Safety Renewal

BY EDVALDO PEREIRA LIMA | FROM SÃO PAULO, BRAZIL

In November 2008, the International Civil Aviation Organization (ICAO) established the Regional Aviation Safety Group–Pan America (RASG-PA), taking its next big step toward coordination of safety initiatives in Central America, the Caribbean, North America and South America. Parameters for the group's mission were taken from the ICAO Global Aviation Safety Plan, a strategic action plan for 2008–2011 to accomplish a reduction in the number of fatal accidents and fatalities irrespective of the volume of air traffic, a significant decrease in the global accident rate and regional rates no more than twice the global figure.

In cooperation with the Latin American and Caribbean Air Transport Association (ALTA), the RASG-PA hosted the 1st Pan American Aviation Safety Summit, a major collaborative effort and historic event for the region's commercial aviation community, drawing about 200 attendees here on April 19–23.

Loretta Martin, regional director for ICAO's North American, Central American and Caribbean Office, defined *safety* for purposes of the summit as "a condition in which the risk of harm and damage is limited to an acceptable level."[1] Worldwide, the hull-loss accident rate of Western-built transports, measured by airline domicile, was 1.0 per million departures in 2000–2009. The rate for the United States and Canada was 0.5, and the countries of Latin America and the Caribbean had a rate of 2.3, Martin said.

States targeted by RASG-PA had a combined 31 fatal accidents, with 1,254 fatalities, she said.[2] The good news: There were no hull-loss accidents involving Western-built

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Regional summit focuses Pan American aviation leaders on loss of control, CFIT, unstabilized approaches and runway excursions.

Edvaldo Pereira Lima

commercial jet aircraft operated by Latin American or Caribbean air carriers in 2009, down from a rate of 2.5 the year before; the rate decreased from 0.58 to 0.41 for the United States and Canada combined.

Within Pan American subregions, the safety picture may differ radically for specific states or aviation stakeholders, which made the summit a valuable opportunity for dialogue, data exchange, and sharing experiences, expertise, research findings and training methods, Martin added.

"All of these different organizations have their own training programs, but they never really get the opportunity to come together and find out what the other side is doing, and how they are approaching different things," Martin said. "The point was to share those experiences. And we were dealing with different levels of development, as well. These states have highly developed systems, under-developed systems and systems that are developing. It could be very challenging to bring all of these aspects together at different stages of development."

One case study discussed was Colombia, where the number of civil aviation accidents decreased from 0.62 per 10,000 sectors in 2002 to 0.45 in 2009, with fatalities coming down from 28 in 2003 to five last year.[3] This was achieved in a strongly growing market. The global economic crisis seems not to be affecting the Colombian air transport industry as badly as air transport in states in other regions of the world. In 2007, the local airline industry boarded 14.4 million total passengers. Last year, that figure was 16.3 million; so as traffic and operations grew, the number of accidents decreased.[4]

A Major Culprit

Despite encouraging numbers, safety issues remain in Colombia and elsewhere in the region. The no. 1 threat is runway excursions. According to the International Air Transport Association (IATA), Latin America had a rate of 1.34 runway excursions per million flights in the 2004–2008 period, while North America had a rate of 0.36. Between 2004 and 2009, Latin America recorded 28 of these events, the second highest number worldwide. North America recorded 21.

Hideki Endo, a captain and assistant director, IATA Safety, Operations and Infrastructure, brought to the summit a detailed picture of the global situation. Runway excursions during landing represented 83 percent of the total 161 excursions in the 2004–2009 period; runway excursions during takeoff were 17 percent, Endo said. Inadequate rejected takeoff performance, unstabilized approaches and poor go-around decisions have been the main causal factors worldwide, he said. Accidents can be prevented through "training, awareness of the threats and applying good judgment to reduce the risk," Endo added.

