

# PIECE *by* PIECE

BY LINDA WERFELMAN

**Aviation safety specialists say relatively few of the world's airlines have assembled one of the most significant developments in safety – the safety management system.**

Safety management systems (SMS) have tremendous potential not only as tools for risk reduction within individual operations but also for establishing uniform aviation safety standards around the world. Nevertheless, SMS development has been slow, and some international aviation safety specialists say that many operators are unsure exactly how to proceed.

An SMS typically is characterized as a structure of systems to identify, describe, communicate, control, eliminate and track risks. More formally, the International Civil Aviation Organization (ICAO) defines an SMS as “an organized approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.”<sup>1</sup>

In its *Safety Management Manual (SMM)*, published in 2006, ICAO says that the SMS concept represents a shift away from a *reactive* safety mode — in which advances stem from accident investigations and resulting recommendations — in favor of a *proactive* mode — in which the ongoing collection of data enables continual analysis of operations to identify risks and determine the best methods of addressing them before the risks result in an accident or serious incident (Figure 1, p. 16).

The manual is designed to provide information to help ICAO member states meet ICAO standards with respect to the implementation of SMS by aircraft operators, airport operators, air traffic services providers and maintenance organizations within their jurisdictions. Its compliance information was gathered from people who have developed and managed aviation safety activities in operations throughout the industry, and its target audience includes those who are responsible for planning and managing effective safety activities.

Management personnel at operators and service providers have a “special responsibility for safety management,” the *SMM* says. “In a major study of airlines around the world, it was found that the safest airlines had a clear safety mission, starting at the top of the organization and guiding actions right down to the operational level.

... Above all, management sets the organizational climate for safety. Without its wholehearted commitment to safety, safety management will be largely ineffective.”

At press time, ICAO was preparing a letter to be sent to member states proposing establishment of a more specific SMS framework built on four basic components: safety policy and objectives, safety risk management, safety assurance and safety promotion.

ICAO said that airlines and aircraft maintenance organizations around the world should have an SMS in place by Jan. 1, 2009 — a deadline that aviation safety specialists say will be impossible for many to meet.<sup>2</sup> Civil aviation authorities in some countries, including Australia, Canada and the United Kingdom, already require airlines and other aviation organizations to have SMS; in many other countries, civil aviation authorities are actively encouraging the use of SMS. For example, in the United States, SMS is not required but encouraged, and a Federal Aviation Administration (FAA) advisory circular provides guidance for SMS development by aviation service providers.<sup>3</sup>

Full-scale implementation of SMS around the world is “going to take more time,” said Capt. Daniel E. Maurino, coordinator of the ICAO Flight Safety and Human Factors Programme.

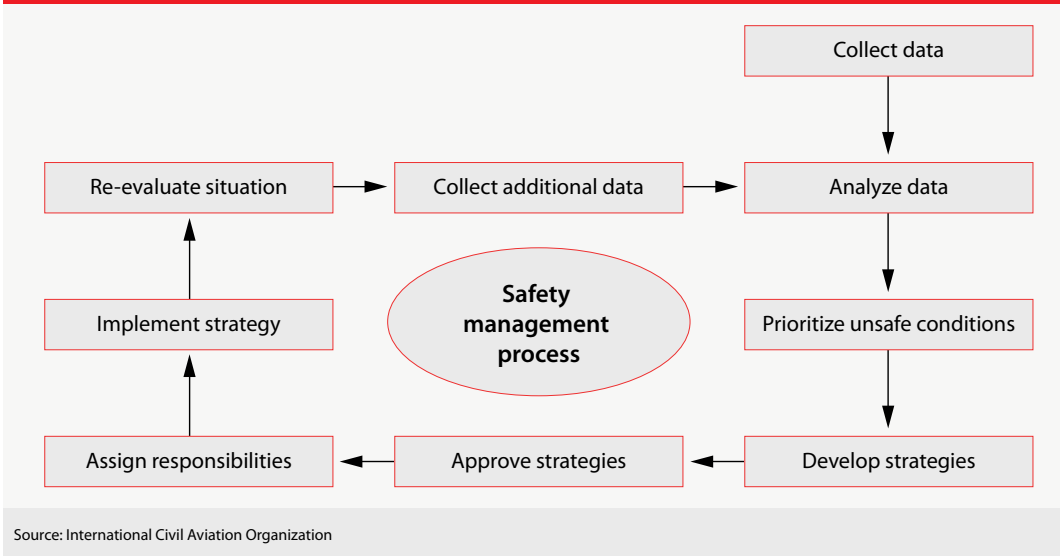
Maurino estimated in November 2007 that only about 10 percent of all airlines worldwide have “a reasonably implemented SMS.”

