

A pilot fails to notice a warning light for two critical aircraft systems and conducts a takeoff. A crew ignores company procedures on a repositioning flight. A maintenance technician fails to move a work stand prior to towing.

Are these one-time events or do they represent a trend?

Before we can explore what safety issues may be trending in business aviation, knowing how and where the trends are identified is important. Most operators have begun to collect data as part of their safety programs. To get valuable information that will help reduce operational risk, we must see data analysis as one element of the whole. A safety management system (SMS) anchors and brings all elements of the safety program together. Each element of a system works only when all pieces are interacting with one another. One cannot exist without the others. Therefore, we must begin our story of what's trending with the fact that SMS is trending.

When the business aviation community gathers in November in Las Vegas for this year's National Business Aviation Association Convention & Exhibition (NBAA 2015), much of

the conversation will again focus on SMS. As a relatively new system, the concept of SMS is broadening its reach while it matures as a management standard for all of aviation.

The International Standard for Business Aircraft Operations (IS-BAO), created by the International Business Aviation Council (IBAC) in 2002 and directed initially at corporate flight departments, set the early standard for SMS, based on the International Civil Aviation Organization model. In spite of early opposition from many operators, IS-BAO was embraced by departments that wanted to be proactive and formally adopt the proven concepts of SMS. Now there are more than 700 operators worldwide registered as adhering to IS-BAO standards, which include a fully functioning SMS.

The trend of moving from mere regulatory compliance to SMS acceptance and adoption has regulators around the world preparing leadership for SMS requirements for operators. Bermuda and the Cayman Islands, as well as Canada, were among the first countries to pass SMS regulations. The European Aviation Safety Agency will begin enforcement of its own regulations next year. Mexico and China will follow.

What Is Trending?

BY SUNSHINE MCCARTHY



The U.S. Federal Aviation Administration already requires SMS of air carriers certificated under Federal Aviation Regulations Part 121. Applicability to Part 142 (flight schools) and Part 145 (maintenance shops), as well as to Part 135 (commuter and on-demand) operators, is expected to follow. Part 91 (general aviation) operators are voluntarily following as well. Ground handlers, such as fixed base operators (FBOs), are also in the sights of the regulators and will be obligated to comply; some FBOs already are moving in that direction. Last year, the International Standards–Business Aviation Handlers, established by IBAC, came into being with standards that will guide these organizations in the direction of a fully functioning SMS.

By now, it is no secret to any business operator that SMS is here to stay. Those operators that have implemented an SMS are beginning to reap the benefits. Through documentation and identification of risks (data), SMS is improving the operation of all stakeholders.

The ultimate safety goal of an SMS is to reduce accidents and incidents to the lowest possible level on the back of a strong safety program centered on sound data, guidance and best practices. However, securing reliable data is a continuing challenge for both operators and regulators.

If you have a fully functioning SMS, data collection is a task that usually is easily accessible from the many data points/reports you have created within your system. A variety of SMS/quality management tools are available to operators. Those tools can be an in-house system or a program an operator has purchased from a vendor. Either way, it is important to understand that they are just tools that the operator uses to collect

and analyze data. The evaluation of this data is helpful in managing potential risks and events that are hanging around the corner (latent conditions). It is imperative that all stakeholders participate. For management, the ability to extract that information and put it to good use to mitigate potential risk is extremely valuable.

In SMS data analytic terms, you want to know “what data begets what” while visualizing some sort of hierarchy that can be used in describing what data sharing and analytics are necessary to take someone’s SMS from a reactive state to a proactive state.

Here’s a possible hierarchy:

- Identification — Data should be gathered from all areas of the operation such as flight operations, maintenance, scheduling/dispatch, cabin crew, line service, management.
- Collection — Data on risks and hazards can be gathered from many places internally; safety reports, flight risk analysis, and flight operational quality assurance data are the most common, but don’t exclude information from employee injury reports, customer feedback, etc. Data can also come from external sources such as auditors, government and industry-sponsored databases and surveys, etc.
- Analysis — Data should be evaluated to determine the impact of risk.
- Assessment — The value or relevance of the data to the operation should be determined.
- Reporting — The assessment should be shared with management and the staff.

- Management — Resources should be provided for change within the operation.
- Prediction — The potential risk to the organization should be forecast.
- Prescription — Remedies or mitigations should be developed to reduce the level of risk. This should lead to the updating of documents, standard operating procedures, guidance and standards, followed by training.

