic has sponsored a number of aviation safety training programs. According to Ladislav Mika (MO4226) of the Civil Aviation Department, "Safety training has become a byword of the Republic's Ministry of Transport."

Most recently, an international course in basic aviation accident prevention and investigation was organized by the Southern California Safety Institute (SCSI) together with the Czech Republic Ministry of Transport. It was held in April 2003 and focused on ICAO requirements including an introduction

Benefits of Individual ISASI Membership

About You

You are an air safety professional. You may work for an airline, a manufacturer, a government, the military, an operator, or on your own. But you are a person who is dedicated to improvement of aviation safety and you joined ISASI with the expectation of enhancing the achievement of that goal.

About ISASI

ISASI is the only organization specifically for the air safety investigator. Our motto is "Air Safety Through Investigation." We are a growing, dynamic organization with a full range of membership.

Why Join? Lots of reasons—activities, education, services, and networking

• The yearly ISASI seminar has become a focal point for aviation safety professionals throughout the world. Attendance has steadily grown and the presentations are state of the art and meaningful. The 2002 seminar was held in Taipei, Taiwan, and the 2003 seminar will be in Washington, D.C., celebrating the 100th anniversary of flight.

• The new *Reachout seminar program* was instituted to provide low-cost, subject-oriented seminars in regions of the world with higher accident rates. Since the first *Reachout* held in Prague, Czech Republic, in May 2001, there have been six Reachout seminars in Lebanon, Chile, India, Sri Lanka, Tanzania, and Costa Rica. All have been an unqualified success in attendance and content. These mini-seminars provide our corporate members an opportunity to directly affect safety in those areas where it will have the greatest return.

• The ISASI publication, *FORUM,* is a first-class magazine, published in color four times a year. Its editorial content emphasizes accident investigations findings, investigative techniques, and experiences, regulatory issues, industry accident prevention developments and ISASI, and member involvement and information. Each issue also features one of our corporate members in a full back-page "Who's Who" article.

• The annual seminar-published *Proceedings* are provided to individual members at no cost on line.

• Individual members have access to past ISASI publications, our library, and accident database.

• ISASI now has an easily accessible website, www.isasi.org, with an extensive "Members Only" information section and a limited general public area.

• Our corporate and individual members are a large and diverse group working in all facets of the industry worldwide. This presents a unique opportunity for personal and on-line networking.

ISASI is the place for those dedicated to improving aircraft accident investigation and aviation safety.

PREAPPLICATION FOR INDIVIDUAL MEMBERSHIP

(Cut and mail to the address below or otherwise contact ISASI to receive a full membership application.)

PLEASE PRINT

Name (last, first) ______________________

Date of birth ______________________

Home address ______________________

City ______________________

State, district, or province ______________________

Country ______________________

Postal zip/zone______________________

Home telephone______________________

Citizen of (country) ______________________

Spouse's name (optional) ______________________

I AM INTERESTED IN APPLYING FOR SOCIETY MEMBERSHIP IN THE MARKED MEMBERSHIP CLASSIFICATION. PLEASE FORWARD TO ME A FULL MEMBERSHIP APPLICATION.

• **Member**—A professional membership class requiring at least 5 years' active experience as an air safety investigator.
• **Associate Member**—A professional membership class for air safety investigators who do not yet fulfill the requirements for member.
• **Affiliate Member**—A public, non-professional membership class for persons who support ISASI's goals and objectives.
• **Student Member**—A membership class for students who support ISASI's goals and objectives. (If student, list name of institution where enrolled______________________.)

Present employer ______________________

Employer's name ______________________

Address and telephone ______________________

Did your position involve aircraft accident investigation? ❏ Yes ❏ No

Your title or position: ______________________

Dates: from:______________ to ______________

INTERNATIONAL SOCIETY OF AIR SAFETY INVESTIGATORS
Park Center
107 East Holly Avenue, Suite 11
Sterling, VA 20164

Telephone: 703-430-9668
Fax:703-430-4970
E-mail: isasi@erols.com

to safety management systems now favored by Britain, Canada, Australia, and several other countries. The course was developed and directed by Olof Fritsch (MO0550) and Dick Wood (LM0598) who also sit on the Southern California Safety Institute (SCSI) Board of Advisors.

Wood, in explaining why and how the course was developed, said: "For over 30 years, Swedavia, part of Sweden's CAA, offered an annual course in aircraft accident prevention and investigation taught at the Royal Institute of Technology in Stockholm. The course enjoyed an excellent reputation but was terminated in 2002 for financial reasons. This created a void in the availability of prevention and investigation training in the European area."


