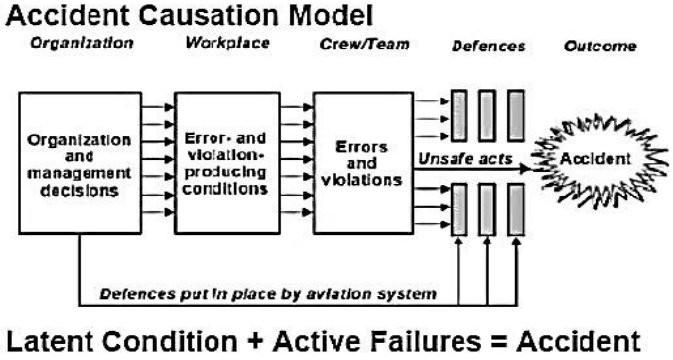
SMS for Aviation Organizations

Safety Management System (SMS) programs have recently been developed and implemented by airlines, airports, manufacturers, civil aviation authorities, and air traffic control units worldwide. The International Civil Aviation Organization (ICAO) has emphasized SMS implementation with the requirement that by January of 2009, all airlines, ATC providers, aviation maintenance organizations (AMOs) and airports implement an SMS program. The FAA is also developing SMS regulations, with an advanced Notice of Proposed Rulemaking (NPRM) having already been issued in 2009. A description of SMS, safety factors specific to aviation organizations, and requirements/solutions for SMS program implementation follows.



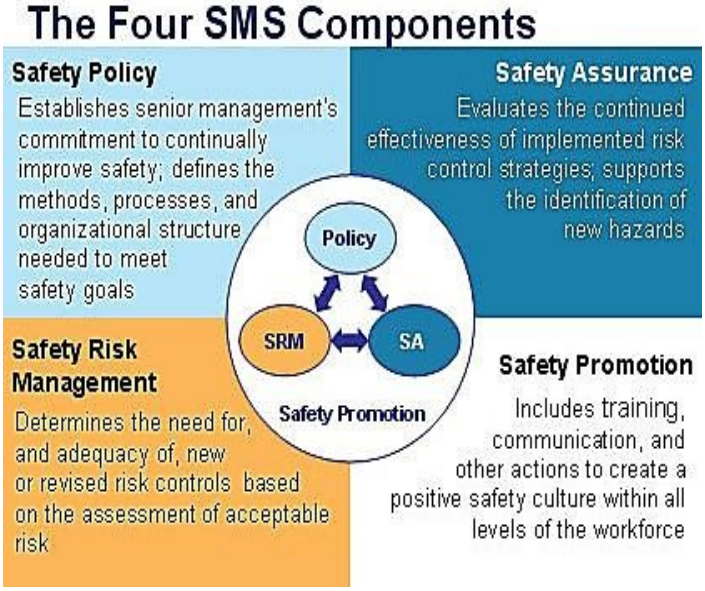
Aviation safety management doctrine has shifted from an outdated traditional reactive basis to a modern proactive, organizational-based focus. Aircraft accidents have become statistically rare events. That does not mean, however, that there is no room for improvement. SMS employs advanced system management theory and practice to drive the occurrence rate of serious safety events down to an even lower level.

A definition of safety must be provided to grasp the fundamental concepts of SMS. Safety can be defined as *the state in which the risk to harm to persons or damage to property is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.* The terms hazard and risk also need to be defined. Hazard is *the condition or circumstance that can lead to physical injury or damage* and risk is *the consequence of a hazard measured in terms of likelihood and severity.*

SMS is *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. Note that the preceding definition stresses the systems aspect of SMS as its core operational concept. A system can be thought of as *a group of processes that act together to transform inputs into a desired output.* A system has a clear objective and processes to achieve that objective. A means of measuring the degree to which the objective has been achieved is also necessary to evaluate system performance. The definition stresses that an SMS is a comprehensive process, it includes all aspects of the operation.

SMS uses proven procedures and techniques to identify and analyze hazards, and their associated risks, inherent to the operation. The hazards are then eliminated, if possible. If not, the associated risks are managed to a level as low as reasonably practicable by reducing the likelihood of an occurrence or the severity outcome of an occurrence, should one happen. Tracking of the risk mitigation efforts is done to analyze system effectiveness. Concurrent with these efforts, new emerging hazards, and/or hazards initially overlooked, are identified for attention. These efforts are all conducted within a structured framework of safety targets, policies, procedures, and departmental/personnel accountabilities.



SMS is comprised of essentially four components: Safety Policy, Safety Risk Assessment, Safety Assurance, and Safety Promotion. Safety Policy establishes senior management's commitment to continually improve safety. This commitment defines the methods,

processes, and organizational structure needed to meet the required safety goals. Safety Risk Management determines the need for new or revised risk controls based upon what the organization considers an acceptable level of risk to be. This component also evaluates existing risk control measures. Safety Assurance serves to evaluate (measure) the effectiveness of the risk control strategies that have been implemented, along with the identification of developing hazards. Safety Promotion consists of training, communication, and all other associated initiatives necessary to create and maintain a positive safety culture in the organization. The preceding is simply an overview of SMS, many resources are available that provide a much more in-depth knowledge of SMS design, implementation, and operations.