Among the 90 percent that do not, most major airlines in industrialized countries have “the building blocks for an SMS” in the form of incident-reporting systems, safety investigations, safety audits and safety promotion, Maurino said. For many, coordinating the building blocks to craft an SMS will be a time-consuming process, he said.

Maurino described early development of SMS as “piecemeal.” By now, he said, “we’re still in kind of an awareness phase, but there is a definite move toward making things happen.”

Bill Edmunds, senior human performance specialist for the Air Line Pilots Association, International (ALPA), agreed.

## Safety Management Process



**Figure 1**

“It’s an evolving process,” Edmunds said. “It’s pretty intensive in time, effort and money ... and it’s going to be years before it’s in place everywhere.”

### ‘10 Different Answers’

Despite the information currently available, there still is no widespread agreement on exactly what constitutes an SMS, said Nicholas A. Sabatini, FAA associate administrator for aviation safety.

“If I talk to 10 people, I get 10 different answers about what an SMS is,” Sabatini said in November at the 4th Annual FAA International Aviation Safety Forum.

Acting FAA Administrator Robert A. Sturgell told the same gathering that he perceives SMS as the vehicle that will help the aviation industry take a step forward to improve safety worldwide.

“Ultimately, we don’t want to just meet ICAO minimums,” Sturgell said. “Our goal is to raise the bar worldwide, no matter where you go. ... From takeoff to touchdown and all points in between, we want to ensure a consistent level of safety.”

SMS has the potential to help improve safety internationally, in areas where accident rates

are high as well as in those where they are low, he said.

“We all still need to take a step up,” he said. “The safety management system approach will enable us to do that. ...

“At its most fundamental level, a safety management system helps organizations identify and manage risk. It does not wait for something to happen. It doesn’t rely on anecdotal information. It is based on hard data. Safety

management systems help us manage risk far better than we have because it’s a disciplined and standardized approach to managing risk.”

As an example, Sturgell cited the recent FAA “call to action” in which the agency used SMS principles in response to a series of runway-related problems: “We [had] looked at 5.4 million records covering a 20-year period. We found 117 isolated instances of flight crew confusion here in the [United] States involving a variety of issues.”

With the resulting call to action, FAA officials and industry representatives addressed those issues — including miscommunication, missed turns on taxiways and runways, and unhelpful airport signage — through increased training of both flight crews and airport employees on ground operations, accelerated programs to upgrade signage and airport markings, and development of a voluntary safety reporting system for air traffic controllers.

Capt. Ana Vegega of United Airlines, SMS director for ALPA, said that, despite the emphasis on data collection, SMS also relies on forward-looking data analysis and subsequent actions.

“We can’t do much with data by itself,” Vegega said during ALPA’s 2007 Air Safety and

Security Week, held in August. “We need to be able to analyze the data and turn it into information and then knowledge.”<sup>4</sup>

Lack of proper reporting and release of data may be the single greatest obstacle to implementation of SMS, she said.

Some of those attending the FAA safety forum agreed, noting that both mandatory incident reporting and voluntary reporting of observed safety lapses within a corporate just culture are crucial to a healthy SMS.<sup>5</sup>

Data sharing is essential, and in a number of countries, including the United States, laws specify that the information can be “freely given without fear of retribution or punishment,” Sabatini said.

Randy Gaston, vice president of flight operations at Gulfstream Aerospace, added, “Without protection of data, you’re going to have a hard time progressing with SMS.”

### **Mandatory SMS**

Giovanni Bisignani, director general and CEO of the International Air Transport Association (IATA), told the safety forum that his organization has incorporated “SMS thinking” into the IATA Operational Safety Audit (IOSA), “effectively making [SMS] a requirement for all IATA airlines.”

He added, “Now, it’s time to dig deeper. Although we all agree on the concept and are implementing it as best practice, there is no global standard to guide us, or targets to monitor progress.”

If a measurable global standard is adopted, Bisignani said, “SMS has the potential to be a powerful tool to align our safety efforts.”

### **Relationship of Trust**

In Canada — where officials of Transport Canada (TC) decided in 2005 to require airlines to implement SMS, although some Canadian airlines voluntarily began using it several years earlier — TC officials today say that the success of SMS internationally depends on the quality of the safety culture within a country’s aviation industry and the country’s own regulatory authority.

“The development of an effective safety culture is predicated on a relationship of trust between the organization and the employee; the employee and the regulator; and the regulator and the industry,” TC said. “In some cases, this may already exist; in most cases it will take some time to establish a foundation that fosters the development of this relationship. Some of the tools that will promote this growth are reporting policies that are, to the extent possible, non-punitive; effective communications at all levels; and feedback on the system’s inputs, outputs and continuous improvements.”<sup>6</sup>

Canadian airlines were among the first to implement SMS, with goals that included increasing industry accountability, instilling a positive safety culture and improving performance.

