Australian Government
Civil Aviation Safety Authority

Safety Management Systems for aviation: a practical guide

SMS 1

Safety management system basics

3rd Edition

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Contents

Introduction

This resource kit contains advisory material for aviation operators and organisations. It provides guidance on, or best practice examples of, various safety management system (SMS) elements for you to consider when you are implementing or updating your SMS.

This kit is designed for small to medium-sized air operator's certificate (AOC) holders involved in air transport operations, as well as for approved maintenance organisations and airport or aerodrome operators. Other aviation organisations may also find it useful.

The broad principles apply to all operators and organisations. The structure and content of an SMS will essentially be the same for them all. However, the detail will need to reflect the size and complexity of the specific organisation, as well as the risks unique to its location and operation. SMS is scalable, so your system needs to reflect what you do, your specific risks, and what you are doing about them. Above all, the way you manage safety needs to be systematic.

There are 9 booklets in the *SMS for Aviation – a practical guide* resource kit.

This booklet 1: 'Safety management system basics'

And booklets:

2. 'Safety policy and objectives'
3. 'Safety risk management'
4. 'Safety assurance'
5. 'Safety promotion'
6. 'Human factors and human performance'
7. 'SMS scaling for size and complexity'
8. 'SMS resource kit'
9. 'Safety management systems for RPAS'.

Booklets 2–5 follow the International Civil Aviation Organization (ICAO) framework for an SMS. At the back of each of these are templates and samples to guide organisations in developing and implementing their SMS.

Booklet 6 'Human factors and human performance' looks at the role human performance plays in safety management.

Booklet 7 'SMS scaling for size and complexity' is a short guide to the basics for smaller organisations and focuses on SMS implementation depending on the complexity of your operations.

Booklet 8 'SMS resource kit' provides some key guidance material and tools regarding the lifecycle of an SMS from implementing to operating to continuous improvement for excellence.

Booklet 9 'Safety management systems for RPAS' is designed for use by commercial RPAS operators, with the information targeted towards remotely piloted aircraft operator certificate holders, who have either no formal SMS or only a basic SMS in place.

‘Safety management system (SMS): a systematic approach to managing safety… to continuously improve safety performance.’

International Civil Aviation Organization

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Why SMS?

Dr Tony Barrell, a former CEO of the UK Health and Safety Executive’s Offshore Safety Division, (the offshore petroleum safety regulator), who led the development of the regulatory response to the 1988 Piper Alpha disaster, in which 167 men died, observed:

> *‘There is an awful sameness about these incidents … they are nearly always characterised by lack of forethought and lack of analysis and nearly always the problem comes down to poor management …’*

Anybody with a passion for aviation knows that safety is as important to the industry as oxygen is to breathing. Poor or ineffective safety management can be disastrous and lead to public outrage, exhaustive inquiries, and drawn-out legal action. The lack of forethought, analysis, and poor management Dr Tony Barrell refers to often goes hand-in-glove with inefficiency and poor business practices.

Safety management is not a dark art – its central concepts are simple. In fact, safety management was succinctly described at an ICAO working group as ‘organised common sense’.

The guidance provided by this resource kit, including the toolkits at the end of each subsequent booklet, are not legal advice, is not a substitute for individual advice, and may not be applicable to everyone’s situation. However, the information contained in each booklet are examples of ways an organisation can develop certain elements within an SMS. These are designed to assist in building overall SMS knowledge, being compiled from various sources, and are in no way a CASA recommendation regarding templates or standards to meet regulatory compliance.

> 'What costs money is not safety, but bad safety management. Once management of an organisation realises safety is financially rewarding and the costs incurred are investments with a positive return, the road to a full safety culture is opened.'
>
> Patrick Hudson

Image: Adobe Stock | iofoto

SMS – what's in it for you?

The business benefits of an SMS

Those in business know a structured approach to safety management is something which complements and supports good management, engineering, and human factors practices. Some of the generally accepted benefits of an SMS include:

- a reduction in the direct cost of incidents, aircraft and component damage, aircraft recovery and lost time injuries
- a reduction in indirect costs such as insurance, legal action, business reputation etc.
- a reduction in some operating costs, by exposing inefficiencies in existing processes and systems. Integration with other internal or external management systems may also save on additional costs.

What does an SMS cost?

Yes, setting up and maintaining an SMS will have an associated cost depending on the size and complexity of your organisation, but an accident will cost far more – potentially your business. History shows organisations which have had fatal accidents often do not survive.

The cost of developing an SMS and ongoing annual operating expenditures will differ comparatively for small and medium sized airlines. These costs would be much less if an operator already has a functioning SMS.

You need to weigh these costs against the direct and indirect costs of accidents and incidents. A small to medium-sized operator on a limited budget does not have to spend large amounts of money to improve its safety culture. In fact, implementing safety management programs will help to improve operational safety, reducing inefficiencies and leading to reduced operating costs.

For a small maintenance organisation, this figure is likely to be halved.

Cost of not having an SMS

Direct costs

There are obvious, easily measured, on-the-spot costs of incidents and accidents. These mostly relate to physical damage, and include things such as rectifying or replacing equipment, or compensating for property damage or injuries.

For example, the direct cost of damage from a propeller strike on a light twin aircraft includes overhaul and engine strips.

Indirect costs

Indirect costs are usually higher than direct costs but are sometimes not as obvious and often delayed. Even a minor incident will incur a range of indirect costs. These costs include:

- loss of business and damage to the reputation of an organisation
- legal and damage claims
- increased insurance premiums
- loss of staff productivity
- recovery and clean-up
- cost of internal investigations
- loss of use of equipment
- cost of short-term replacement equipment.

As well as the direct costs from damage in the propeller strike on a light twin aircraft as mentioned above, indirect costs for aircraft cross hire, rescue and ferry activities could add up even further.

The above indicates that an SMS is likely to produce several business benefits, the most obvious being a reduction in accidents and incidents, and in the longer term a reduced insurance rate. An effective SMS will also help to create a more positive working environment, resulting in better productivity and morale.

Business benefits

There are parallels between business, safety, and quality management. Business and safety management both involve goal setting, establishment of policies, measurement of performance and continuous improvement.

However, an SMS goes beyond a business or quality management system (QMS) because it focuses on how people contribute to the safety outcomes of an organisation. Accordingly, SMS focuses on hazard identification, risk, and protection, while QMS focuses on products, services, and production. This people focus underlines the importance of integrating human factors and human performance in all parts of an SMS.

Image: Civil Aviation Safety Authority

Aviation safety verses people safety

Workplace Health and Safety (WHS) is a field concerned with protecting workers and other persons against harm to their safety, health, and welfare within the workplace, and is regulated under the *Work Health and Safety Acts* of relevant States and Territories. All business operators in Australia have a legal duty to take reasonable care of the health and safety of their staff and customers.