In identification, we need to boil down a world full of hazards that are inefficient and inconsistent versions of the truth into a collection or “register” that fits into an operational hazard register or risk register. These data are then analyzed to identify existing controls and determine risk based upon severity and likelihood.

Next, each hazard is assigned a risk level based on the severity of the risk multiplied by the likelihood that it will occur, ranked in a risk register, and reported in a matrix, table or monitoring tool. Management uses the refined data to identify mitigation strategies, develop safety performance targets/measures and develop metrics and thresholds that enable accurate monitoring.

Once these hazards are captured, they require constant review, usually by committee or by the management team, to reassess the relevant impact to the operation. This should be done on an annual basis, or more often if required.

Think of it as a means to project ahead and identify what potential risks/hazards might occur. Keep in mind that it might not be human factors, forgetfulness, lack of training or knowledge, legitimate mistakes, fatigue or some other thing related to a person, but rather

Data Sources

Sample Internal Operation Data	NBAA Top Safety Issues (External)
Fatigue	Loss of control in flight
Repositioning flights	Runway excursions
Use of contract personnel (maintenance and flight)	Fatigue
Operating in mountainous terrain	Procedural noncompliance
Nonprecision approaches	Distraction and technology management
Inadequate procedures	Airspace complexities
Equipment failures	Single-pilot task saturation
Weather and environment	Birds and wildlife
Operations in uncontrolled airport	Ground handling collisions

NBAA = National Business Aviation Association

Source: Baldwin Aviation Safety & Compliance

Table 1

mechanical issues with the aircraft or maintenance of a piece of equipment, the ergonomics and layout of the aircraft avionics switches, your infrastructure and so forth. All of these things should be considered and analyzed during this process of data analysis using the model above as an example.

Most importantly, an individual operator is the only one who can identify and control hazards specific to his or her operation. What might be of risk to one operator may not be a factor at all for another operator. SMS was designed to focus on and emphasize the things that can cause harm to you and your team. That said, sharing data can play a valuable role in reducing accidents and incidents industry-wide.

In the business aviation world, only a small fraction of data is shared. Within many organizations, data are collected and analyzed but rarely shared outside the organization's walls. Many indicators are missed and trends are not shared because operators think the data are insignificant. They are not. Business aviation needs to step up its participation in data sharing.

So what is available today? Until such time as a business aviation database

can be built, you are able to access the top safety issues from NBAA, the U.S. National Transportation Safety Board, Helicopter Association International and other organizations representing various industry sectors. Then you should ask yourself the following questions: Do some or all of these issues apply to me? Are there indicators that the industry has identified occurring in my operation? Are there other issues surfacing that could impact my operation?

A robust business aviation database may be right around the corner. The Aviation Safety Information Analysis and Sharing (ASIAS) program is being highlighted with business aviation operators (see p. 22). Part 121 operators have been actively participating in ASIAS for years and have submitted large amounts of data that can be accessed by members of the program. Corporate flight departments are now considering this program, and some already have signed memorandums of understanding to gain access to the data. However, the price to pay is contributing your data. Also worth mentioning is that some regional business associations (Southern California Aviation Association, for instance) are

on the leading edge of business aviation information sharing and have developed their own programs to collect de-identified data for the use of their members without the cumbersome paperwork that may come along with it.

Using all available data (both internal and external) is the best way to lay the groundwork for predicting future outcomes. In Table 1, an operator may capture data internally that does not necessarily align with industry-identified issues. Both must be taken into consideration when assessing trends.

In summary, data analysis and data trending do not have to be complicated processes. Your own unique data, combined with industry issues, provide a strong insight into potential operational risks.

So, the question:

- A pilot fails to notice a warning light for two critical aircraft systems and conducts a takeoff.
- A crew ignores company procedures on a repositioning flight.
- A maintenance technician fails to move a work stand prior to towing.

Are these one-time events or a trend?

Answer: Collectively, after a root cause analysis, they could represent a trend in fatigue issues. ➔

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InSight is a forum for expressing personal opinions about issues of importance to aviation safety and for stimulating constructive discussion, pro and con, about the expressed opinions. Send your comments to Frank Jackman, vice president, communications, Flight Safety Foundation, 801 N. Fairfax St., Suite 400, Alexandria VA 22314-1774 USA or jackman@flightsafety.org.