FLIGHT SAFETY FOUNDATION

LEARNING FROM ALL OPERATIONS

FOUNDATIONAL SUPPORT DOCUMENT

# INTEGRATING LEARNING FROM ALL OPERATIONS INTO THE COMPONENTS OF A SAFETY MANAGEMENT SYSTEM (SMS)

Flight Safety Foundation

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# 1. Understanding Learning From All Operations

Flight Safety Foundation (FSF) is an international, non-profit organisation committed to exploring means of improving safety within the aerospace industry. In July 2021, the FSF Learning From All Operations group published a white paper, *"Learning From All Operations: Expanding the Field of Vision to Improve Aviation Safety"* (Flight Safety Foundation, 2021). This white paper highlighted a potentially fundamental shift in how aerospace safety professionals approach safety and a means to augment current safety protocols. So far, the group has published seven concept notes and two case studies. The transition from learning only from accidents and incidents towards emphasizing learning from both undesirable and positive outcomes may help expand an organisation's view of its overall safety performance (Flight Safety Foundation, 2021; 2022).

Integrating Learning From All Operations into safety management system (SMS) components may be an essential next step for improving safety performance. Such integration can help to identify emerging hazards and latent risks that could lead to accidents or incidents. As seen in this paper, Learning From All Operations can be integrated into the existing components of an SMS, including safety policy, safety risk management, safety assurance, and safety promotion. In addition, an organisation's safety structure can be supported by creating a positive, learning safety culture beyond a just culture, where employees actively participate in safety dialogue, share their experiences, practice intervention, and acknowledge the subjective nature of risk (ICAO, 2016, 2018; IFALPA, 2023). Overall, the Foundation believes that incorporating Learning From All Operations into existing SMS may help organisations manage safety risks effectively, create operational capacity and make them resilient in the face of expected and unexpected events.

## 1.1 The traditional approach to safety

Figure 1 depicts a conceptualized performance distribution and highlights that a traditional, reactive approach to safety focuses only on a small part of this distribution, namely, data collected from accidents and incidents. This approach assumes that accidents and incidents result from specific failures and that identifying and addressing these failures prevents future accidents.

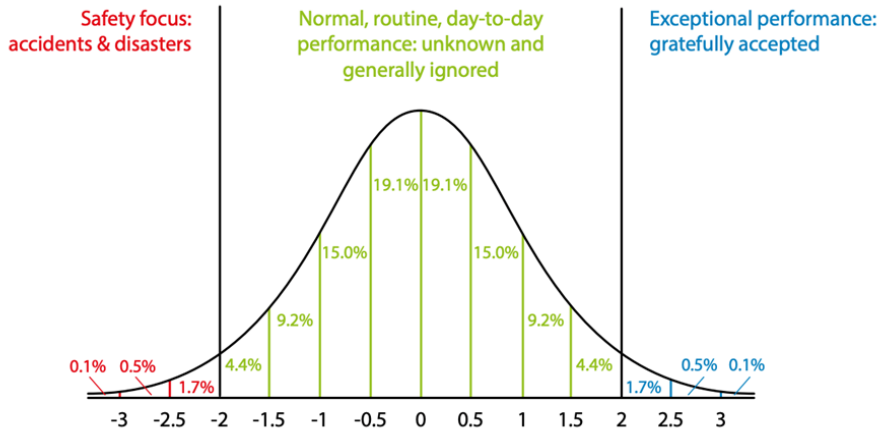


*Figure 1 Event probability and safety focus, EUROCONTROL, 2013, p25.*

Using this approach to safety has reduced the number of accidents in the industry. However, it has some limitations. First, because accidents are relatively rare, there are few opportunities to learn from what went wrong and determine how to prevent it from happening again. Identical accidents are extremely infrequent. Second, the traditional approach focuses on safety's negative aspects rather than promoting positive characteristics, such as resilience (Hollnagel, 2014).

## 1.2 The Learning From All Operations approach to safety

The Learning From All Operations approach to safety incorporates the principle that all operations can provide learning opportunities. Learning occurs from accidents, incidents, near misses, routine procedures, and resilient behaviours, leading to successfully preventing undesirable events. Organisations need to create a *"culture of safety"* that is open to safety dialogue and is willing to change, if they want to further evolve their safety management. They need to collect and analyse all data to identify trends and patterns. Thus, to implement Learning From All Operations in practice, organisations should determine how to integrate it into their SMS.

