

Stepping Up to SMS

Most corporate aircraft operators are willing, but few know how.

BY MARK LACAGNINA

© Stephen Strathdee/Dreamstime.com

Field experience suggests that the greatest challenge to corporate flight departments in establishing a safety management system (SMS) is developing a safety risk profile, which is the keystone of an SMS. The type of risk assessment required for an SMS is different than most corporate aircraft operators are used to conducting.

“We have, for many years, been preaching the concept of having a ‘safety program’ — that’s the term that was used by the industry,” said Darol Holsman, manager of aviation safety audits for Flight Safety Foundation. “The basis of the safety program was to monitor your events and activities; if you have accidents or incidents, investigate them, find the causes and then establish mediation steps to keep them

from happening again. Risk assessment for an SMS is the opposite approach: You conduct an assessment of what you are doing and develop mitigation to prevent any potential accidents or incidents from occurring. It is a challenge because it’s a cultural change to the process of safety management.”

Despite the challenge in its application, the risk assessment process holds such promise for further improvement of corporate aviation’s excellent safety record that SMS is attractive to many flight departments. “There is no lack of enthusiasm,” Holsman said. “The operators we talk to are fully convinced that this is the way to go, and, in many cases, they are very happy to see it happen, because the underlying theme is that it is a reversal of what we have been doing for so many

years. Instead of just studying our events and accidents, and finding ways to solve them, we’re now trying to prevent them in the first place. For many operators, that is a positive change and certainly is worth pursuing.”

John Smith, who spearheaded the development and implementation of an SMS as safety manager for a major corporation, said that risk assessment was one element that was not in place when he began work in 2004.¹ “When he retired, the former safety manager left behind strong safety policies and procedures, a terrific safety culture and a lot of files,” he said. “We had religion, so to speak, but it wasn’t coordinated, identifiable or measurable.”

“We had incident-reporting programs that were very informal and had no



© Chris Sorensen Photography

Developing and implementing an SMS takes time and effort — and money — but is not as difficult as it might first appear.

mechanisms to investigate, document or follow up with takeaways,” Smith said. Developing a risk assessment program seemed daunting at first. “Coming up with a documented process took some mental wrangling, but it turned out to be much easier than I originally had thought,” he said.

Not Rocket Science

At first glance, SMS guidance materials reveal an intimidating array of systems, procedures, processes and methods — almost all having their own subsystems. Grasping the concept is made more difficult by the different and somewhat complex definitions of SMS given by various organizations. For example, the International Business Aviation Council (IBAC) defines it as “a systematic and comprehensive process for the proactive management of safety risks that integrates the management of operations and technical systems with financial and human resource management.”

Aviation safety specialists with whom ASW spoke agree that developing and implementing an SMS takes time and effort — and money — but is not as difficult as it might first appear. Likely the most encouraging definition is provided by the International Civil Aviation Organization (ICAO) in its *Safety Management Manual*, which says that an SMS is “an organized approach to managing safety” (see p. 14). The manual goes on to say, “There is no single model that ‘fits all.’ ... The degree of formality and rigidity in the SMS should be a reflection

of the organization’s needs, rather than blind adherence to doctrine.”

“Operators tend to ‘complexify’ this too much, and I tell them to take what they normally are involved in and implement their SMS risk assessment around that,” Holsman said. “On the other hand, some operators are just trying to take their old way of doing business and Scotch-taping the SMS on top of it. They would be better off to start with a restructuring of their existing programs and procedures to match what SMS is all about.”

The Gold Standard

The incentives for implementing an SMS include certification as meeting the International Standard for Business Aircraft Operations (IS-BAO), which was developed by IBAC to “promote global standardization and to assist operators in establishing quality flight departments using best practices of business aircraft operations worldwide.”

An SMS is an IS-BAO requirement and includes several elements, including a written policy that clearly delineates the safety responsibilities of company executives, the flight department manager, pilots and others; identification and demonstration of compliance with regulations and standards; training programs; operations and other manuals; data collection and analysis; risk identification, analysis and mitigation; accident/incident reporting and investigation; and independent operational safety reviews and audits of the SMS.

IBAC’s IS-BAO manual includes detailed descriptions of all the SMS elements and acceptable means of implementing them, a sample safety policy, a generic operations manual, an internal audit manual and other guidance material.