A key difference between WHS and an SMS is the intent. The intent of WHS is to meet legal and ethical obligations by fostering a safe and healthy workplace. Whereas an aviation SMS intentionally focuses on the safety management functions relating to, or in direct support of, the safe operation of aircraft. This means it goes beyond just legal obligations, and prioritises actions to address safety risks at all levels. Thus it more effectively manages organisational resources for the optimal benefit of aviation safety.

An SMS considers and recognises people safety elements but extends this to include the impact human performance has on safety outcomes. It is designed to look at all safety consequences, considering interactions and interfaces between all organisational components of the system for the benefit of the entire aviation industry.

Safety culture – where does your organisation sit?

A safety culture within an organisation is generally thought to be a set of beliefs, norms, attitudes, or practices which reduce the exposure of all people in and around the organisation to conditions considered dangerous or hazardous. Safety culture can also be described as how people behave in relation to safety and risk when no one is watching.

ICAO identifies it as an expression of how safety is perceived, valued, and prioritised by management and staff, and is reflected by the extent to which individuals are:

- aware of risks and hazards within the organisation
- continuously behaving to uphold and enhance safety
- able to access resources necessary for safe operations
- willing and able to adapt when facing safety issues
- willing to communicate safety issues
- consistently assessing safety related behaviours through the organisation.

In a positive safety culture, a shared concern for, commitment to, and accountability for safety is promoted. Positive safety culture features include managers and staff making decisions and taking actions to promote safety. This is reinforced by:

- individuals and teams continually critiquing their behaviours and processes looking for opportunities to improve, and welcome critique from others
- management and staff sharing a common awareness of hazards and risks within the organisation and the need to manage risks
- individuals making decisions according to a common belief that safety is part of the way they do business
- individuals valuing being informed and informing others about safety
- individuals trusting their colleagues and managers with information about their experiences, and the reporting of errors and mistakes is encouraged to improve safety.

An organisation's safety culture directly impacts safety performance and is arguably the single most important influence on the management of safety. When a positive safety culture is visibly supported by upper and middle management, front-line staff develop a sense of shared responsibility towards achieving the organisation's safety objectives. When management actively endorses safe practices, safety becomes embedded within the organisational culture and underpins the normal way of doing things.

> 'If you are convinced that your organisation has a good safety culture, you are almost certainly mistaken. A safety culture is strived for, but rarely attained. The process is more important than the product.'
>
> James Reason

Effective safety culture

According to the James Reason model, there are five key ingredients or elements that make up a positive safety culture which is effective.

- Learning culture: The organisation must possess the willingness and the competence to draw the right conclusions from its safety information system and be willing to implement major reforms.
- Informed culture: Those who manage and operate the system have current knowledge about the human, technical, organisational, and environmental factors that determine the safety of the system.
- Reporting culture: An organisational climate exists in which people are prepared to report their errors and near-misses.
- Just culture: There is an atmosphere of trust. People are encouraged, even rewarded, for providing essential safety-related information, but they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.
- Flexible culture: The organisation can adapt in response to changing operating environments, including emergency scenarios. Having plans in place to manage change including shifting its structure to allow for ongoing effective performance indicates flexibility.

There is an inter-relationship between these elements, for example an informed culture relies on a good reporting culture, which in turns depends on a just culture. Overall, these safety culture elements combine to create a culture of trust, helping the organisation to manage and improve its safety performance. If this culture of trust is missing staff do not feel supported or encouraged to report accidents, incidents, or near misses. Without this information an organisation cannot be aware of its hazards nor manage its risks to ensure the safety of operations.

Benefits of an effective safety culture

An effective safety culture not only helps to meet your moral and legal obligations, such as providing a safe work environment for employees, but also has other benefits, including:

- Return on investment: A positive safety culture provides a much greater control over losses. In turn, this allows your organisation to operate in inherently risky environments where the return on investment is the greatest.
- Trust: A positive safety culture will generate trust on the part of other customers and other aviation organisations, potentially generating more business through alliances.
- Improved audits: A positive safety culture will welcome audits as an important source of external information and confirmation about how well your organisation is performing.

There is a strong relationship between safety culture and a safety management system. An SMS consists of several defined minimum standards. However, standards are just words on paper. As Professor Patrick Hudson says:

> 'Sound systems, practices and procedures are not adequate if merely practised mechanically. They require an effective safety culture to flourish. Improvements in safety culture are needed to move off the plateau of performance.'

While safety culture can be considered like the oil that lubricates the engine parts (elements of the SMS), ultimately, safety culture is the link between behaviour (errors and violations) and the effectiveness of the SMS. An SMS will not be effective unless there is a positive safety culture, which in turn determines how your people will contribute to the SMS and what they think about it.

ICAO framework: SMS components

There are significant community expectations that aviation organisations must not only take safety seriously, but also demonstrate that they are doing this in a systematic way. Globally, ICAO sets the standard for aviation safety management. ICAO member states, such as Australia, must ensure that various types of aviation organisations implement an acceptable safety management system.

There is also a requirement for training in human factors and non-technical skills (NTS) for maintenance personnel, flight crew, cabin crew and other safety-critical personnel.

In Australia, CASA reflects these through various regulations, across air operators and approved maintenance organisations, requiring aviation organisations to be able to demonstrate an effective approach to safety management.

> Having an SMS just because the regulations say you must is the worst reason for doing it.

Senior management need to be committed to safety and pursuing SMS improvements in the same way they strive for increased profits. Organisations must develop and implement systems to ensure risks are managed to a level considered to be as low as reasonably practicable (ALARP).

An SMS is designed to be outcomes and risk based as opposed to compliance based. This means that organisations should implement and maintain an SMS that shifts away from being reactive and compliance driven to a model that includes proactive and performance-based tools and methods.

This recognises compliance alone cannot assure safe operations and instead focuses on safety management being driven by the combination of an operator's risk profile and safety performance. An organisation's SMS can therefore be designed specific to the nature of the organisation and the complexity of their activities. To breakdown what an SMS refers to consider:

- Safety: the state in which risks associated with aviation activities (related to, or in direct support of, aircraft operation) are reduced and controlled to an acceptable level.
- Management: the planning, resourcing, directing and controlling.
- System: a coordinated plan of procedure.

Safety management involves managing your aviation business activities in a systematic, coordinated way that minimises risks.

According to ICAO, a safety management system is a systematic approach to managing safety, including the necessary organisational structures, accountabilities, responsibilities, policies, and procedures. As with all management systems, it involves goal setting, planning, documentation, and the measuring of performance goals. It also involves:

- adopting scientifically based, risk-management methods
- systematic monitoring of safety performance
- creating a non-punitive work environment which encourages hazard and error reporting
- senior management commitment to pursue safety as vigorously as financial results
- adopting safe practices and safety lessons learned
- stringent use of checklists and briefings to ensure consistent application of standard operating procedures (SOPs)
- integrating human factors in safety training to improve error management skills.