PHOTO COURTESY MOT

Attendees of the 10-day basic aviation accident prevention and investigation course represented 11 countries.

Twenty four attendees from the Czech Republic, Hungary, Greece, Germany, Saudi Arabia, Bosnia-Herzegovina, the Netherlands, Finland, Poland, Singapore, and South Africa participated in the 10-day course, which included samples of aircraft wreckage brought from the old Swedavia crash laboratory near Stockholm.

Mika says the Prague course has been recognized as the successor to the long-running Swedavia courses. Other upcoming Prague training includes an international course in aviation safety April 19-30, 2004, and a cabin safety, security, and health symposium to be held March 23-25, 2004. For more details, visit the SCSI website at www.scsi-inc.com. ◆

ISASI Names Memorial Fund

The ISASI memorial scholarship, established by the ISASI International Council at its October 2002 meeting in memory to all ISASI members who have died, was officially named the ISASI Rudy Kapustin Memorial Scholarship Fund by the Council at its spring 2003 meeting, in honor of the former ISASI Mid-Atlantic Regional Chapter president and long-term ISASI member who developed a reputation as "tinkicker extraordinaire" among his peers.

The scholarship is intended to encourage and assist college-level

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 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.

Upcoming Events

- **ISASI 2003** Washington, D.C.—August 26-28
- **ISASI 2004 Gold Coast Australia—** October 1-3
- **ISASI 2005**—Ft. Worth, Tex.
- **The International Aviation Fire Protection Association** (IAFPA) 4th annual "Aviation Fire Asia 2003" conference October 8-10 in Singapore. Contact website: www.iafpa.org.uk.
- **16th European Aviation Safety Seminar** (EASS) 2004 March 15-17 in Barcelona, Spain. Contact Joanne Anderson, Flight Safety Foundation, at 703-739-6700, Ext. 111; e-mail: anderson@flightsafety.org.
- **49th Annual Corporate Aviation Safety Seminar** (CASS) in Tucson, Ariz., April 27-29, 2004. The theme of this year's conference is "Quality Safety-Oasis in the Desert." Contact Joanne Anderson, Flight Safety Foundation, at 703-739-6700, Ext. 111, e-mail: anderson@flightsafety.org

TRAINING COURSE CALENDAR 2003/2004

UNIVERSITY OF SOUTHERN CALIFORNIA
• Aviation Safety Program Management
Oct. 6-17 (03), Jan. 5-16, Mar. 22-Apr. 2, Jun. 21-Jul. 2, Sept. 20,Oct. 1, Dec. 6-17
• Human Factors in Aviation Safety
Sept. 15-19 (03), Nov. 10-14 (03), Mar. 1-5, May 17-21, Sept. 13-17, Nov. 8-12
• Safety Management for Aviation Maintenance
Nov. 3-7 (03), May 10-14, Nov. 1-5
• Software Safety
Nov. 10-13 (03), Apr. 26-29, Nov. 15-18
• Gas Turbine Accident Investigation
Nov. 17-21 (03), May 3-7, Nov. 15-19
• Accident/Incident Response Preparedness
Oct. 20-22 (03), Feb. 23-35, Oct. 18-20
• Photography in Accident Investigations
Oct. 23-24 (03), Feb. 26-27, Oct. 21-22
• Helicopter Accident Investigation
Oct. 27-32 (03), Apr. 5-9, Oct. 25-29
• Aircraft Accident Investigation
Sept. 22-Oct. 3 (03), Dec. 8-19 (03), Mar. 8-19, Jun. 7-18, Oct. 4-15
• Incident Investigation/Analysis
Sept. 9-12 (03), Jan. 26-29, Aug. 30-Sept 2
For further information contact:
University of Southern California/Aviation Safety Programs
Tele: 310-342-1345
Website: www.usc.edu/dept/engineering/AV.html