A story of success was related by Geraldo "Harley" Meneses, a captain and safety officer at TAM Linhas Aéreas, which in 2001 became the largest Brazilian airline in its home market. It has continued to expand and now operates into 43 domestic and 17 international destinations, with an average of 730 daily flights. The company's estimated growth in revenue passenger kilometers for 2010 is 14 to 18 percent, and the fleet likely will increase from 148 aircraft at the end of this year to 165 by late 2014.

As the airline prepared for the safety challenges of such rapid growth — taking advantage of a home market that, like Colombia, did not seem to be affected as badly by the economic crisis in other parts of the world — a decision

was made to reduce unstabilized approaches. Taking Flight Safety Foundation's *Approach and Landing Accident Reduction Tool Kit*[5] as a reference, the air carrier used its flight data monitoring program to analyze existing flight operations, which had shown 38 unstabilized approaches per 1,000 flights in 2004. As the safety campaign progressed, TAM flight crews reduced this rate to 30 the following year, 10 in 2006, fewer than five in 2007 and 2008, and 2.08 last year, Meneses reported.

LOC-I Solutions

Loss of control in flight (LOC-I) has been ranked no. 2 on RASG-PA's priority list of regional safety risk areas. Another growing concern is flight crew fatigue and possible links to LOC-I, said Carlos Arroyo Landero, an Aeroméxico captain and representative of the International Federation of Air Line Pilots' Associations (IFALPA). About 20 percent of the voluntary reports received by the U.S. National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System mention fatigue-related factors, he said. NASA's fatigue countermeasures program for civil aviation began targeting safety issues related to fatigue, sleep and circadian rhythms in 1980. This early research evaluated more than 500 pilot volunteers in line operations, flight simulators and sleep laboratory settings. Sleep loss and circadian rhythm disruption are still found to be primary causes of commercial aircrew fatigue, Arroyo said.

A particular problem for aircrew has been that the body's circadian-rhythm "clock" is not able to adapt quickly to changes such as time-zone crossings and sudden duty/rest rescheduling. As a positive, science-based response to this challenge, fatigue risk management programs are employing both preventive and operational strategies. The region's advocates of such programs often encounter hindrances, however, in the form of inherent resistance to change and lack of flexibility in today's globally competitive market, Arroyo said. This mentality is a companion to funding problems, as the implementation of science-based predictive measures may require financial input, he added.

He nevertheless sees signs of hope for fatigue risk management solutions in the region. "We lack resources [in our countries] but there is much good will," Arroyo explained. "It is necessary to make use of these free training initiatives by RASG-PA and IFALPA. We have found again a way to communicate and share all this information."

Pilot Monitoring

Another case of leveraging international best practices for regional safety has been advanced training for effective pilot monitoring. Monitoring and cross-checking are seen as a crucial layer of defense, with each crewmember effectively checking the flight path, aircraft systems and each other's actions. Arroyo co-authored a presentation with another airline captain, Juan Carlos González Curzio, that said that poor pilot monitoring was found to be a factor in 84 percent of 37 crew-caused accidents studied by the U.S. National Transportation Safety Board (NTSB). Despite this, implementation of more effective monitoring so far has not been a priority task in the region, they said. And to make it happen is not easy or intuitive.

Arroyo recounted a success story about the spread of pilot-monitoring improvements, however. A few years ago, he said, Robert Sumwalt — now an NTSB member, then a US Airways captain and member of the steering committee of the Line Operations Safety Audit (LOSA) Collaborative — concluded from LOSA data analysis that the industry had failed to deal adequately with the challenges of pilot monitoring. "He designed the idea of pilot monitoring training," Arroyo said. "As soon as he started doing this, the Asociación Sindical de Pilotos Aviadores de México, the association of Mexican airline pilot unions, invited him to come share his thoughts." When Curzio became director of flight standards at Aeroméxico, he moved immediately to turn Sumwalt's ideas into actions.

"Six years later, we have implemented a cultural shift," Arroyo said. "We provide monitoring skills during each recurrent training and evaluate them at each training event."