The ICAO SMS framework consists of four components:

1. Safety policy and objectives
2. Safety risk management
3. Safety assurance
4. Safety promotion

Safety policy and objectives

Safety policy

A safety policy outlines what your organisation will do to manage safety. Your policy is a reminder of 'how we do business around here'. Safety policy statements typically include:

- the overall safety objectives of the organisation
- the commitment of senior management to provide the resources necessary for effective safety management
- a statement regarding responsibility and accountability for safety at all levels of the organisation
- management's explicit support of a 'positive safety culture', as part of the overall safety culture of the organisation.

Safety objectives

The safety objectives should state an intended safety outcome, that is, what you are going to do. These objectives may be expressed in terms of short-, medium- and long-term safety goals.

To be able to measure the effectiveness of operational safety objectives, they should be SMART: specific, measurable, achievable, and relevant; and have a specified timeframe within which they are to be achieved.

For more information about safety policy and objectives, see booklet 2 in this kit.

Safety risk management

Risk management is a key component of an SMS and involves two fundamental safety activities:

- identifying hazards
- assessing risks and mitigating their potential to cause harm.

To determine what controls you use to mitigate risk, you apply the 'as low as reasonably practicable' (ALARP) principle. However, while it has been used for some time in risk mitigation, there are limitations to the ALARP principle.

Risk management is simply a careful examination of what could cause harm, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm.

Identifying hazards

A hazard is anything which may cause harm to people, or damage to aircraft, equipment, or structures. Examples of aviation hazards are bad weather, mountainous terrain, wildlife activity near an aerodrome, contaminated fuel, poor workshop lighting and fatigue. You have to identify and manage organisational hazards, so they do not compromise the safety of your operation.

Generally, the hazard exists now, while the risk associated with that hazard might occur in the future. Several ibis birds at the landfill centre adjacent to the aerodrome is a present hazard. The future risk is that if they are involved in a bird strike, they could cause engine failure and an aircraft accident.

Risk assessment

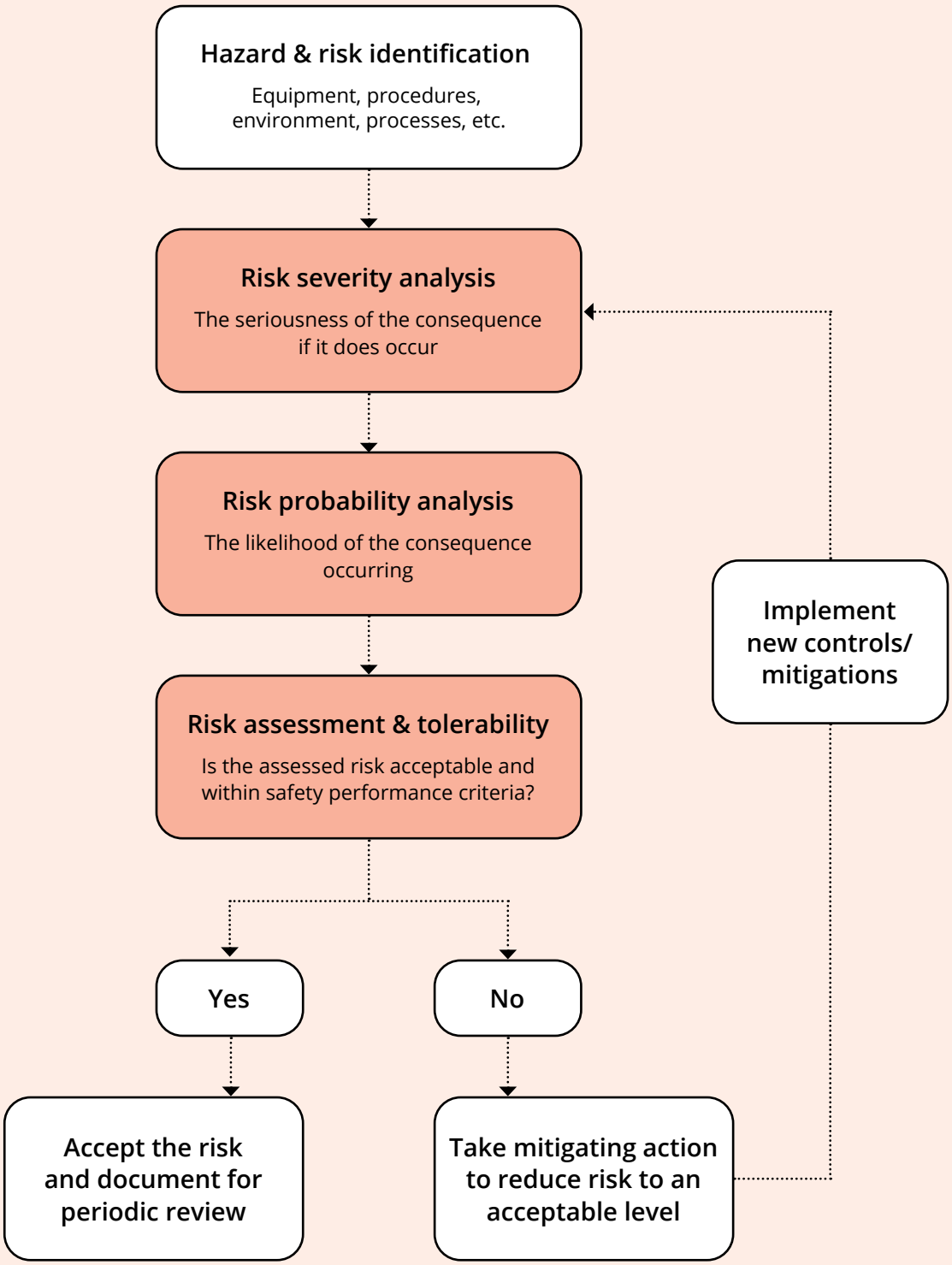
Risk is the probability or likelihood, that somebody could be harmed by various hazards, together with an indication of how serious the consequence or the harm could be.

Don't overcomplicate the process. Many aviation organisations know their hazards well and the necessary control measures are easy to apply. If you run a small organisation and you are confident you understand what is involved, you can do the assessment yourself.

Risk management is fundamental to safety management and involves some essential steps, as shown in the figure below.

For more information about safety risk management, see booklet 3 in this kit.

Essential steps involved in safety risk management



Safety assurance

Safety assurance involves establishing a systematic process for assessing and recording an organisation's safety performance. This includes activities such as internal audits, safety investigations, management of change, monitoring, analysis, and continuous improvement.

Safety performance indicators

Safety performance indicators (SPIs) are metrics or parameters that provide information relating to your safety objectives and are a reference point for your safety data collection. SPIs are an essential component of data-driven decision-making and measure the achievement of your safety objectives. In addition, they provide a measure of the integrity and effectiveness of SMS processes and activities.

Initially SPIs may be developed using limited sources of safety information. Identifying key SPIs that are relevant or harmonised across the aviation industry can be a good starting point for developing your SPIs. Later more safety data will be available and the organisation's safety analysis capabilities will likely mature. As this happens you should consider refining the scope of your SPIs to better align with your safety objectives.