TRANSPORTATION SAFETY INSTITUTE & FAA
• Aircraft Accident Investigation
Oct. 21-29, (03), Nov. 3-21 (03), Jan. 27-Feb. 4, Mar. 9-17, May 3-11, Jun. 8-16, Jul. 13-21, Jul. 27-Aug. 4, Aug.18-26
• Accident Investigation Recurrent Tng.
Nov. 4-6 (03), Jan. 13-15, Mar. 2-4, Apr. 20-22, Aug. 10-12, Sept. 14-16
• Human Factors in Accident Investigation
Dec. 2-4 (03), Feb. 10-12, Apr. 13-15, Jun. 29-Jul. 1, Aug. 31-Sept. 2
• Rotorcraft Accident Investigation
Dec. 2-11(03), Jan. 21-30, Feb. 18-27, Mar. 23-Apr 1, Apr. 20-29, May 18-27
• Aircraft Cabin Safety Investigation
Nov. 14-15 (03), May 4-5, Aug. 19-20
• Aviation Safety Officer
Dec. 9-11 (03), May 18-20
• Amateur Build Aircraft Accident Investigation
Jan. 27-29, Jun. 8-10, Jul. 27-29
• Turbine Engine Accident Investigation
Dec. 9-11 (03), May 18-20
For further information contact:
Pat Brown, Transport Safety Institute
Tele: 405-954-7206
Website: www.tsi.dot.gov

SOUTHERN CALIFORNIA SAFETY INSTITUTE
A=Albuquerque, NM
T=Torrance, CA
O=Ottawa, Canada
V=Vancouver, British Columbia
PR=Prague, the Czech Republic

• Aircraft Accident Investigation (A)
Oct. 13-24 (03), Feb. 23-Mar. 5, May 30-Jun. 11, Oct. 11-22
• Human Factors for Accident Investigators (A)
Oct. 27-31 (03), Mar. 8-12, Jun. 14-18, Oct. 25-29
• Investigation Management (A)
Nov. 3-7 (03), Mar. 15-19, Jun. 21-25, Nov. 1-5
• Gas Turbine Accident Investigation (A)
Nov. 10-14 (03), Mar. 22-26, Nov. 8-12
• Advanced Aircraft Accident Investigation (T)
Dec. 1-5 (03)
• Aircraft Performance and Structures Investigation (A)
Nov. 17-21 (03)
• Operational Risk Management (T)
Sept. 29-Oct 3 (03), Mar. 1-5
• Ramp and Maintenance Safety (T)
TBD
• Safety Decision Making (T)
Nov. 10-14 (03)
• Practical System Safety (T)
Oct. 13-17 (03)
• Fire and Explosives Investigation (A)
TBD
• Helicopter Accident Investigation (A)
Sept. 8-12 (03), Mar. 29-Apr. 2
• Electronic Systems Investigation (A)
Sept. 15-19 (03)
• Flight Data Analysis (O)
Sept. 29-Oct. 1 (03), Nov. 15-17
• Safety Management Systems (T)
Sept. 8-19 (03), Feb. 2-13 (03), Sept. 13-24
• Human Factors in Safety Management Systems (T)
Sept. 22-26 (03), Feb.16-20, Sept. 27-Oct. 1
• International Aircraft Cabin Safety Symposium (V)
Feb 2-5
• European Edition of the Cabin Safety Symposium (PR)
Mar. 23-25
• Basic Accident Prevention and Investigation (PR)
Apr. 19-30
• Accident and Incident Investigation for Aviation Managers (T)
Oct. 6-10 (03), Feb. 23-27
• Accident Prevention Through Safety Recommendations (T)
Sept. 22-26 (03)
For further information contact:
Eduardo Treto, Registrar
SCSI, 3521 Lomita Blvd, Ste. 103
Torrance, CA 90505-5016, USA
Tele: 1-800-545-3766 or 310-517-8844
Fax: 310-540-0532
E-mail: registrar@scsi-inccom
Website: wwwscsi-inccom

students interested in the field of aviation safety and aircraft occurrence investigation, according to Richard Stone, ISASI Executive Advisor and one of the two fund administrators.

While the Kapustin family made the initial fund contribution, the memorial will be continued through donations and will provide an annual allocation of funds for the scholarship. All members of ISASI enrolled as a full-time student in a recognized and accredited education program concentrated on aviation safety and /or aircraft occurrence investigation are eligible for the scholarship. A student who has received the annual scholarship will not be eligible to apply for it in another year.

The Executive Advisor and Vice-President of ISASI, Ron Schleede, will be the executors and administrators of the fund. They will check that the education program is at a recognized school and meets the aims of the Society, assess the applications, and determine the most suitable candidate. Donors and recipients will be advised if donations are made in honor of a particular individual.

The scholarship will consist of an annual $1,500 award that will be made to the student who wins the competitive writing requirement, meets the application requirements, and will be registered for the ISASI annual seminar. The award is intended to help cover the registration, lodging, and travel costs of attending the seminar.