The risk assessment process required by IS-BAO leads to creation of a detailed safety risk profile. The profile is based on analysis of the company’s exposure to loss from several factors, including available air traffic services, airports and approach aids used, aircraft and maintenance details, and flight crew qualifications and experience. Mitigation strategies must be developed

for high-risk factors. For example, the mitigation strategy for risk from pilot fatigue could be the establishment of flight and duty time limits.

The IS-BAO manual provides examples of safety risk profiles for hypothetical flight departments of different sizes and additional information on risk assessment in a document titled *Guidelines for the Conduct of Risk Analysis for Business Aircraft Operators*.

Building the Foundation

The safety risk profile is the foundation on which an SMS is built. The IS-BAO manual says, “The nature and degree of safety management necessary ... should be determined by assessing the nature of the safety risks to which the flight operation is exposed. In other words, the safety risks of an operation should be profiled to determine the appropriate level and focus of safety management. The SMS is then tailored to proactively address the risks specific to a company’s flight operation.”

Ray Rohr, standards manager for IBAC, told attendees at the Foundation’s 2004 Corporate Aviation Safety Seminar (CASS) that the process of creating a safety risk profile need not be complex. “It can be adjusted to suit the time and resources available and the complexity of the operation that is being examined,” he said.

The first step in risk assessment is to identify accident scenarios and their associated hazards, defined as “conditions or circumstances that can lead to physical injury or damage.” Rohr said, “One effective way of identifying the possible causes of accidents and the related hazards is through a brainstorming session involving a team of as many people in the flight department as possible. This process can be an effective way to create ‘buy-in’ and to tap into the knowledge base of the organization.”

The next step is to determine the potential consequences of the hazards by gauging both the severity of the associated safety risks and the likelihood that they could affect flight operations. There are several methods of classifying risk severity and likelihood; criteria recommended by IBAC are shown in Table 1. “The

hazards and associated safety risks with the highest severity and likelihood should receive the most attention,” Rohr said.

The risk assessment process is completed by “deciding how to manage the hazards and associated risks, and documenting the information so that action will be taken and tracked, and the results assessed later,” he said. Again, a brainstorming session involving everyone in the flight department is a good way to develop mitigation strategies, or “the measures that must be taken to eliminate a hazard or to reduce the severity and likelihood of one or more risks.”

“Let the information flow freely during this phase of developing mitigation,” Rohr said. “The ideas will subsequently be refined so that they are realistic and appropriate.”

The resulting safety risk profile should be presented to everyone in the company who makes decisions affecting the flight department’s operations. Rohr said that it is important that company executives, pilots, maintenance technicians, service personnel and others be aware of the risks and understand and support the mitigation strategies.

“The safety risk profile also establishes a framework that ensures that everyone becomes involved in the operator’s safety management activities and understands that their participation and input are not only valued but are essential,”

Safety Risk Classification

Severity

Category A	Potential for loss of life or destruction of the aircraft
Category B	Potential for serious injury or major damage to the aircraft
Category C	Potential for minor injury or damage to the aircraft
Category D	Trivial (e.g., inconvenience)

Likelihood

High	Often
Medium	Occasionally
Low	Seldom
Rare	Unlikely
Very rare	Highly unlikely

Source: Ray Rohr

Table 1

he said. “A safety risk profile is a living document that must be periodically updated.” IS-BAO requires updating at least every two years.

Tracking Hazards

Taking action to address the safety risk profile involves what the IS-BAO manual calls technical management. “The technical management system is the mechanism for translating the mitigation identified in the risk analysis process ... into the programs, procedures and manuals used by the operator,” Rohr said. For example, if duty and flight time limits were chosen as the best way to mitigate the risk of fatigue, they would be incorporated in the operations manual and training manual.

Beyond the risk profile, technical management also includes documentation of applicable regulations and standards, and how the flight department meets them; and documentation of the safety responsibilities of department personnel. Technical management also ensures that personnel are properly qualified and trained, and have the equipment and tools necessary

to meet their safety responsibilities.

Hazard identification and tracking continues the risk assessment process and provides for evaluating the appropriateness and effectiveness of the department’s safety management activities. “The hazard identification program can include voluntary or confidential reporting programs, safety committee meetings, operator data collection systems, brainstorming sessions,

SMS audits and safety reviews,” Rohr said. “The hazard tracking system is the mechanism to document, track and evaluate the effectiveness

of remedial measures that are being undertaken.” For example, the effectiveness of the duty and flight time limitations might be evaluated from reports that pilots are required to file after working more than a specified number of hours. “These reports will also build a database that may be used in the future to make modifications to the fatigue countermeasures,” Rohr said.