The ICAO indicator catalogue provides a framework for a harmonised approach to the development of SPIs and can be used to assist organisations in identify key indicators relevant to aviation safety. These can address objectives at an individual organisational level and assist with organisations addressing State Safety Programme (SSP) considerations.

The ICAO indicator catalogue is routinely updated, continuing to expand, and evolve from feedback provided by regulators and industry operators. It's important to understand that not all indicators are applicable or relevant to all aviation operations. It is recommended that if you are using the indicator catalogue in your organisation you select those relevant to your aviation activities and customise them to fit your specific operations and safety objectives.

The full and up to date ICAO indicator catalogue can be found at: https://www.icao.int/safety/Pages/Indicator-Catalogue.aspx

Sample of some ICAO indicators

Indicator	Rational	Indicator type
Number of traffic collision avoidance system (TCAS) events by advisory type. (Advisory types include resolution advisories or traffic advisories)	TCAS alerts indicate potential loss of separation and the risk of mid-air collision.	Reactive or lagging
Number of accidents by operation type, occurrence category risk category and injury level	Number of accidents is an overall indicator of safety performance	Reactive or lagging
Accident rate by operation type and occurrence category	The accident rate is an overall indicator of safety performance	Reactive or lagging
Long landings: the percentage of landings over 1000 feet from threshold	This indicator helps measure the risk of runway safety occurrences	Reactive or lagging
Ratio of finding per ramp inspection	Findings raised during a ramp inspection indicate a safety concern. Since more inspections would be expected to generate more findings, therefore, a ratio of findings (instead of just the number of inspections) would be a more appropriate indicator for comparison.	Predictive or leading
Runway inspections by finding category and inspection period	Inspections are important as they allow early detection of non-compliances. The indicator helps assess the effective implementation of runway inspections schedule within the organisation.	Predictive or leading

Safety investigations

Investigating incidents and accidents in a structured way is fundamental to an effective SMS. If you do not investigate incidents thoroughly, you cannot learn from them, and therefore will miss opportunities to identify risks to your operation.

James Reason has formulated one of the most widely accepted and respected theories of how and why accidents happen.

Reason says accidents have multiple causes and involve many people operating at different levels of an organisation. After Reason's ground-breaking work, it is now generally accepted that accidents do not result from a single cause but are due to multiple contributing factors.

The scenario *'poor meal choice'* below, illustrates how even a simple meal choice involves multiple contributing risk factors.

'The only real mistake is the one from which we learn nothing.'

John Powell

Poor meal choice

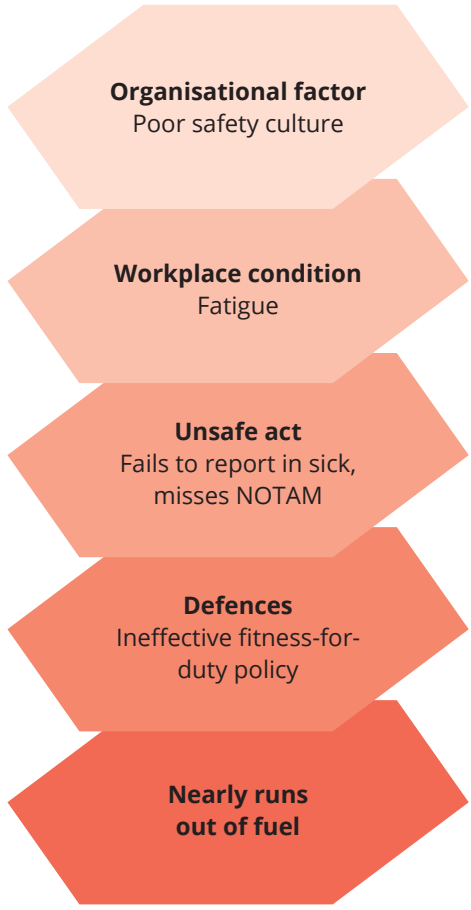
Mike, a captain working for a small charter operation, meets some friends at a seafood restaurant for dinner. He chooses the curried prawns and does not drink any alcohol as he has an early flight duty the next morning. Mike heads home after dinner to get to bed early, but not long after going to bed he starts to feel unwell. He is up for most of the night with stomach issues and manages to get only two hours sleep. He arrives at work early the next morning dehydrated and fatigued and does not pay enough attention to the NOTAMs forecasting low cloud and thunderstorms en route. Mike is forced to divert around the 'unexpected' weather and with the extra miles tracked, nearly runs out of fuel before reaching his destination airport.

Mike made several errors or unsafe acts. He chose to come to work knowing he was not fit for duty (mistake), and he paid little attention to the NOTAMs (slip). His errors resulted from fatigue impairment (workplace condition).

However, as with most incidents, there is more to it than that. During the safety investigation, several fellow pilots also admit to coming to work not fit for duty, and not declaring it, because of a shortage of pilots and management pressure not to call in sick. So, it's not just Mike. His not declaring unfit for duty can now be considered as a routine violation, due to organisational cultural practices.

This operator's fitness-for-duty policy is ineffective. It is an example of an absent or failed defence. The pressure management imposes on pilots demonstrates a poor safety culture (organisational factor).

These multiple contributing factors arose from failures in these broad areas:



For more information about safety assurance, see booklet 4 in this kit.

Image: Civil Aviation Safety Authority

Safety promotion

Under the ICAO SMS structure, safety promotion is divided into two elements:

1. safety communication
2. safety training and education.

Effective safety promotion fosters awareness and understanding of an SMS throughout the organisation, helping to create a positive safety culture.

Safety training provides skills and knowledge, as well as raising awareness of risk issues. Safety communication sets the tone for individual behaviour, giving a sense of purpose to safety efforts. You need strong lines of communication at all stages of your SMS implementation. Maintaining your SMS requires ongoing communication, from reporting to raising awareness of safety issues.

Both activities help the organisation to adopt a culture that goes beyond merely avoiding accidents or reducing the number of incidents. It becomes more about doing the right thing at the right time in response to both normal and non-normal or emergency situations. Safety communications and training help to foster safety best practice.

For more information about safety promotion, see booklet 5 in this kit.

The role of human factors in an SMS

What are human factors?

The study of human factors is about understanding human behaviour; integrating human factors principles is critical to an effective SMS. Human factors is a broad term referring to the study of people's performance in their work and non-work environments.

Human factors aims to optimise the fit between people and the system in which they work, to improve both safety and efficiency. Regulations and safety management systems are merely

mechanical unless the safety behaviour of people, through human factors principles, is clearly understood.

Human factors encompasses knowledge from a range of scientific disciplines that support human performance through the design and evaluation of equipment, environments, and work, to improve human performance and overall system performance. Organisations should avoid a stand-alone human factors policy that sits gathering cobwebs on a shelf. Human factors is as much a part of SMS activities as are issues such as cost, risk and resources.

Historically, thinking about the human contribution to the aviation system has largely focused on the errors and violations people make that adversely affect safety. More recently, there has been a shift in focus to the positive contribution to safety, resilience, and efficiency made by people in the system. However, the human contribution to an accident must be understood in context to avoid an over-simplistic label of 'operator error'.