The application requirements are
- Be a full-time student in an aviation safety/investigation/system safety course of minimum duration of 1 year.
- The student must be a member of ISASI.
- The student is to submit a 1,000 (+/- 10 percent) word paper in English addressing "the challenges for air safety investigators."
- The paper is to be the student's own work and countersigned by the student's tutor/academic supervisor as authentic, original work.
- The papers will be judged on their content, original thinking, logic, and clarity of expression.
- The student must complete the application form and submit it to ISASI with his or her paper by March 31, 2004.
- The Judges' decision will be final.

The scholarship application form is available from the ISASI home office at Park Center, 107 East Holly Avenue, Suite 11, Sterling, VA, USA 20164-5404 or from the ISASI website at www.isasi.org.

Information to be provided by the student includes name, ISASI membership number, address, course in which enrolled, year of enrollment, and subject studies. The name and address of the school is also required as is the name of the student's tutor or academic supervisor. ◆

ATS Working Group Sets Work Program

The ATS Working Group continues to make steady progress. Despite the gloom within the industry associated

ISASI ROUNDUP

Continued . . .

NEW MEMBERS

Corporate
• School of Aviation Safety and Management, ROC Air Force Academy (CP0214)
Chung-liang Chiang
Chin-Ben Line
• Flight Safety Foundation-Taiwan (CP0215)
Lt. General Weng-Chou Wang
• EMBRAER-Empresa Brasileira de Aeronautica S.A. (CP0216)
Umberto Irgang
Koch Donovan

Individual
Adams, James, H., MO4915, Anchorage, AK, USA
Baron, Robert, AO4906, Pompano Beach, FL, USA
Bedwell, Jr., Ted, L., AO4904, Bowling Green, KY, USA
Blackwell, LaDetria, R., ST4929, Daytona Beach, FL, USA
Borthwick, Donald, R., ST4913, Wellington, New Zealand
Brunelle, Noelle, D., ST4910, Daytona Beach, FL, USA
Bustamante, Manuel, MO4905, Mexico City, Mexico
Chin, Johnny, L., FO4920, Singapore, Republic of Singapore
Cortes Torres, Ricardo, H., ST4902, Bogota D.C., Colombia, South America
Cossette, Andre, MO4916, Trois-Rivieres, PQ, Canada
Gallaher, Paul, A., MO4927, Salinas, CA, USA
Gaskins, Matthew, S., ST4908, Duxbury, MA, USA
Gibb, Gerry, MO4923, Doncaster, Australia
Hamilton, III, Charles, S., MO4907, Anchorage, AK, USA
Horswell, Jamie, ST4911, Blakehurst, NSW, Australia
Howell, Thomas, R., MO4909, Eliot, ME, USA
Johnson, Steve, A., AO4925, Sydney, NSW, Australia
Koenig, Brian, E., FO4930, California, MD, USA
Landsberger, Shane, A., FO4921, Singapore, Singapore
Lawson, Rodney, R., FO4912, Christchurch, New Zealand
Duane, D., AO4922, Tsawwassen, BC, Canada
Osgood, Jon, MO0991, Homer, AK, USA
Paston, Simon, C., ST4914, Auckland, New Zealand
Perrault, Marc, MO4901, Outremont, PQ, Canada
Pugh, John, G., MO4928, Altus, OK, USA
Queitzsch, Jr., Gilbert, K., FO4931, Newcastle, WA, USA
Rakow, Joseph, F., ST4926, Ann Arbor, MI, USA
Sawatzky, Kristopher, J., MO4918, Calgary, AB, Canada
Sharon, C. Michael, MO4900, Gloucester, ON, Canada
Sheppard, K. Graham, MO4917, Sackville, NB, Canada
Stein, Edward, A., MO4903, San Mateo, CA, USA
Tousignant, Andre, MO4919, Kirkland, ON, Canada
Widjaja, Prita, MO4899, Tangerang, Banten, Indonesia
Young, David, S., AO4924, Eastwood, NSW, Australia

with SARS and the Middle East conflict, the Group's membership has responded positively to the challenge of establishing a work program for its work year, according to Group Chairman John Guselli.

The program's work items are shown along with the Group members who will coordinate the issues and consolidate them into a unified effort.