In 2008, TC and Canadian operators will complete the three-year SMS implementation process at airlines and will continue the process within airports, flight training operations, maintenance organizations and manufacturers, Capt. Merlin Preuss, director general of civil aviation at Transport Canada, told the FAA safety forum.

“This is a long push for regulatory authorities,” Preuss said. He added that TC has developed an internal equivalent of an SMS, because “regulatory authorities must ‘walk the walk’” by complying with the same standards that they impose on the aviation industry.

The effort to implement SMS will be especially difficult for operators and regulators without a history of a positive safety culture, TC said.

Capt. Peter Griffiths, director general of civil aviation at the U.K. Department for Transport, said that one good way to propagate SMS throughout the worldwide aviation industry would be to develop a tool kit or some similar method of prescribing the steps needed to implement an SMS.

“People constantly ask for something more concrete,” Griffiths told the FAA safety forum. Nevertheless, those who develop a tool kit will face a challenge in drafting plans that will apply



to all types of operations, large and small, he said, noting that in some smaller operations, SMS may be implemented by people who have little training in the area.

The U.K. Civil Aviation Authority (CAA) says, in published guidance for aviation organizations developing SMS, that each organization should introduce SMS with whatever component is simplest to implement.

“It is unlikely and probably undesirable that an organization should attempt to introduce a complete SMS in a short time scale,” the CAA said. “It is for the organization to decide which components should have priority for introduction if training or new processes need to be developed.”<sup>7</sup>

### **‘Part of Their Business’**

In Australia, Civil Aviation Safety Authority (CASA) CEO Bruce Byron has told the CEOs of the country’s aviation organizations that they must consider safety management “as part of their business — not just a technical add-on.”

In a booklet distributed to the CEOs, Byron discussed development of SMS and other key aspects of safety management, including a positive safety culture and human factors issues.<sup>8</sup>

Byron said, “Internationally, it is now recognized that a structured SMS is an essential feature of an aviation business.”

Although many CEOs in industry have operated SMS for years, he said, “It is clear that others need some help.”

Citing guidance material produced by ICAO and CASA, among others, he said that one of the most pointed actions a CEO can take to advance safety is to preside over the operation’s “top” meetings on safety. This ensures that everyone in the company knows that SMS is considered a vital part of the business, he said.

That approach is in place at Continental Airlines, where CEO Larry Kellner chairs quarterly meetings of the corporate safety review board, whose members are the airline’s senior executives, said Capt. Don Gunther, senior director for safety and regulatory compliance.

“That’s ... the top-down approach,” Gunther said, “and it sends a message companywide that the SMS is important to senior leadership.”

Gunther began work in 2005 on Continental’s SMS implementation plans. Today, Continental’s program is “pretty far along” but still not 100 percent implemented, he said. In addition to the corporate safety review board, two elements already are in place:

- Numerous safety action teams, which represent Continental employees within a particular geographic location or with a specific type of job or concern; members also include safety personnel from ALPA and, when appropriate, the FAA. The safety action teams are the “heart and soul of the safety management program,” Gunther said.
- A business partner program, also known as an airside partnership for safety, which includes Continental’s vendors, who participate in quarterly safety programs and training in such areas as threat and error management. Gunther said Continental credits the program with much of this year’s 50 percent reduction in ground damage — and 80 percent reduction in associated costs — incurred by vendors. Overall, ground damage has decreased 30 percent this year, he said.

In addition, a safety awards program recognizes employees’ advances in safety training and awareness, reductions in injuries and damages, and improvements in compliance with U.S. Occupational Safety and Health Administration (OSHA) requirements. The program reinforces the airline’s strong safety culture, Gunther said.

Even with these elements of an SMS in place, Gunther said, “I feel like we’ve just taken the first step.”

He said that a fourth element of the program, expected to be in place in early 2009, will be a safety database that will incorporate existing safety data sets.

Capt. William E. Yantiss, vice president of corporate safety, security, quality and environment at United Airlines, told the FAA forum that most SMS efforts in the United States began when the FAA asked U.S. airlines to develop standards for their foreign code-share partners.

“That presented a unique challenge,” Yantiss said, referring to the need to develop standards that would be acceptable to the code-share airlines as well as to regulators. The process has not always unfolded smoothly, as demonstrated when the CEO of one code-share airline threatened to expel him from the airline’s property because he was insisting that the code-share operation comply with ICAO standards.

Partly because of that incident and all it represented, Yantiss said that he favors global standardization rather than airline-specific rules or even regional standardization.

Nevertheless, Sabatini cautioned that, although basic operating principles should be established on an industrywide basis, “we cannot walk in lock step” on SMS implementation.

Peter Stasny, head of the Eurocontrol Safety Regulation Unit, agreed.

Although SMS development depends on consistent regulations, the programs cannot operate “in exactly the same way in all the different sectors,” Stasny told the FAA safety forum.