In a paper prepared with Terry Kelly, managing director of SMS Aviation Safety, for presentation at the 2007 CASS, Rohr said, “Another valuable tracking tool that can be used is the corporate flight operational quality assurance (C-FOQA) program that has been piloted by Flight Safety Foundation. A number of operators have used the program to collect data and identify trends, and have achieved very positive results.”

Coping With Change

Revision of the flight department’s SMS also might be required when changes occur in the aircraft fleet, operating environment, hiring/scheduling practices, organizational structure or maintenance, the IS-BAO manual says.

“Bringing a new airplane into the fleet is a good example,” Holsman said. “There are revised SOPs [standard operating procedures] that you have to deal with, there’s probably new technology, there are training issues and a variety of other projects that should be plugged into the risk assessment process.” Holsman noted a flight department that recently began using a different type of tow vehicle: “Another candidate for risk assessment. It made towing easier, but it required new rules, training and so forth.”

Rohr said that a formal change management process is not required for all flight departments. “Single-aircraft operators that operate in stable, low-risk environments may choose not to maintain a change management process,” he said. “It is more appropriate for larger or more complex operations, or those that frequently experience significant change.”

Certification Stages

As mentioned earlier, SMS development and implementation take time. In recognition of



© Cessna Aircraft Co.

this, IS-BAO certification is conducted in three stages. Initial, Stage 1, certification might be granted if the flight department has developed most of the elements of an SMS and has an action plan to complete development. The next IS-BAO audit is conducted 24 months later. If the flight department is making good progress but does not yet have all the elements in place, it might qualify for Stage 2 certification and will be audited again either in 24 months or 36 months, depending on how much progress has been made. If the department's SMS is found to be fully implemented during the second audit, the department could be granted Stage 3 certification, the highest level.

What usually is still in the development phase during the initial audit is a risk assessment process. "We have done about 30 IS-BAO audits in the last four years and found that about half a dozen of the operators had a fully developed risk assessment process that's being applied to their day-to-day activities," Holsman said. "They're very much in the minority. Only a select few have moved to Stage 3 certification."

Smith's company, which operates a mixed fleet, achieved Stage 1 certification in 2005 and Stage 3 certification last year. "In 2005, we had the 'chapter in the manual' [i.e., documented SMS elements] and the mechanisms were in place to collect the data we needed, but the data weren't there," Smith said.

Achieving IS-BAO certification is not the only reason to implement an SMS. Koch Industries' flight department, which operates 10 jets and a turboprop, set up an SMS in 2002 not only to achieve IS-BAO certification but to prepare its application to become a participant in the U.S. Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP). Flight department manager K.C. Carlson said, "We were the first Part 91 [corporate] flight operation to qualify for VPP 'Star' status." This is the highest status, recognizing companies with exemplary safety and health management systems and performance.

Development and implementation of the Koch flight department's SMS was led by Jonathan Baxt, the department's director of safety and a former



Air National Guard safety officer. "Jon brought a wealth of experience and information from safety management programs that he implemented in the Guard and used effectively over the years," Carlson said. "We have a safe operation — our department is celebrating its 60th year with no accidents or serious incidents — but up until 2002, we did not have a formal safety management system." He said that implementation of the SMS "stepped up our safety culture to the next level" and also resulted in a reduction of insurance premiums.

Smith said that his involvement in developing and implementing an SMS was typical of corporate aviation. "We are not hiring people with heavy-duty safety backgrounds for a number of reasons, one of which is there are not a lot of them out there in corporate aviation that can come into a department," he said. "So, you're going to appoint someone who knows the department, usually a line pilot. A safety management system is not just a new chapter in a manual. It's not an easy process. You have to identify what you do now and what you can do better, and come up with methods and mechanisms to get there. But the difficulties in getting the pieces of the puzzle together certainly are not insurmountable. It's nothing that anyone in the flight department could not do. You just need to want to do it." ●

Note

1. At press time, the corporation asked ASW not to publish its name. "John Smith" is a pseudonym.

"You have to identify what you do now and what you can do better, and come up with methods and mechanisms to get there."