• Review of ATS Working Group terms of reference (to be advised),
• Review and update of investigator guidelines (Renaud Dunn, Canada),
• Impact of culture in ATS investigations (Renaud Dunn, Canada),
• TCAS/ATC interface and procedures (Andrea Lanfrancotti, Italy; Tomokatsu Sato, Japan; and LG, Taiwan),
• Runway safety (Ladislav Mika, Czech Republic; Richard Wentworth, USA),
• Radio telephony issues 1) English as the sole language in ATS, 2) Phraseology enhancements, 3) Microphone technique, pitch, and delivery speed (to be advised),
• Visual perception issues in the ATC environment (Chris Sullivan, Australia),
• Post implementation issues of CNS/ATM (Ian Weston, U.K.),
• Organizational safety management and ATC (Chris Sullivan, Australia), and
• IFR terrain clearance provision by ATC (to be advised).

The groups have been tasked with collating the elements associated with these issues. The findings will be distributed for the benefit of all ISASI members. Should an ISASI member have any additional issues to put before the ATS Working Group, contact Secretary Bert Ruitenberg at B.Ruitenberg@compuserve.com. ◆

Two ISASI Members Elected to IFALPA Board

Two ISASI members, Capt. Paul McCarthy, USA (MO4875), and Capt. Carlos Limon, Mexico (MO3157), have been elected to serve as Principal Vice-President Technical Standards and Deputy President, respectively, of the International Federation of Airline Pilots Associations (IFALPA), a corporate member of ISASI.

The election was held in conjunction with IFALPA's annual conference held in Funchal, Madeira, earlier this year. Other officers elected are President, Capt. Dennis Dolan, USA; Principal Vice-President Professional Affairs, Capt. Georg Fongern, Germany; Principal Vice-President Membership & Regional, Capt. Masayuki Ando, Japan; and Principal Vice-President, Administration & Finance, Patrick Sutter, Switzerland. ◆

ISASI 2003 Releases Tech Paper Schedule

The ISASI 2003 Technical Program Committee has selected papers for presentation at ISASI 2003 and is pleased with the response, according to Chairman Tom McCarthy. He noted that the selection process was difficult due to the overall quality of the submitted abstracts. The selected papers promise to deliver a dynamic and informative technical program for the delegates in keeping with the theme of the seminar, he concluded.

Keynote speakers for the upcoming annual seminar include the Honorable Ellen G. Engleman, Chairman, the NTSB; the Honorable Marion Blakey, Administrator, the FAA; Paul-Louis Arslanian, Chief, BEA, France; Rob Graham, Director Safety Investigations, Australian TSB; and John Carr, President, NATCA.

The technical papers to be presented may be found on the ISASI website, www.isasi.org. ◆

ISASI INFORMATION

OFFICERS

President, Frank Del Gandio
Executive Advisor, Richard Stone
Vice-President, Ron Schleede
Secretary, Keith Hagy
Treasurer, Tom McCarthy

COUNCILLORS

United States, Curt Lewis
International, Caj Frostell
Australian, Lindsay Naylor
Canadian, Barbara Dunn
European, Max Saint-Germain
New Zealand, Ron Chippindale

UNITED STATES REGIONAL CHAPTER PRESIDENTS

Arizona, Bill Waldock
Mid-Atlantic, Ron Schleede
Alaska, Craig Beldsoe
Northeast, David W. Graham
Dallas-Ft. Worth, Curt Lewis
Pacific Northwest, Kevin Darcy
Florida, Ben Coleman
Rocky Mountain, Richard L. Perry
Great Lakes, Rodney Schaeffer
San Francisco, Peter Axelrod
Southeastern, Inactive

NATIONAL AND REGIONAL SOCIETY PRESIDENTS

Australian, Kenneth S. Lewis
SESA-France Chap., Vincent Fave
Canadian, Barbara M. Dunn
New Zealand, Ron Chippindale
European, Ken Smart
United States, Curt Lewis
Russian, V. Venkov
Latin American, Marco A. de M. Rocha