Many organizations that have adopted an SMS program have realized that the program does indeed add to the bottom line of the company. Aviation organizations exist to deliver a service, achieve production output, and generate return on investment to allow growth and continued operations. In spite of the often-stated phrase that “safety is #1 around here”, in reality, generation of revenue is what allows an organization to keep its doors open. No aviation organization has ever been created to deliver only safety. Indeed, safety truly is **not** the first priority for aviation organizations. Effective safety management is just one of many organizational processes that allow a firm to deliver its services and generate profits. Through positive management of safety, SMS programs have become good business operational practice. SMS stands alongside any other core business management function. In today’s litigious society, the cost of even one serious aviation safety event can be staggering. A high profile accident has the potential to end the very existence of the company. Resources intelligently allocated to an SMS can ensure the survival of the organization and continued operation of the firm.

Organizational factors also introduce hazards. Smaller organizations may not have sufficient resources to employ a full-time safety manager. Safety duties are often assigned as a collateral function to a mid-level manager, such as the Chief Pilot or Manager of Standards. Safety management can unintentionally become a secondary priority, especially considering the substantial effort required. A small company may therefore possess a weak safety culture. The firm must have genuine commitment from upper level management to allocate both personnel and financial resources to the critical functions of safety management. A robust and extensive SMS program can serve as a force multiplier for just such a situation by enabling positive and measurable results to be generated due to the inherent advantages of SMS.

An SMS program requires that the

interrelated topics of requirements and solutions be addressed. Successful SMS operation relies on five key concepts: upper level management buy-in, a just culture, safety event reporting and feedback, training and education, and program ownership. Upper level management absolutely must both support and interact with the SMS program. The entire organization must see management not just giving the appearance of promoting the SMS program, but also actually being involved with it. Considering the many demands upon upper level management, this critical requirement is an extreme challenge for an organization. A non-punitive just culture towards affected personnel is also crucial. A single instance of punishment inappropriately applied can destroy the entire initiative. Of course, an organization must precisely define the limits of what is acceptable behavior, such as typical human factors-related events (slips, errors, mistakes) as opposed to willful deviations from policies and procedures (violations, “work-arounds”, intentional disregard of SOPs). Safety event reporting is a key foundation of SMS. If safety personnel are not informed of event occurrences, there can be no investigations. Training on program basics, implementation, and continued operation is essential. All personnel, from senior management to new-hires, must receive understandable and documented SMS training. This training must be tailored to the personnel receiving it. The organization’s accountable manager does not need to become an instant expert in SMS. Personnel on the “pointy edge of the spear” (flightcrews, maintenance technicians, ramp workers, etc.) should receive operationally-specific training. Even if the organization does not have a dedicated safety manager, someone must be tasked with ownership of the program. Regardless of the complexity level of the SMS, documentation plays a key role in sustaining an effective program. These crucial functions can’t be shared or structured as a volunteer or part-time duty.

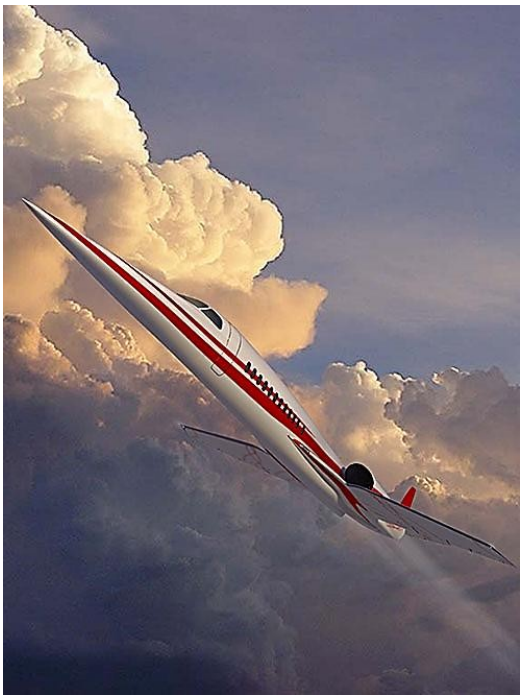
With a firm understanding of SMS, potential solutions for a firm to utilize SMS can now be evaluated. Once the decision to implement an SMS has been, structured program support (software) can be incorporated. Several firms and organizations have developed SMS software. Some of these programs are even available at no cost. The following table provides some SMS software packages that are available (the data in no way constitutes an endorsement, the references are **strictly for informational purposes only**).

Organization/Company	Software	Contact
Omni Air Group	Quality SMS	http://omniairgroup.com
International Safety Systems	AIRS	http://www.safeware.com.au
Northwest Data Solutions	SMS Pro	http://www.aviation-sms.com

Air Charter Safety Foundation	AVSIS	http://www.acsf.aero/avsis
Advanced Logistics Development	FavoWeb FRACAS	http://www.aldservice.com
Superstructure Group	AQD	http://www.superstructuregroup.com

Any SMS software program will greatly assist in the operation of the program. Typical functions such as event reporting, analysis, data tracking, report management, and trend analysis are all easily performed with these software programs. The smaller the organization, the more software programs such as these will assist.