Errors are as normal as breathing oxygen, and about as certain as death and taxes.

As a minimum, you should integrate human factors and human performance principles into the following areas of your SMS:

- identifying hazards and reducing risk to be ALARP
- managing change
- designing systems and equipment
- designing jobs and tasks
- training of operational staff
- safety reporting and data analysis
- investigating incidents.

For more information about human factors and human performance in your SMS, see booklet 6 in this kit.

The role of SMS in RPAS

An SMS is of equivalent relevance to remotely piloted aircraft system (RPAS) operators as it is for air transport operators and airports.

The RPAS sector, as the relative newcomer to the aviation industry, has seen unprecedented levels of growth over the past 10 years. In 2018 the number of RPAS operators overtook the number of traditional crewed operators, making it the fastest growing sector within aviation in Australia. The capability of RPAS to deliver solutions which traditional crewed aviation cannot offer, coupled with the cost-effectiveness of operating an RPA versus crewed aircraft will undoubtedly see the continued growth of RPAS, including into services which are not currently in place.

Naturally, regulators, other aviation participants, and the public will seek assurance that an expansion of RPAS into unchartered territories is safe. An effective SMS will assist with demonstrating levels of safety within the sector and therefore instilling confidence which will be essential to enable continued growth of the RPAS industry.

Regardless of an organisation's activities, size and complexity, all elements of the SMS framework are relevant and can be tailored to every organisation – including RPAS. What will vary is the specific content of the SMS. This will depend on various specific organisational factors including size, complexity and level of risk associated with your aviation activities.

For more information about safety management systems for RPAS, see booklet 9 in this kit.

Implementing an SMS

SMS implementation involves spelling out all aspects of developing and implementing the SMS. It is expected that an SMS will mature over time through a process of continuous improvement.

Organisations should conduct a gap analysis to determine which parts of their safety management system are currently in place, and which parts need to be added to, or modified, to meet their own, as well as regulatory, requirements.

For many organisations there will be some elements of an SMS already in place so carrying out a gap analysis is the first step to your SMS implementation planning. Where gaps have been identified these should be included in your implementation plan. The plan will detail the gaps and the actions that need to be taken to implement an SMS, including what, when and by whom.

Whether you are a large or small aircraft operator, a maintenance organisation, or an aerodrome operator, your existing systems and processes can be refined and enhanced to complement and support any additional elements that are required for the SMS.

Your implementation plan should be developed to allow for prioritising the different elements over time, as building an SMS overnight or attempting to turn on all elements at once will be far too challenging, a step-by-step phased approach will deliver a more effective SMS.

However, a critical step to implementing an SMS is senior management commitment and endorsement. This needs to be led by the accountable manager or chief executive officer (CEO). The CEO needs to demonstrate a commitment to safety by:

- recruiting a management team appropriate to the size and complexity of the organisation
- ensuring adequate resources are in place to implement the SMS, and for ongoing management of the SMS
- developing, endorsing, and disseminating a safety policy and safety objectives
- establishing a safety strategy and safety goals
- specifying the roles, responsibilities, and accountabilities of the management team in relation to aviation safety.

Many organisations will already have an established Quality Management System (QMS). When developing your implementation plan you should consider how an SMS can relate to your QMS. An SMS is more safety-focused and can be considered as an enhanced or expanded QMS. Whereas a QMS focuses on internal quality assurance procedures, an SMS complements this by adding a risk-based approach to the structure, responsibilities, processes, and procedures.

Enhancing your QMS to meet SMS expectations provides the benefits of increased effectiveness and assurance of high safety performance standards. As there are many common elements to both systems, an organisation with an established QMS is already part of the way there.

Gap analysis

To implement your SMS effectively, you need to understand where your organisation is now, where you want it to be, and how you are going to get there. A gap analysis provides valuable information about which parts of your SMS you already have in place, and which parts you should add or modify to meet both your company and regulatory requirements.

Use a checklist to assess each component, marking off a 'yes', 'no', or 'partially present'. The results will show where you should focus your efforts.

Once you have completed and fully documented your gap analysis, the items you have identified as missing or deficient will form the basis of your SMS implementation plan.

For a copy of a comprehensive gap analysis tool, see booklet 8 in this kit.

Developing an SMS implementation plan

Regardless of the size and complexity of an organisation all elements of the SMS framework are required, however the implementation of your SMS should be tailored to your organisation's size, complexity, and activities. Although this may seem a daunting task, especially for some smaller organisations, breaking the system down into discrete elements and using a gap analysis will help you to recognise what you already have in place and what is still needed.

Implementing your SMS will be more effective with careful planning. This plan will be a detailed guide to how you are going to set up your SMS. Your SMS will change and grow – improving continuously – so your implementation plan can be a living document, used throughout the life of your SMS. Establishing a solid foundation is essential to effectively implementing an SMS.

Your implementation plan should address all the areas covered in the SMS manual, especially safety strategy, safety objectives, safety management processes and activities, resource implications, training, safety promotion and timelines.

However, regardless of the size and complexity of your organisation, the first critical phase in implementing an SMS is ensuring you have senior management commitment. It is essential senior management is committed to effective safety management implementation and has allocated resources accordingly, including people, time, and finances.

SMS implementation plan

The SMS implementation plan defines your organisation's approach to putting your SMS in place. It needs to be realistic, meet the organisation's safety objectives and support efficient delivery of services. The plan should provide a clear picture of the resources, tasks, and processes required to implement the SMS.

The plan, which may consist of more than one document, describes how an organisation will achieve its corporate safety objectives and how it will meet any new or revised safety requirements, regulatory or otherwise. The plan also details the actions to be taken, by whom, and in what time frame.

Your SMS implementation plan should be developed in consultation with the accountable executive and other senior managers and should include who is responsible for actions along with timelines. Your plan should also address coordination with external organisations such as your third-party providers or contractors where applicable.

Depending on the size of the organisation and the complexity of its operations, one person, or a planning group with an appropriate experience base, can develop the SMS implementation plan. The planning group should meet regularly to assess the progress of the implementation plan and have the necessary resources (including time for meetings) to do the job.

The plan can be documented in different forms, varying from a simple spreadsheet to using specialised project management software. Regardless of its form the plan should be monitored regularly and updated as required, with clarity set as to when any specific element can be considered successfully implemented as opposed to in progress.

You need to recognise that achieving an effective SMS may take several years and a successful implementation needs to be a phased approach allowing you to turn on elements in a step-by-step approach.

An SMS implementation plan typically includes a gap analysis of all SMS components, including level and degree already present of:

- SMS documentation requirements, including an SMS manual and other supporting materials
- safety roles and responsibilities
- safety policy, goals, and objectives
- hazard reporting policy and reporting method
- means of employee involvement and engagement – both during implementation and ongoing
- safety performance measurements
- safety communication strategy – both during implementation and ongoing
- safety training plans
- management review of safety performance
- accountable individuals for implementation activities and required delivery timeframes
- phased approach timelines for key deliverables, with regular review points to assess progress.