## 2.0 Understanding SMS

SMS represents a holistic framework that fosters a shared safety culture within the aerospace industry. It integrates a proactive approach to risk management, moving away from a reactive position on safety issues (Teske & Adjekum, 2021). The four core components of SMS – safety policy, safety risk management, safety assurance, and safety promotion – collectively form a comprehensive structure that ensures a continuous cycle of safety improvement (ICAO, 2016). As seen in Figures 2 and 3, an SMS can be simple or complex and scalable to the organisation. One size need not fit all, and the SMS can grow as the organisation's safety structure matures. Components of all SMSs contain the following (ICAO, 2018):

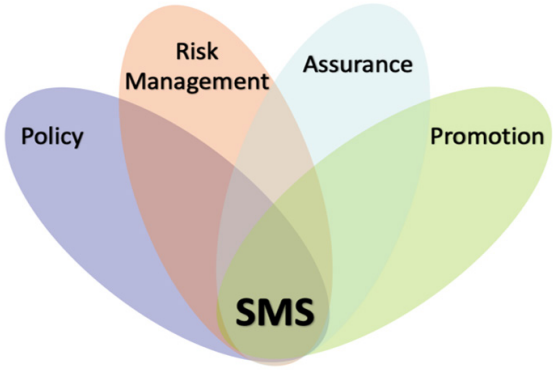


Figure 2 FSF LAO basic SMS Model, 2023, based on ICAO, 2018

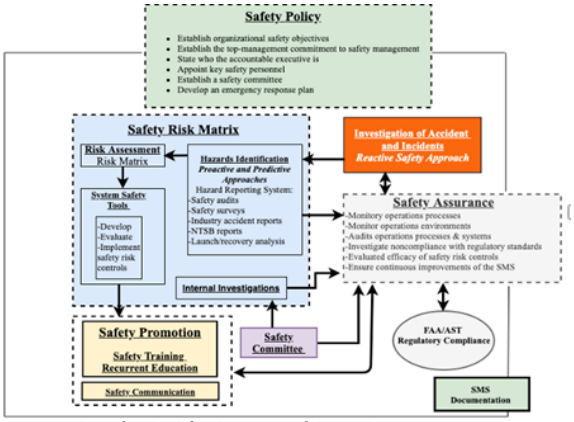


Figure 3 Complex SMS for Commercial Space Operations. Teske & Adjekum, 2021

- **Safety policy:** The foundation of SMS builds upon a clearly defined safety policy. This policy outlines an organisation's commitment to safety and sets the tone for the entire SMS. It establishes the framework for setting safety objectives, defining responsibilities, and integrating safety considerations into all operational aspects.

- **Safety risk management:** This component involves identifying, assessing, and mitigating safety risks. This includes systematically identifying potential hazards, analysing the associated risks, and implementing strategies to reduce or eliminate them. Organisations may prevent accidents and incidents by understanding potential threats.

- **Safety assurance:** Safety assurance focuses on evaluating the effectiveness of current safety management processes and ensuring compliance with established policies and procedures. This component involves regular audits, assessments, and performance evaluations to monitor the implementation of safety measures and identify areas for improvement.

- **Safety promotion:** Promoting safety consciousness among employees and stakeholders is vital for the success of SMS. This component involves training, communication, and fostering a safety-first oriented culture. It encourages open reporting of safety concerns, near misses, and incidents, enabling organisations to learn from past experiences and enhance safety practices.

## 2.1 Benefits and significance of SMS

The implementation of SMS yields many benefits that extend beyond immediate safety improvements. One of the foremost advantages is the shift from a reactive to a proactive safety approach (ICAO, 2018). By anticipating and addressing potential risks before they escalate, SMS aims to reduce the likelihood of accidents and incidents, safeguarding human lives and valuable assets. Moreover, SMS encourages transparency, collaboration, and communication across all levels of an organisation. Establishing clear roles and responsibilities ensures that safety is everyone's responsibility, creating a collective effort toward a secure environment.

In addition to enhancing safety, SMS also contributes to operational efficiencies. As organisations identify and address safety risks, they also streamline operational processes, reducing downtime caused by accidents or incidents. These attributes translate into cost savings and increased productivity. Furthermore, integrating SMS can enhance an organisation's reputation and credibility. Stakeholders, including passengers, regulatory bodies, insurance companies, and investors, trust organisations that prioritise safety and operate within a proactive safety culture.