Another SMS program option is the formulation of a commercial agreement with a third party vendor. The vendor can then assist the client firm with the development, implementation, and management of the SMS program. This concept, a “virtual safety program”, has been successfully utilized by airlines, manufacturers, and maintenance providers. Safety expertise outsourcing can provide the client with professional and competent safety management, especially if the company is small or has limited personnel. The safety management provider can constantly be prepared to assist the client in conducting crisis management operations should an incident/accident occur. The vendor would then be of great assistance in acting as a liaison with government agencies (FAA, NTSB), manufacturers, and the media. Emergency response planning is another core component of an SMS program. Using a competent outside vendor to assist in the development of an Emergency Procedures Manual will consequently minimize the financial impact of a serious safety event. For the much more frequent occurrence of incidents and near-misses, again, an outside vendor can be a great benefit. The vendor’s safety management plan will include an event reporting system, thereby allowing the firm to learn of safety gaps in their operation. For a company to even become aware of just a single problem area could potentially save them from failure, or at least a large financial burden in the case of an event.



Various organizations can also provide assistance with the development of an SMS program. An appropriate Civil Aviation Authority (CAA), by means of regulatory guidance and supporting reference material, can greatly assist with getting a program up and running. ICAO, Transport Canada, Civil Aviation Authority (New Zealand), and the Civil Aviation Safety Authority (Australia) are but a few of many CAAs that have now completed extensive efforts concerning SMS. These agencies provide a wealth of

practical, “how-to” knowledge, available with just a click of a keyboard or mouse button. The Federal Aviation Administration (FAA) is also in the process of developing a thorough SMS effort. The FAA has issued Advisory Circulars, set up an Office of SMS, and initiated an SMS Aviation Rulemaking Committee (ARC). This ARC will assist them in the development of SMS regulations, policies, procedures, and guidance material. Industry trade organizations, aviation advocacy groups, and even private sector firms and consultants all are now focusing on SMS programs. Aircraft Owners and Pilots Association (AOPA), General Aviation Manufacturers Association (GAMA), National Business Aircraft Association (NBAA), International Business Aircraft Council (IBAC), National Air Transportation Association (NATA), and Air Charter Safety Foundation (ACSF) all have completed substantial efforts regarding SMS. These groups all have sections of their websites devoted to SMS, often with many comprehensive resources. Regardless of the source, any type of aviation firm today should have no difficulty accessing guidance material to assist with the implementation of an SMS program.

SMS Guidance and Reference Sources

FAA

FAA SMS Program Office
http://www.faa.gov/about/initiatives/sms/specifics_by_aviation_industry_type/air_operators/

FAA System Approach for Safety Oversight (SASO) Office SMS Brochure
http://www.faa.gov/about/initiatives/saso/library/media/SMS_Brochure.pdf

AC 120-92: Introduction to SMS for Air Operators
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/6485143d5ec81aae8625719b0055c9e5/$FILE/AC%20120-92.pdf

Safety Management System Manual
http://atcvantage.com/docs/FAA_ATO_SMSM_v1.1.pdf

FAA Order VS8000.367 SMS Requirements
http://www.mitrecaasd.org/SMS/doc/FAA_ORDER_VS8000.367_SMS_Requirements.pdf

FAA Order VS8000.1 SMS Doctrinehttp://www.mitrecaasd.org/SMS/doc/FAA_ORDER_VS8000.1_SMS_Doctrine.pdf

SMS Framework V2.0
http://www.mitrecaasd.org/SMS/doc/SMS_Framework_Rev2-Final.pdf

SMS Assurance Guide V2.0
http://www.mitrecaasd.org/SMS/doc/SMS_Assurance_Guide_Rev2-Final.pdf

SMS Implementation Guide V2.0
http://www.mitrecaasd.org/SMS/doc/SMSImplementationGuide_Revision2_7-15-09.pdf

AC 150/5200-37: Intro to SMS for Airport Operators
http://www.mitrecaasd.org/SMS/doc/AC_150_5200_37.pdf

System Safety Handbook
http://www.faa.gov/library/manuals/aviation/risk_management/ss_handbook/

FAA-H-8083-2 Risk Management Handbook
http://www.faa.gov/library/manuals/aviation/media/FAA-H-8083-2.pdf

ICAO

Doc 9859 Safety Management Manual V2.0
http://www.icao.int/anb/safetymanagement/DOC_9859_FULL_EN_V2.pdf

SMS Training
http://www.icao.int/anb/safetymanagement/training/training.html

Transport Canada

SMS Guidance Material
http://www.tc.gc.ca/civilaviation/sms/guidance.htm

Civil Aviation Authority of New Zealand (NZCAA)

SMS Guidance Material
http://www.caa.govt.nz/SMS/SMS_home.htm

Australian Govt. Civil Aviation Safety Authority (CASA)

SMS Guidance Material
http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD:360292169:pc=PC_91430

United Kingdom Civil Aviation Authority (CAA)

SMS Guidance Material
http://www.caa.co.uk/default.aspx?catid=872&pagetype=90&pageid=9953