Once completed, senior management must endorse the SMS implementation plan.

For further guidance on implementation planning, see booklet 8 in this kit.

SMS implementation plan checklist

- ☐ The SMS implementation plan details all aspects of developing and implementing your SMS, with actions allocated to identified people and with realistic timelines.
- ☐ The implementation plan addresses all the areas covered in the SMS manual, covering all SMS elements, and includes any required supporting documents.
- ☐ A gap analysis has determined which parts of a safety management system are in place, and which parts should be added or modified to meet SMS and regulatory requirements (the review involves comparing the SMS components and elements against the existing systems in the organisation).
- ☐ A checklist accounts for each component and its respective sub-elements. With 'yes', 'partially present' and 'no' responses showing how existing systems meet SMS requirements. There are fields in which to report partial compliance or deviations, as well as any actions needed to meet the criteria.
- ☐ The gap analysis is complete and fully documented. Identified missing or deficient items form the basis of the SMS implementation plan.
- ☐ Current capabilities for safety management (including experience, knowledge, processes, procedures, resources etc.) have been reviewed.
- ☐ Shortcomings in safety management experience have been recognised and resources to assist in development and implementation of the SMS identified.
- ☐ Internal procedures for the investigation of incidents, hazard identification, safety monitoring etc. have been reviewed and modified as required for integration in the SMS.

SMS evaluation tool

While the SMS framework components can be tailored to an organisation's size and complexity, the framework is a standardised common approach to safety management across all aviation domains. The Safety Management International Collaboration Group (SM ICG) developed an SMS Evaluation Tool, in direct compliment to this common approach. The tool evaluates the overall effectiveness of an organisation's SMS, as a function of both compliance and performance, through a series of indicators based on the ICAO SMS framework. Each indicator can be reviewed by an organisation to assist in evaluating the extent to which it is *Present, Suitable, Operating and Effective*, using the guidance provided against each SMS component.

This concept of evaluating SMS effectiveness supports the move from traditional, compliance-based oversight to performance-based oversight focusing on how the SMS is performing. It provides a common baseline for SMS effectiveness evaluation that creates a sound basis for mutual acceptance of SMS.

The SM ICG SMS Evaluation Tool has been adopted and integrated into the Australian aviation system by CASA as a useful tool for aviation organisations to use to evaluate their SMS from commencement through to continuous improvement.

Present, Suitable, Operating and Effective (PSOE)

When evaluating SMS components and elements, indicators are assessed using the PSOE principles. Allowing organisations to evaluate the individual indicators to determine are they present, suitable, operating, and effective.

Present	There is evidence that the relevant indicator is documented within the organisation's SMS documentation.
Suitable	The relevant indicator is suitable based on the size, nature, and complexity of the organisation and the inherent risk in its activity.
Operating	There is evidence that the relevant indicator is in use and an output is being produced.
Effective	There is evidence that the relevant indicator is achieving the desired outcome and has a positive safety impact.

When starting out on your SMS journey the indicators will be mainly evaluated as meeting the *present* and *suitable* classifications. However, as your SMS starts to become fully functional you would start to be meeting, or aiming to achieve, the *operating* and *effective* classifications.

Due to the continuously changing and dynamic nature of aviation, during ongoing and subsequent evaluations, the suitable designation should be constantly re-evaluated, considering any changes to the organisation, its activities and operating environment.

An item cannot be considered *operating* or e*ffective* if it is not *present* and it cannot be considered as *present* if it is not documented, documentation ensures consistent repeatable and systematic outcomes.

For more information and a copy of the SMS evaluation tool, see booklet 8 in this kit.

Toolkit

Image: Civil Aviation Safety Authority

Safety management

This toolkit contains the following:

- ☐ Index of toolkit items
- ☐ Jargon busters: abbreviations, acronyms, and definitions
- ☐ References.

NB: There are many systems and products across various industries, so this toolkit can only include a very small sample of practices and tools for information.

Inclusion of materials does not imply endorsement or recommendation. Each organisation must select the most appropriate products for its individual and specific needs.

Index of toolkit items

This is *your* safety toolkit with some best-practice tips and practical tools that can be adapted to meet your organisation's needs. We hope you find them useful, whether you are further developing your SMS, starting an SMS from scratch, or simply looking for some ideas to improve your existing SMS.

This list summarises the tools and templates you will find at the back of each of the respective booklets. This is not an exhaustive list of resources, and each booklet contains additional tools and guidance materials within them.

Booklet 1 – Basics

- jargon busters
- references.

Booklet 2 – Safety policy and objectives tools

- positive safety culture: enablers and disablers
- sample safety leadership rules
- safety policy statement examples
- safety manager: job description example
- sample safety committee terms of reference
- guidance for language and layout of procedures and documentation
- document register example
- case study: Aviation Safety Lifesavers Policy.

Booklet 3 – Safety risk management tools

- error prevention strategies for organisations
- hierarchy of controls
- risk register example
- case study: outback maintenance hazard and risk identification
- Involving staff in safety risk management
- case study: Bush Aviation's hazard report form
- fatigue risk management system.

Booklet 4 – Safety assurance tools

- generic issues to consider for safety performance monitoring
- example: safety performance indicators and targets
- example: audit scope planner
- sample: self-assessment checklist
- practical safety culture improvement strategy
- safety culture index survey
- information relevant to a safety investigation
- corrective and preventative action plan
- case study: sample event notification & investigation report
- case study: sample aviation safety incident investigation report
- checklist for assessing institutional resilience against accidents (CAIR)
- example: management of change template.

Booklet 5 – Safety promotion tools

- conducting a training needs analysis
- example: safety training plan
- guidance on training outcomes
- delivering engaging, effective training online
- ways to promote safety
- effective safety communication tips
- sample: safety information bulletin
- guidance for safety briefings and toolbox talk
- case study: aviation safety toolbox talk
- example: safety briefings and toolbox meeting attendance form.

Booklet 6 – Human factors and human performance

- understanding human factors and human performance
- relationship between human performance and SMS.

Booklet 7 – SMS scaling for size and complexity

- how to scale SMS elements according to size and complexity
- small, non-complex organisation considerations.

Booklet 8 – SMS resources

- SMS gap analysis tool
- 10 steps to SMS implementation
- SMS evaluation tool.

Booklet 9 - Safety management systems for RPAS.

- how to tailor an SMS for RPAS operations
- REoC holder SMS considerations.