Safety hindrances in countries targeted by RASG-PA also have to do with geographical aspects of the environment. "For example, Benito Juárez International Airport in Mexico City is a high-altitude airport at 7,300 ft," Arroyo said. "Some 70 percent of the airspace is occupied by mountains, volcanoes included. The final approach requires a 90-degree turn within 6 nm [11 km]. Predominating winds mean one of the two runways is active 90 percent of the time. We overfly the city, which produces heat and turbulence because of the large paved surfaces and buildings. This used to make our approaches unstabilized. Thanks to flight monitoring — with LOSA and a flight operational quality assurance [FOQA] program — we identified where we could improve that situation. So we reduced unstabilized approaches by 95 percent."

Technical advice on developing solutions like these also has been available to the region in other ways. The U.S. Commercial Aviation Safety Team

(CAST) has been one of them. Kyle Olsen, a team member and U.S. Federal Aviation Administration consultant, came to the summit with a mission to share the latest CAST safety enhancements designed to reduce LOC-I events.

"We would like to see all the pilots in these Pan American countries have the latest version of upset recovery training," Olsen said. "The next safety improvement we would like to see is for all operators and regulators to discontinue the use of the term 'pilot not flying' and use 'pilot monitoring,' which has a different connotation. In North America and in Europe, [operators] have developed guidelines on what tasks the pilot monitoring should be accomplishing. The third area is related to the use of automation. Some crews over-use it or under-use it, and there is a balance for the appropriate use of automation. There have been some human factors studies done on that issue in North America, Europe and Asia. We want to use that material to provide guidance in [other] Pan American countries. We need expertise from the [local] training people at airlines, as well as government authorities and other interested people to help us to really flesh out these [CAST] safety enhancement projects in the region."

Implicit in all the summit presentations was that the region is now being called upon to make a paradigm shift — beyond reactive or even proactive models to a data-driven predictive model — and local resistance must be tackled head-on and mentalities changed accordingly. This is not a comfortable task, however, presenters agreed.

Miguel Antonio Mojica, a captain and flight safety director at TACA, told a relevant story: "We began a tremendous transition from the reactive mode to the predictive mode by attempting to introduce FOQA in 2002 and 2003. We followed ICAO's recommendation that the program should be nonpunitive and anonymous. Nevertheless, it also has a reactive part, as an investigative tool. So we asked our CEO, 'What should be our policy?' He said, 'If the staff reports on a voluntary basis, we will establish an immunity policy. Otherwise, it definitely will be used as an investigation tool.' This [response] upset our crews. Therefore, we had to take the opportunity of using safety and accident prevention training to sell them on the program as a non-punitive initiative. Later, both voluntary and mandatory reporting began to happen. Our Latino culture is a bit reactionary to reporting … with a lot of *machismo* [bravado] and a lack of transparency. On the flight deck, there was also a high degree of vertical authoritarian power [to overcome]."

It took time, but this mentality was changed successfully as FOQA data provided information for safety enhancements that resulted in better operational performance, Mojica recalled.

The cultural shift to data-driven safety initiatives also brought significant results to the LAN group of airlines, said Jaime Silva Rivera, a LAN captain and corporate safety director. He described the group's package of integrated reactive, proactive and predictive programs. LOSA was implemented five years ago, and these airlines also have found the IATA Safety Audit for Ground Operations to be "an excellent tool to tackle this complicated issue of ground [risks]," Rivera said. LAN has fully implemented a safety management system (SMS), including a personnel drug-testing program and a fatigue risk management program for its crews.

Analytical tools in its flight data monitoring program also have allowed LAN to detect unsafe situations in routine operations. "We encountered ice obstruction on the pitot tubes of our Airbus A340 and A320 fleets," Rivera said. "We enhanced procedures, changed equipment and enhanced training, and the modifications to airspeed indicators meant that we had to send crews to simulator training."