## 2.3 Regulatory framework for SMS implementation

The regulatory landscape shapes the implementation and execution of SMS within the aviation industry. In 2013, the International Civil Aviation Organisation (ICAO) introduced Annex 19, *Safety Management*, to its standards and recommended practices, recognizing the need for an industry-standardized approach to safety management. Annex 19 specifically addresses SMS, providing guidelines for its implementation across the global aviation sector. This move towards a harmonized framework reflects the international community's commitment to enhancing aviation safety. According to Teske and Adjekum (2022), organisations in the aerospace industry can sustain high reliability and low numbers of incidents and accidents in high-tempo operations by augmenting safety protocols through an SMS.

# 3.0 Methodology to Gain Insights Into SMS Integration of Learning From All Operations

Flight Safety Foundation recognizes safety as a holistic effort involving all organisational levels (Figure 4). Although Learning From All Operations may prove to be a vital augmentation to improve safety outcomes and prevent accidents, integrating the results of this approach into the SMS can be challenging.


Figure 4 Continuous Learning at Three Levels

To explore means of integration, six members of the Foundation's Learning From All Operations working group identified five questions, one for each of the four SMS components and one for "Emergency Preparedness." These questions were further refined in an iterative process, resulting in the final survey instrument seen in Appendix A. Questions like "How would you suggest integrating Learning From All Operations into safety policy?" and "How would you suggest integrating Learning From All Operations into safety risk management?" were used.

The resulting survey consisted of five questions with a mean completion time of 15 minutes. Respondents were members of the Foundation's Learning From All Operations working group, consisting of a cross-section of international aerospace safety professionals. Participants were given 1,800 characters to provide detailed answers for each question, and the survey was active over a six-week period. Some participants opted to email their answers, and those responses were also included in the analysis. The introduction to the survey contained the following:

> As a member of the [Learning From All Operations] working group and with your ICAO Annex 19 *Safety Management* knowledge, we ask you to participate in this anonymous survey. As we explore an additional section of the [Learning From All Operations] white paper, please answer these questions to the best of your knowledge.
>
> **Imagine that you are asked to integrate Learning From All Operations information into your organisation's SMS or create a "wish list" of means to integrate.**
>
> *(Consent: By continuing with this survey, you are giving consent to the Foundation to review your data. Your answers will be kept anonymous unless you identify your organisation in your answers. The data establish other means of supplementing Learning From All Operations with existing SMS programs.)* Appendix A.

The results were collected, evaluated, and grouped for commonalities in a sentence-structure format with deductive thematic coding to capture the collective comments of the survey-takers for each SMS component (Braun & Clarke, 2006). The authors combined comments made for E*mergency Preparedness* into the *Safety Policy* section to follow the ICAO SMS structure. The results of this survey provided insights into possible means of integrating the Learning From All Operations approach into an organisation's SMS to help improve aviation safety outcomes.

## 4.0 Results of the Survey

The survey main results are described below; the full results are given in Appendix B. Eleven respondents (n = 11) submitted complete surveys from a survey group of thirty seven (n = 37). Much like the interwoven nature of the components of an SMS, many of the

survey statements contained duplicate concepts. Psychological safety, or the requirement for all members of an organization to feel comfortable making statements, safety or otherwise, without reprisals was central throughout the survey results. Some of the respondents' statements are quoted in the following sections and appear in italics. The results are described in terms of integrating Learning From All Operations to enhance each of the four SMS components.

## 4.1 Proposals for enhancing safety policy

The safety policy component should recognize that employees face complex situations in their daily operations, especially when making tough safety calls. The emphasis should include *"balancing trade-off decisions and risk tolerability and acknowledging the limitations of policies and procedures."* Moreover, safety policy should also focus on the real world of unstable contexts that need to be monitored and supported in novel ways. Safety must become a guiding principle and not merely a compliance suggestion augmented by a slogan or seen as an add-on. The language of the safety policy should support the concept that not everything can be made safer through procedures. Appropriate variation and adaptation may be necessary, and Learning From All Operations supports this ever-changing balance. A presumption of *"promoting trust and a psychologically safe environmental"* behaviour in all situations should be established, including iterative departmental re-evaluations of policies and procedures.