CORPORATE MEMBERS

Accident Investigation Board, Finland
Accident Investigation Board/Norway
ACE USA Aerospace
Aeronautical & Maritime Research Laboratory
Air Accident Investigation Unit—Ireland
Air Accidents Investigation Branch—U.K.
Air Canada
Air Canada Pilots Association
Air Line Pilots Association
Air New Zealand, Ltd.
Airbus S.A.S.
Airclaims Limited
Airservices Australia
AirTran Airways
Alaska Airlines
All Nippon Airways Company Limited
Allied Pilots Association
American Airlines
American Eagle Airlines
American Underwater Search & Survey, Ltd.
ASPA Mexico
Association of Professional Flight Attendants
Atlantic Southeast Airlines—Delta Connection
Austin Digital, Inc.
Australian Transport Safety Bureau
Avianca & SAM Airlines
Aviation Safety Council
Avions de Transport Regional (ATR)
Belgian Air Force, Air Staff Brussels, VSF
Bell Helicopter Textron, Inc.
Board of Accident Investigation—Sweden
Boeing Commercial Airplanes
Bombardier Aerospace
Bombardier Aerospace Regional Aircraft/ de Havilland, Inc.
Cathay Pacific Airways Limited
Cavok, International, Inc.
Civil Aviation Safety Authority, Australia
COMAIR, Inc.
Continental Airlines
Continental Express
DCI/Branch AIRCO
Delta Air Lines, Inc.
Directorate of Flight Safety (Canadian Forces)
Directorate of Flying Safety—ADF
Dutch Transport Safety Board
Embry-Riddle Aeronautical University
Emirates Airline
Era Aviation, Inc.
EVA Airways Corporation
Federal Aviation Administration
FedEx Pilots Association
Finnair Oyj
Flightscape, Inc.
FTI Consulting, Inc.
GE Aircraft Engines
Global Aerospace, Inc.
Hall & Associates LLC
Honeywell
Hong Kong Airline Pilots Association
Hong Kong Civil Aviation Department
IFALPA
Independent Pilots Association
Int'l. Assoc. of Mach. & Aerospace Workers
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Japan Air System Co., Ltd.
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Middle East Airlines
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National Business Aviation Association
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SICOFAA/SPS
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Singapore Airlines, Ltd.
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SNECMA Moteurs
South African Airways
Southern California Safety Institute
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SystemWare, Inc.
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JetBlue Airways Infuses a Safety Culture

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

The very first thing that all new JetBlue Airways recruits—from pilots to customer service agents to executive management—learn are the airline's five values: safety, caring, fun, integrity, and passion. And that in every situation, safety always comes first.

This focus on safety was built into JetBlue from day one. When the low-fare carrier launched in February 2000, it not only wanted to establish new standards for air travel with a focus on customer service and inflight amenities such as wide leather seats with 24 channels of free DIRECTV, but the airline also set out to be innovative in its approach to safety.

"JetBlue invested in the latest safety technology and programs right from the start," said Steve Predmore, VP of Safety. "For example, we adopted Flight Operational Quality Assurance (FOQA) and the Aviation Safety Action Program (ASAP) into our daily operations, even though these are costly and resource intensive, especially for a new airline."

Steve Predmore, who joined the airline in November 2001, leads a safety crew of 13 crewmembers—JetBlue calls departments "crews" and employees "crewmembers." The safety crew is responsible for flight safety, system safety (internal evaluation), occupational health, and environmental safety.

Predmore expects his safety team to double this year, as the airline continues to grow and expand its operations. JetBlue currently serves 22 cities around the United States and flies a fleet of 43 A320 aircraft—all of them purchased new from Airbus. The airline plans to put another 10 A320s into service by the end of 2003.

Following September 11, the JetBlue safety crew was closely involved in a number of important safety and security updates to the airline's operations and aircraft. JetBlue became the first airline to install reinforced, bullet-proof doors on all its aircraft and to add a cabin camera surveillance system to give pilots "eyes" in the back of the plane. After the terrorist attacks, the airline decided to completely separate the activities of the safety and the security crews to ensure that both areas received equal focus and to encourage cross-communication.

The safety crew has also implemented what is known across the airline as JEMS (JetBlue Event Management System), an online reporting system through which crewmembers can have their safety concerns heard and reviewed.

"This is not a centralized bureaucracy, and we encourage our crewmembers to share their safety concerns or issues with us without fear of retribution," said Predmore. "They are our eyes and ears across the airline and we rely on them to help us to make JetBlue safe in every regard."

As well as ensuring JetBlue's safety compliance, the safety crew's other main role is to educate crewmembers about the importance of safety and living the JetBlue "safety" value. The team hosts quarterly safety meetings for JetBlue crewmembers where they listen to talks by safety experts from a variety of industries, not just aviation, and have an opportunity to discuss safety issues with their colleagues from across every area of the airline.

"Although we've just become corporate members of ISASI and take an active role in the group, the goal of everyone in the JetBlue safety crew is to ensure we never need the assistance of ISASI."

JetBlue will be a Platinum sponsor of the ISASI 2003 annual safety seminar to be held in August. ◆

ISASI
107 E. Holly Ave., Suite 11
Sterling, VA 20164-5405
USA

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