Diversified Goals

Controlled flight into terrain (CFIT), the third-ranked risk area in summit discussions of RASG-PA strategy, generated a dialogue between the air traffic control (ATC) representatives and other segments of air transport. Alex Figuereo, vice president Americas, International Federation of Air Traffic Controllers' Associations (IFATCA), highlighted the role of

Martin, top, and de Gunten

Edvaldo Pereira Lima

ATC in this issue and tried to clear up a misconception. "ATC, as defined by ICAO, is not responsible for separation from terrain during climb and descent phases, except when radar-vectoring [aircraft]," Figuereo said.

Along the same lines, IFATCA policy says that ATC "MSAW [minimum safe altitude warning] systems must be fully implemented without delay, with the necessary operational requirements and appropriate ATC procedures and training on a worldwide basis, in order to significantly reduce the numbers of CFIT accidents." This policy, however, also states, "It must be kept in mind that an aircraft ground proximity warning system can often perform better than ATC MSAW systems."

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Edvaldo Pereira Lima

The role of states in providing safety enhancements was covered for summit attendees by Carlos Pellegrino, operational safety superintendent at Brazil's Agência Nacional de Aviação Civil (ANAC), the national civil aviation agency. Brazil is pioneering the first stage of implementation of a state safety program for aviation. This is being done under the joint civilian-military arrangement the country applies in aviation, in cooperation with the Comando da Aeronáutica, Força Aérea Brasileira, the aeronautical command of the Brazilian Air Force, he said.

A presentation by Líbano Miranda Barroso, CEO of TAM, also received a positive response from the audience as he detailed the airline's top-down safety commitment, its SMS structure, principles of balancing safety and operational costs, and safety impact on business continuation.

Alex de Gunten, ALTA's executive director, said he considered the summit successful but emphasized that the work discussed is not yet done. "Latin America improved in safety last year, but we're still not where we want to be," he said. "We want to reach the levels of the United States and Europe in incident rates." This requires an orchestrated effort among all stakeholders and financial support, de Gunten added. ICAO's Martin said that The Boeing Co. provided $100,000 in support that initially has made it possible for RASG-PA to conduct safety events and translate key safety documents. Additional monetary support will be needed to launch other safety programs, Martin said.

In addition to the summit's safety themes of high-level technical, organizational and corporate issues, and human factors, there was an inspirational reminder. When Steven Chealander, a captain, vice president, Training and Flight Operations Support, Airbus Americas, and former NTSB member, stepped on stage to deliver his presentation, he carried a poignant book. He quoted from *The Empty Chair: Love and Loss in the Wake of Flight 3407* by Gunilla Theander Kester and Garyl Earl Ross, an independent anthology[6] of spontaneous poetry, essays, songs, diaries, memoirs and other writings by family members and friends of the 50 people killed in the crash of Colgan Air Flight 3407 on Feb. 12, 2009, near Buffalo, New York, U.S. (*ASW,* 3/10, p. 20).

Chealander used the book to remind his peers in RASG-PA that it takes just one accident to forever affect the lives of many, and that a normal flight operation in seconds can turn into a tragedy. "We move lives, we can never forget that," he said. Creating a safety culture is "paramount … a leadership issue … to prevent the accident now," he added.

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Notes

1. This definition was developed by the CAST/ICAO Common Taxonomy Team.
2. Some summit presenters used preliminary IATA data for 2009. Another source was: IATA. *Safety Report 2008.* 45th edition. April 2009. Data are for hull losses per million sectors.
3. Data are from the Aeronáutica Civil de Colombia, the civil aviation authority of Colombia.
4. Aeronáutica Civil de Colombia.
5. Detailed explanations of stabilized approach as a safety defense are in the newly revised version of the FSF *ALAR Tool Kit* at <flightsafety.org/current-safety-initiatives/approach-and-landing-accident-reduction-alar/alar-tool-kit-cd>.
6. This book can be obtained from <www.lulu.com/product/paperback/the-empty-chair/6281736?productTrackingContext=search_results/search_shelf/center/1>.