Creating trust and a psychologically safe environment for all employees to share experiences, concerns and thoughts without fear of reprisal, is crucial. Employees should be enabled to report safety concerns through an easy-to-use portal. Senior management should encourage reporting positive behaviours, including *"emphasizing storytelling to support safety understanding and active intervention."* ,that, when practiced by all, may improve the organisation's functional capacities.

## 4.2 Proposals for enhancing safety risk management

The lack of positive data to power the safety risk management processes can be addressed by extending the information collection to frequent, daily "work as done" situations and by extending learning from others. The safety risk management component should be augmented to use in *"detecting weak signals"* to identify subtle signs of operational discomfort, or trouble. *"Collecting stories, narratives, and insights"* from learning teams helps to understand the realities of "work as done" directly from those doing the work. Mini workshops, known as Learning Teams, should be conducted during recurrent training sessions to identify, collect and analyse safety risks and sources of resilience (Conklin, 2017). *"Seeking frontline staff input for management of change and operational risk assessments"* may help safety departments fully understand the challenges to the operations. The subjective nature of risk should be acknowledged, and suggestions of possible adverse safety outcomes should be communicated with frontline workers. The actual measurable effectiveness of policies should be considered by leadership, with research that should be used to address

safety risks. *"Sharing and comparing manuals' content with other organisations,"* including comparing documentation, manuals, and risk assessments with other organisations, should also be considered, creating an industry-wide view. It is essential to actively speak to frontline workers and look for practical operational drift, ambiguities, and goal conflicts. Frontline staff should use threat and error management (TEM) and pressure-based operational risk assessment to manage risk effectively (Flight Safety Foundation, 2023). Operational risk assessments should be shared with frontline staff to capture their experience as a resource and for critical crosschecking of feasibility for proposed or existing barriers. The organisation should seek ways to introduce an understanding of performance variability (including the positive, not just the negative) and capacity into risk management. Safety suggestions or reporting of observed positive, resilient behaviour should be encouraged.

Safety risk management should be based on performance distribution, including standard and routine daily performance, to become genuinely predictive. Data analysis, specifically digital surveillance data, flight data monitoring (FDM), and flight operational quality assurance (FOQA) have historically focused on "exceedance events." These data sources can be expanded to support learning across all performance distributions, *"identifying practical drift, ambiguities, and goal conflicts."*

## 4.3 Proposals for enhancing safety assurance

Insights emerging from studies and analyses of incidents, accidents, near-misses, and resilient behaviours should be disseminated across the organisation to help foster improvements. *"Building a climate of trust"* is essential to ensure the reporting of relevant information by frontline staff without fear of retribution. Therefore, implementing an operational learning review (OLR) (McCarthy, 2020), learning and improvement team (LIT) (AA, 2021), learning teams, or survey approach will inform the operator how risk controls are performing. Doing so adds needed context to the big data picture obtained from FDM or FOQA (Conklin, 2017).

Event investigations are conventionally focused on what went wrong, but the same methods can also be applied to what goes well. Even in adverse event investigations, questions can be asked about what went right during the event, how things usually go well, and why things sometimes go exceptionally well (Flight Safety Foundation, 2022).

It is also essential to involve frontline staff in managing the change process. An industry taxonomy that lets all participants understand the measured capacity and positive outcomes should be refined and available. Specific positive safety performance indicators (SPIs) should be developed to begin *"tracking positive events and behaviours"* and things going well. All SPIs and the relevant targets should be openly shared with frontline staff.

Surveys and audits traditionally focus on problems and negative aspects of group-based values, beliefs, attitudes, and behaviour. Nevertheless, they can easily be applied with a focus on strengths and everyday work practices (Flight Safety Foundation, 2022).

Observations of work — studying how routine and non-routine work occurs — is an essential primary method for understanding everyday work. Observations can have a single or broad focus, use various recording technologies, and be continuous or selective. The focus should be on work rather than limited to specific unwanted outcomes or negative elements of work (Flight Safety Foundation, 2022).

