

The Aviation SMS Database

By Paul Salerno

Aviation service providers, corporate flight departments, and other members of our aviation industry in general, continue to talk about Safety Management Systems and their implementation. A number of aviation organizations now have Safety Management Systems in place, but they vary considerably in terms of employee acceptance, effectiveness, and ease of use. This is due in part to the fact that guidance is still forthcoming, and also because each organization's SMS is typically developed from within, based on existing safety climate / culture and accident prevention programs that have evolved over time. Sadly, many organizations who have "implemented" SMS find themselves with little more than just another manual sitting on the shelf.



Most people agree that SMS is a "data-driven approach to safety". In essence, this means we collect and analyze data, identify hazards and latent conditions, assess risk, and implement risk controls in order to prevent accidents. Some organizations are collecting data from inexpensive employee reporting programs and system / task analyses. Others are investing relatively large sums of money in Flight Data Monitoring (FDM) systems to collect data on flight profiles and deviations from standard operating procedures. And while employee reporting and FDM can both contribute to overall safety efforts as part of a comprehensive SMS, *the data must still be processed into meaningful risk controls and corrective actions.*

SMS uses a [quality management approach](#) to managing safety. It requires, among other things, the monitoring of daily activities, identification of hazards through system / task analysis, management of change, training, auditing, a method for employees to report hazards, errors and events, and procedures for managing risk and following up to ensure that implemented risk controls remain effective. Clearly, this is no easy task, and requires more than an SMS Manual and some paper forms to do the job right.

So what do we do with our data? How do we address the many latent conditions that we know exist within our organizations, in a manner that is both proactive and predictive, as SMS doctrine teaches us? And how can we make the whole safety risk management process efficient and effective? Fortunately, modern technology provides us with the [SMS database](#). The ubiquitous Excel® spreadsheet is but one example of a tool that is great for recording and organizing data, but falls short of addressing many safety risk management and safety assurance processes.

When planning / developing an SMS database, or if selecting a customized or off-the-shelf commercial program, consider first which standards you want to meet; ICAO only? IS-BAO for private operations? [US commercial standards](#)? Transport Canada SMS requirements? Your database selection should be aligned with the terminology and requirements of the standard(s) you specify. Is the database configurable to meet your current needs and projected growth?

Consider also whether your database will be hosted by a third party, or reside on your company-owned servers, either in-house or co-located. Costs of hardware, space, and IT resources must also be considered, in addition to the software itself. In any case, much of your safety risk data will be sensitive and confidential. Physical security, access devices, firewalls, intrusion protection / detection, secure transmission, backup and storage should all be planned for.

Regarding employee reporting, will your reporting system be paper, or web-based, or provide for both? If web-based, how will employees connect? Effective reporting should be accessible and easy. Will you offer anonymous reporting options? And how will data from employee reports be entered into the database?

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Then consider the following [safety attributes](#), such as those required by [FAA's SMS Assurance Guide](#). These attributes should be incorporated not only in an organization's SMS Manual, but in the SMS database as well:

- Levels of *authority* should be established for database administration, password assignment and access.
- Will the database provide for *user-defined values* and data entry choices, that will permit use of the database for management of other issues, such as quality management, security, occupational health, and environmental protection?
- How will *interfaces* between managers be handled regarding investigation, risk acceptance, and corrective actions? Does the proposed SMS database interface properly with your SMS Manual and existing policies / procedures?
- Will your database provide for the assignment of *responsibilities* for investigation, risk acceptance, corrective actions, and communication of lessons learned?
- Your SMS database should also contain *controls* to ensure the integrity of data and the proper completion of all assigned risk management responsibilities, including follow-up audits. E-mail task alerts are one good example of a control designed to ensure the timely completion of risk controls and other tasks.

SMS is all about continuous improvement. And because SMS uses a quality management approach, there's no reason why your database shouldn't work to improve quality throughout your organization. In addition to managing incidents, accidents, near-accidents and identified hazards, your database should be able to help you track and manage a variety of other user-defined issues. Such issues include scheduling problems, reliability of equipment, errors and quality escapes in maintenance, communications difficulties, security breaches, EPA violations, quality or supply problems with vendors, OSHA reportable injuries, and other processes for which improvement is desired.

An effective SMS database should also support *trend analysis*. Trending allows managers to target specific types of events, equipment, mission types, etc. over time, and look for contributing factors that may be a recurring theme. By accurately determining the root causes of these associated events, risk controls and corrective actions can be implemented that make effective use of our limited safety management resources.



We've come a long way with cell phones, computers, and the internet to help us communicate and manage information, and the complexity of SMS processes demands we use these tools to our advantage. An effective SMS database should go beyond the collecting and sharing of data, to address the many elements of safety risk management, and to improve the quality of other processes throughout your organization.

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