Jargon busters: abbreviations, acronyms, and definitions

Abbreviations

Terms	Definitions
A	
AC	Advisory circular
AGL	Above ground level
ALAR	Approach-and-landing accident reduction
ALARP	As low as reasonably practicable
AME	Aircraft maintenance engineer
AOC	Air operator's certificate
AQF	Australian Qualification Framework
AS/NZS	Australian/New Zealand Standards
ATO	Air transport operator
ATS	Air Traffic Service
ATSB	Australian Transport Safety Bureau
B	
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BVLOS	Beyond visual line of sight
C	
CAAP	Civil Aviation Advisory Publication
CAIR	Checklist for assessing institutional resilience against accidents
CAO	Civil Aviation Order
CAP	Civil Aviation Publication (United Kingdom)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
CDM	Critical decision method
CEO	Chief executive officer
CRM	Crew resource management
CRMI	Crew resource management instructor
CRMIE	Crew resource management instructor examiner
D	
DEEWR	Department of Education, Employment and Workplace Relations
E	
ERP	Emergency response plan
ESB	Effective safety behaviours
F	
FAA	Federal Aviation Administration (United States)
FDA	Flight data analysis
FDAP	Flight data analysis program
FMAQ	Flight management attitudes questionnaire
FRMS	Fatigue risk management system
FTO	Flight training organisation
G	
GAPAN	Guild of Air Pilots and Air Navigators

Terms	Definitions
GIHRE	Group interaction in high-risk environments
GPS	Global positioning system
H	
HF	Human factors
HMI	Human-machine interface
HP	Human performance
I	
ICAM	Incident cause analysis method
ICAO	International Civil Aviation Organization
IFR	Instrument flight rules
IRM	Immediately reportable matter
IRS	Internal reporting system
ISO	International Organization for Standardization
J	
JAR-OPS	Joint Aviation Requirements – Operations
L	
LAME	Licensed aircraft maintenance engineer
LOE	Line operational evaluation
LOFT	Line-oriented flight training
LOS	Line operational simulation
LOSA	Line operations safety audit
M	
MEDA	Maintenance error decision aid
MOS	Manual of standards
MOSA	Maintenance operations safety audit

Terms	Definitions
MoU	Memorandum of understanding
N	
NTS	Non-technical skills
O	
OH&S	Occupational health & safety. See WHS
OSCP	Operationally safety critical personnel
P	
POH	Pilot's operating handbook
PSOE	Present, suitable, operating, effective
PPE	Personal protective equipment
Q	
QA	Quality assurance
QMS	Quality management system
R	
RBTNA	Risk based training needs analysis
ReOC	Remotely piloted aircraft operator's certificate
RePL	Remote pilot licence
RPA	Remotely piloted aircraft
RPAS	Remotely piloted aircraft system
RRM	Routinely reportable matter
S	
SAG	Safety action group
SARPs	Standards and recommended practices

Terms	Definitions
SFAIRP	So far as is reasonably practicable
SLA	Service level agreement
SM	Safety manager
SMM	Safety management manual
SMS	Safety management system
SSAA	Safety-sensitive aviation activity
SOP	Standard operating procedure
SPI	Safety performance indicator
SPT	Safety performance target
SRB	Safety review board
SSP	State safety program
SWI	Safe work instructions
T	
TEM	Threat and error management
TNA	Training needs analysis
U	
UT	University of Texas
V	
VFR	Visual flight rules
W	
WHS	Workplace Health and Safety

Definitions

Accident: an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with intention of flight until such time as all such persons have disembarked, in which:

- a person is fatally or seriously injured[1] as a result of:
  - being in the aircraft, or
  - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
  - direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew, the aircraft sustains damage or structural failure which
- adversely affects the structural strength, performance, or flight characteristics of the aircraft, and
- would normally require major repair or replacement of the affected component, except for engine failure or damage when the damage is limited to the engine, its cowlings, or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin; the aircraft is missing or is completely inaccessible[2].

Accountable executive: a single identifiable person having responsibility for the effective and efficient performance of the SMS

1 For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.
2 An aircraft is considered to be missing when the official search has been terminated and wreckage has not been located.

Air transport operation: a passenger transport operation, a cargo transport operation, or a medical transport operation, that is conducted for hire or reward, or is prescribed by an instrument issued under regulation.

ALARP: as low as reasonably practicable, means a risk is low enough that attempting to make it lower, or the cost of assessing the improvement gained in an attempted risk reduction, would be more costly than any cost likely to come from the risk itself.

Assessment: process of observing, recording, and interpreting individual knowledge and performance against a required standard.

Best practice: a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark.

Behavioural marker: a single non-technical skill or competency within a work environment that contributes to effective or ineffective performance.

Change management: a formal process to manage changes within an organisation in a systematic manner, so that changes which may impact identified hazards and risk mitigation strategies are accounted for before the implementation of such changes. Its objective is to ensure that safety risks resulting from change are reduced to as low as reasonably practicable.

Competency: a combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.

Competency-based training: develops the skills, knowledge and behaviour required to meet competency standards.

Competency assessment: The process of collecting evidence and making judgements as to whether trainees are competent.

Contract: an arrangement or agreement between two or more parties enforceable by law. A contract is a legal document which describes commercial terms and conditions.

Note: The term 'contract' is also taken to mean the following:

- leasing arrangements
- service level agreement (SLA).

Contractors: parties bound by contract to provide certain services.

Consequence: actual or potential outcome or impact of a hazard or event:

- there can be more than one consequence of one event
- consequences can be positive or negative
- consequences can be expressed qualitatively or quantitatively
- consequences are considered in relation to the achievement of objectives.

Corrective action: action to eliminate the cause of or reduce the effects of a detected hazard or potentially hazardous situation to prevent its recurrence.

Crew resource management (CRM): a team training and operational philosophy designed to ensure the effective use of all available resources to achieve safe and efficient flight operations.

Defences: specific mitigating actions, preventive controls or recovery measures put in place to prevent the realization of a hazard or its escalation into an undesirable consequence.

Dispatch: includes any personnel whose responsibilities involve services, data and instructions directly affecting the operation or performance characteristics of the aircraft, such as flight planning or fuel quantity calculations. These include:

- flight planners, crewing officers – schedulers
- ops controllers – flight following; management of aircraft movements including disruption; people responsible for distribution of meteorology data or fuel carriage advice
- load controllers – anyone involved in producing final load sheets, pilots, load masters.

Emergency response plan: a written approach addressing the organisational structure, external and internal systems, responsible parties and their roles, communication procedures, safety, equipment, and actions to be taken in reacting to an occurrence, to ensure that there is an orderly and efficient transition from normal to emergency operations.

Error: non-intentional action or inaction by a person that may lead to deviations from accepted procedures or regulations.

Error management: the process of detecting and responding to errors with countermeasures to reduce or eliminate their consequences and diminish the probability of further errors.

Facilitator: person who enables learning in a student-centred environment by guiding participants through discussions, interactions, structured exercises, and experiences.

Flight data analysis: a process for analysing recorded flight data to improve the safety of flight operations.

Hazard: a source of potential harm. A condition or an object with the potential to cause or contribute to an aircraft incident or accident.

Human factors: the minimisation of human error and its consequences by optimising the relationships between people, activities, equipment and systems.

Human performance: refers to how people perform their tasks, represents the human contribution to system performance.

Incident: an occurrence, other than an accident, associated with the operation of an aircraft which affects, or could affect, the safety of operation.