### 4.4 Proposals for enhancing safety promotion

Integrating Learning From All Operations into *"recurrent training"* sessions is essential to reinforce the importance of learning from incidents, accidents, and near-misses and examples showing effective and positive behaviour. First, it is necessary to adjust safety promotion by *"asking staff for feedback and needs"* to help them remain safe during operations. Then, promote the collected responses and changes received to build engagement, which would also help with assurance. Finally, *investigating good outcomes using the same framework as adverse events"* and identifying role models and positive human contributions can create a path of *"encouraging frontline staff to realize the value of positive contributions."*

## 5.0 Conclusion

Integrating Learning From All Operations into all existing SMS components has the potential to expand the pool of available safety-relevant data. This expansion can enable insights into previously unstudied aspects of safety performance and enable timely detection of and response to safety-relevant events. It does not require a wholesale replacement of an organisation's processes, practices, and tools (Flight Safety Foundation, 2021). However, it does require the willingness to expand one's perspective or mindset, starting from top management to the most junior employee — as a complement to what is already in place. Most aviation organisations are well positioned to collect, analyse, manage, and disseminate safety data and insights. Organisations can leverage existing processes in manageable ways to expand those insights and translate them into action through policies, procedures, training, and equipment design (Flight Safety Foundation, 2022).

Organisations can encourage active communication and promote safety-first principles by acknowledging the subjective nature of risk, building trust, and creating a psychologically safe environment for all employees to share experiences and concerns. Weak signal detection, narratives/insights, mini-workshops, learning teams, and introducing TEM or pressure-based operational risk assessment can help organisations manage safety risks effectively. It is also essential to disseminate insights and involve frontline staff in managing the change process to improve safety performance. Integrating Learning From All Operations into recurrent training sessions and emergency planning can reinforce the importance of Learning From All Operations and develop corrective actions to reduce risks. By incorporating Learning From All Operations into all components of the SMS, organisations may create operational capacity, become more resilient, and be better prepared to handle expected and unexpected events, ultimately ensuring enhancements to the safety of all.

## 6.0 Acknowledgements

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# APPENDIX A
## SURVEY INSTRUMENT WITH RESULTS LEARNING FROM ALL OPERATIONS

As a member of the Learning From All Operations working group and with your ICAO Annex 19 Safety Management Systems knowledge, we ask you to participate in this anonymous survey. As we explore an additional section of the Learning From All Operations white paper, please answer these questions to the best of your knowledge.

**Imagine that you are asked to integrate Learning From All Operations information into your organization's SMS or create a "wish list" of means to integrate.**

*(Consent: By continuing with this survey, you are giving consent to FSF to review your data. Your answers will be kept anonymous unless you identify your organisation in your answers. The data establish other means of supplementing Learning From All Operations with existing SMS programs.)*

1. How would you suggest integrating Learning From All Operations into **Safety Policy?**
2. How would you suggest integrating Learning From All Operations into **Safety Risk Management?**
3. How would you suggest integrating Learning From All Operations into **Safety Assurance?**
4. How would you suggest integrating Learning From All Operations into **Safety Promotion?**
5. How would you suggest integrating Learning From All Operations into safety *Emergency Planning?*

# APPENDIX B
## THEMES IDENTIFIED FROM SURVEY RESULTS

**Safety Policy**

- Balancing trade-off decisions and risk tolerability.
- Acknowledging the limitations of policies and procedures.
- Supporting variation and adaptation.
- Promoting trust and a psychologically safe environment.
- Defining operational defensiveness and safety-first principles.
- Emphasising storytelling to support safety understanding and active intervention.
- Explaining what prioritising safety means in practice.

**Safety Risk Management**

- Detecting weak signals.
- Collecting stories, narratives, and insights.
- Providing continuous training.
- Acknowledging the subjectivity of risk.
- Using learning and research based on often incomplete evidence and in the face of uncertainty.
- Sharing and comparing manuals' content with other organisations.
- Seeking frontline staff input for management of change and operational risk assessments.
- Identifying practical drift, ambiguities, and goal conflicts.
- Using risk assessment in a positive sense.
- Introducing variability and capacity into risk management.

**Safety Assurance**

- Disseminating insights from reviews.
- Building a climate of trust.
- Implementing operational learning review.
- Managing change with frontline staff.
- Using safety as a guiding principle.
- Measuring capacity and positive outcomes.
- Tracking positive events and behaviours.

**Safety Promotion**

- Sharing frontline insights.
- Asking staff for feedback and needs.
- Investigating good outcomes using the same framework as adverse events.
- Using role models to promote safety.
- Encouraging frontline staff to realize positive contributions.