U.S. National Transportation Safety Board Chairman Mark V. Rosenker said that there is no such thing as a “one-size-fits-all” SMS and that any new standards must acknowledge that.

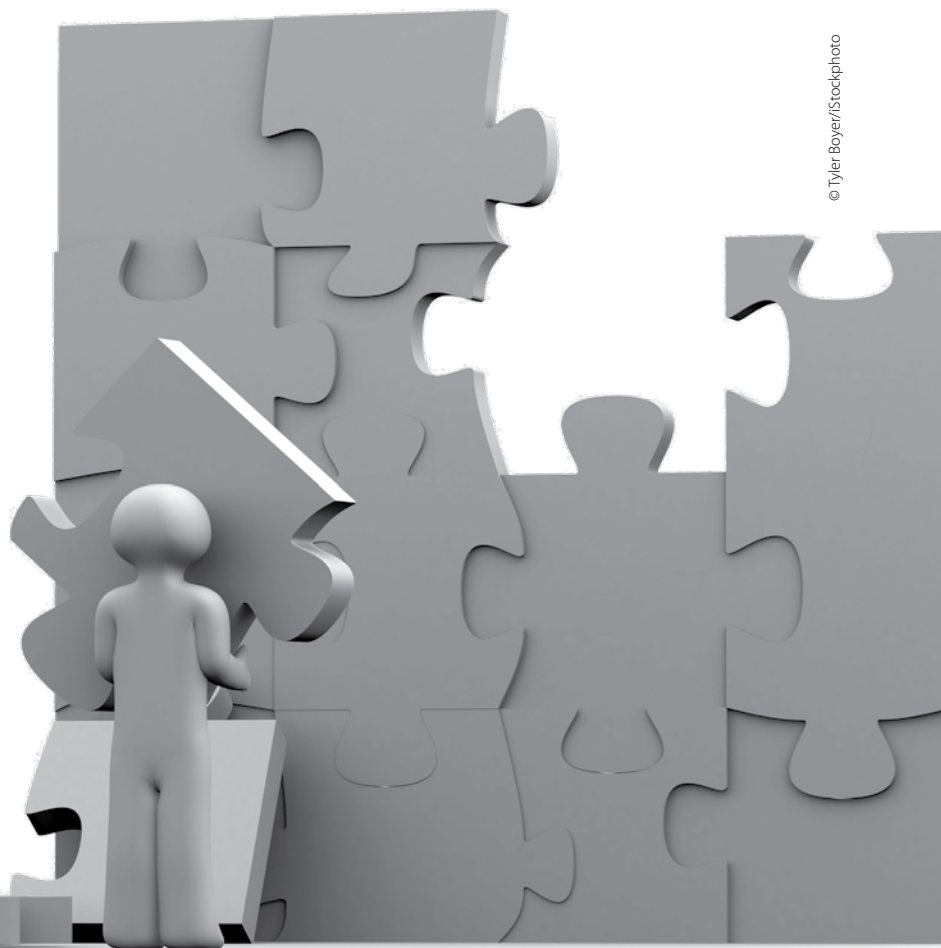
“There are already more advanced regions, and we need a commitment to help [in other regions where SMS implementation has not yet taken hold] and to share information,” Rosenker said. ●

## Notes

1. ICAO. *Safety Management Manual (SMM)*. Document 9859. 2006.
2. ICAO deadlines for SMS implementation already have passed for airports and air traffic services providers.
3. FAA Advisory Circular 120–92, *Introduction to Safety Management Systems for Air Operators*. June 22, 2006.
4. ALPA. “ALPA Safety Reps Hold Town Meeting.” *Air Line Pilot* Volume 76 (September 2007): 21–23.
5. The ICAO *SMM* defines a just culture as one that recognizes that, although personnel should freely share critical safety information without fear of punitive action, “in certain circumstances, there may be a need for punitive action and attempts to define the line between acceptable and unacceptable actions or activities.” In general, however, the *SMM* says that evidence indicates that punishment has “little, if any, systemic value on safety” and that punishment “serves little purpose from a safety perspective.”
6. TC. *Safety Management Systems (SMS): Frequently Asked Questions (FAQ)*, VIII. International Leadership. <<https://www.tc.gc.ca/civilaviation/SMS/FAQ/International/Q2.htm>>.
7. CAA, Safety Regulation Group. Civil Aviation Publication (CAP) 726, *Guidance for Developing and Auditing a Formal Safety Management System*. March 28, 2003.
8. CASA. *Safety Management and the CEO*. <[www.casa.gov.au/sms/download/sms\\_ceo.pdf](http://www.casa.gov.au/sms/download/sms_ceo.pdf)>.

## Further Reading From FSF Publications

FSF Editorial Staff. “Unlocking the Potential of a Safety Management System.” *Flight Safety Digest* Volume 24 (November–December 2005).



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