Inter-rater reliability: the extent to which two or more coders or raters agree, helping to ensure consistency of a rating system.

Just culture: an organisational perspective that discourages blaming the individual for an honest mistake that has contributed to an accident or incident. Sanctions are only applied when there is evidence of a conscious violation, or intentional, reckless, or negligent behaviour.

Latent conditions: existing conditions in the system that can be triggered by an event or a set of events whose adverse consequences may lie dormant.

Likelihood: a general description of probability or frequency, that can be expressed qualitatively or quantitatively, that an unsafe event may occur.

Line-oriented flight training (LOFT): aircrew training which involves a full mission simulation of line operations, with special emphasis on communications, management, and leadership.

Line operational simulation: widely used to provide opportunities for crews to practise CRM concepts in realistic and challenging simulated flight situations.

Line operations safety audit (LOSA): a behavioural observation data-gathering technique to assess the performance of flight crews during normal operations (see also MOSA).

Management: planning, organising, resourcing, leading, or directing, and controlling an organisation (a group of one or more people or entities) or effort for the purpose of accomplishing a goal.

Maintenance operations safety audit (MOSA): a behavioural observation data-gathering technique to assess the performance of maintenance engineers during normal operations.

Non-technical skills (NTS): specific human factors competencies such as critical decision making, team communication, situational awareness, and workload management, which may minimise human error in aviation

Operational safety-critical personnel: perform or are responsible for safety-related work, including being in direct contact with the physical operation of the aircraft, or having operational contact with personnel who operate the aircraft.

Operational safety-related work: safety-related activity in one or more of the following work areas:

- maintenance
- flying an aircraft
- cabin crew operations
- dispatch of aircraft or crew
- development, design, implementation and management of flight operations, safety-related processes (including safety investigations)
- any other duties prescribed by an AOC holder as flight operations safety-related work.

Performance based standards: standards that use a set of performance metrics to determine whether the system is operating in accordance with design expectations.

Predictive: any method that continuously analyses current and historical information to forecast potential future occurrences.

Preventative action: pre-emptive action to eliminate or mitigate the potential cause or reduce the future consequence of a hazard.

Proactive: any method that actively searches for potential safety risks through the analysis of an organisation's activities prior to an occurrence.

Quality management system (QMS): a set of policies, processes and procedures required for planning and execution (production, development, and service) in the core business areas of an organisation.

Reactive: any method that responds to past occurrences.

Risk: the assessed predicated potential severity of the consequence or outcome of a hazard and the likelihood of it occurring. A risk is often specified in terms of an event or circumstance and any consequence that might flow from it. Risk is measured in terms of a combination of the consequences of an event, and its likelihood.

Risk analysis: process whereby possible consequences of hazards are objectively characterised for their severity and probability. The process can be qualitative or quantitative.

Risk assessment: the overall process of risk identification, risk analysis and risk evaluation.

Risk control: activities that ensure that safety policies, procedures, and processes minimise the risk of an aviation accident or incident.

Risk identification: the process of determining what, where, when, why and how something could happen.

Risk management: the culture, processes and structures directed towards realising potential opportunities whilst managing adverse effects.

Risk mitigation: the process of incorporating defences, preventive controls, or recovery measures to lower the severity or likelihood of a hazard's projected consequence.

Safety: the state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety culture: an enduring set of beliefs, norms, attitudes, and practices within an organisation concerned with minimising exposure of the workforce and the general public to dangerous or hazardous conditions. A positive safety culture is one which promotes concern for, commitment to, and accountability for, safety.

Safety data: defined set of facts or set of safety values collected from various aviation-related sources, which is used to maintain or improve safety.

Safety information: safety data processed, organised, or analysed in a given context so as to make it useful for safety management purposes.

Safety manager (SM): person responsible for managing all aspects of an organisation's safety management system.

Safety management system (SMS): a systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies, and procedures.

Safety objective: a brief, high-level statement of safety achievement or desired outcome to be accomplished by the safety management system.

Safety performance: an organisations safety achievement as defined by its safety performance targets and safety performance indicators.

Safety performance indicator: a data-based parameter used for monitoring and assessing safety performance.

Safety performance target: the planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives.

Safety risk: the predicted probability and severity of the consequences or outcomes of a hazard.

Safety-sensitive aviation activity: any aviation activities in an aerodrome testing area.

Service level agreement: see 'Contractors'.

Stakeholders: those people and organisations who may affect, be affected by, or perceive themselves to be affected by, a decision, activity, or risk.

SFAIRP: so far as is reasonably practicable, means that the degree of risk in a particular activity or circumstance must be balanced against the time, trouble, cost, and physical difficulty of taking measures to avoid the risk. The appropriate efforts to counterbalance the risk are the control measures.

State safety program: an integrated set of regulations and activities aimed at improving international and national aviation safety.

Systemic: relating to or affecting an entire system.

System safety: the application of engineering and management principles, criteria and techniques to optimise safety by identifying safety-related risks and eliminating or controlling them (by design or procedures), based on acceptable system safety precedents.

Third-party interface: see contractors.

Threat: events or errors beyond the influence of an operational person, which increase operational complexity and should be managed to maintain the safety margin.

Threat and error management (TEM): the process of detecting and responding to threats with countermeasures to reduce or eliminate their consequences and mitigate the probability of errors.

Tolerable risk: risk that has not been reduced to the desired level however further reduction is impracticable or the cost is disproportionate to the improvement that would be gained.

Training: the process of bringing a person to an agreed standard of proficiency by practice and instruction.

Training needs analysis (TNA): identification of training needs at an employee, departmental, or organisational level, so the organisation performs effectively.

Trigger: an established level or criteria value for a particular safety performance indicator that serves to initiate an action required, (e.g., an evaluation, adjustment, or remedial action).

Unit of competency: a defined group of competencies required for effective performance in the workplace. A competency specifies the required knowledge and skill for and applies that knowledge and skill at an industry level to, the standard of performance required in employment.

Usability: the effectiveness, efficiency and satisfaction with which users can achieve tasks in a particular environment of a product, equipment, or system.

Violation: intended or deliberate deviations from rules, regulations, or operating procedures. A person committing a violation does so deliberately. Violations can be:

- routine: common violations promoted by an indifferent environment, 'we do it this way all the time'
- optimising: corner-cutting based on the path of least resistance, 'I know an easier or quicker way of doing this'
- exceptional or situational: one-off breaches of standards or regulations dictated by unusual circumstances that are not covered in procedures, 'we can't do this any other way'
- acts of sabotage: acts of harmful intent to life, property, or equipment.

References

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- Human factors and safety behaviours: https://www.casa.gov.au/operations-safety-and-travel/safety-advice/human-factors/human-factors-and-safety-behaviours
- Rules and regulations: https://www.casa.gov.au/rules

ICAO publications

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- ICAO Safety Management Manual (Document 9859) 4th edition 2018.
- ICAO Manual on Human Performance for Regulators (Document 10151) 1st edition 2021

Further reading

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