International Civil Aviation Organization
Asia and Pacific Office

Twenty-fourth Meeting of the Asia Pacific Regional Aviation Safety Team (APRAST/24)

(Bangkok, Thailand, 01 to 05 December 2025)

Agenda Item 5: ICAO/ Member State / Industry Presentations

SURVEYS ON SSP/SMS & SAFETY CULTURE IMPLEMENTATION IN APAC

[Presented by AP-RASP WG represented by Australia, Hong Kong China, India, Republic of Korea, Singapore and Thailand]

SUMMARY

This paper presents an analysis of survey responses gathered through the State letter T 6/13.1.4 – AP139/24 (FS) to support the discussions at the **ICAO APAC Safety Management Seminar** on 3-5 February 2025. The pre-seminar surveys were designed to establish a better understanding of the status of State Safety Programme (SSP) and Safety Management Systems (SMS) implementation in different aviation domains and potential areas for improvement. The Surveys were conducted for; (i) Safety Reporting Systems ("SRP Survey"); (ii) ANSPs' Roles in Safety ("ANSP Survey"); and (iii) Safety Performance Indicator (SPI) ("SPI Survey").

The high-level observations from analysing the survey responses demonstrated the potential use of safety surveys to support the ICAO APAC Office's work on aiding SSP/SMS implementation in the region, developing and prioritizing regional safety management initiatives, and promoting a positive safety culture which may be useful in future APRAST work programmes. To this end, this paper proposes to recognise the joint efforts by volunteers in developing and delivering survey analysis as well as States/Administration and industry in providing responses; and use the results to inform future AP-RASP and APRAST initiatives to further enhance regional safety.

1. INTRODUCTION

1.1 To support the ICAO APAC Safety Management Seminar held on 3-5 February 2025 organized under the remit of the Asia-Pacific Regional Aviation Safety Plan (AP-RASP)[1] Working Group (WG) as part of Action Item A.III.1, three surveys were launched by the ICAO APAC Office with support of the APAC Safety Management Seminar Organizing Committee on 27 November 2024 via the State Letter T 6/13.1.4 – AP139/24 (FS) as follows :-

a) Safety Reporting Systems of States/Administrations and service providers[2],

b) Air Navigation Service Providers (ANSPs') Roles in SSP/SMS/Global Safety, and

c) SPIs of States/Administrations and service providers.

[1] ICAO's regional safety plans are in https://www.icao.int/gasplibrary?fid=13365#block-icao-page-title
[2] "Service providers" may be from the public sector (e.g. a government entity) or the private sector (industry).

1.2 The surveys were also relevant to AP-RASP's Action Items A.IV.1 and A.IV.4. The former aimed to establish a mechanism to collect and analyse SPI data from APAC States and common industry Indicators and the latter targeted to establish a mechanism for regional aviation safety data collection and sharing and support States'/ Administrations' participation in regional aviation safety data-sharing projects enhancing safety culture.

1.3 The surveys on States/Administrations and service providers across aviation domains in the Asia-Pacific (APAC) region were conducted to provide data to support panel discussions at the seminar for a better understanding on the current level of SSP/SMS and safety culture implementation, as well as external sharing and using positive safety culture (e.g. just, reporting, learning cultures etc) as driver to further improve safety within the organisations and with stakeholder/partners.

1.4 **28** States/Administrations and ANSPs[3] responded to the surveys. Responses from approximately **640** regulators, ANSPs, industry and aviation personnel were collected by the ICAO APAC Office and secured by Flight Safety Foundation (FSF). Responses were analysed by volunteers[2] which obtained the secured data under data protection agreements. Their efforts on cleansing and analysing the data have enabled the pre-seminar survey responses to be fully utilized to identify good regional practices for sharing with regional partners or improvement opportunities for consideration by the ICAO and AP-RASP WG to support the work at a regional level on aiding SSP/SMS implementation, developing and prioritizing regional safety management initiatives, and promoting a positive safety culture which may be useful for future APRAST work programmes.

2. DISCUSSION

How the Surveys were developed and conducted

2.1 The ICAO APAC Safety Management Seminar Organizing Committee, comprising of the ICAO APAC Office, Flight Safety Foundation, States/Administrations, International Organizations and Industry Partners, formed three Survey Groups[4] in 2024 to develop pre-seminar surveys to facilitate specific Panel discussions, including those targeted at the ANSPs' important role in SSP/SMS, and SPI developments. The Groups utilized the safety culture survey distributed by the ICAO APAC Office on 06 May 2022 via the State Letter AP069/22 (RSO) as reference.

2.2 The Survey Groups developed three different surveys with two questionnaires each[5]. The questions for States/Administrations and service providers were similar in order to collect feedback

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[3] Responses were received from **20** States/Administrations and **28** ANSPs from Bangladesh, Bhutan, Malaysia, Maldives, Netherlands, New Zealand, Pakistan, Republic of Korea, United Kingdom, United States of America, Australia, China, Fiji, Hong Kong China, India, Indonesia, Macao China, Nepal, Papua New Guinea, Philippines, Singapore, and Thailand.

[4] Survey developments and analysis are supported by the following Leaders and Volunteers :-

a) Safety Reporting Systems of States/Administrations and industry ("SRP Survey"): (i) Survey design was led by **United States** and **Hong Kong China**. (ii) Analysis was led by **Singapore**

b) ANSPs' Roles in SSP/SMS/Global Safety ("ANSP Survey"): (i) Survey design was led by **United States** and supported by **Aerothai** and **CANSO**. (ii) Analysis was led by **Thailand**.

c) Identify Common SPIs amongst States/Administrations and industry ("SPI Survey"): (i) Survey design was led by **Republic of Korea** and **India** and supported by **Indonesia** and **Singapore**. (ii) Analysis was led by **Republic of Korea** and **India.**

[5] Questionnaire size (including multiple-choice and open-ended questions) is as follows :-

a) SRP Survey: 25 questions for States/Administrations, 26 questions for service providers.
b) ANSP Survey: 24 questions for ANSP Regulators, 24 questions for ANSPs.
c) SPI Survey: 43 questions for States/Administrations, 43 questions for service providers.

from different stakeholders' perspectives on SSP/SMS implementation and safety culture practices, and their general assessment of positive safety culture promotion in operational environments.

2.3 Survey responses were collected through FSF's online survey platform in a secured manner. The responses were de-identified and aggregated into quantitative data with no intention to compare the data and information amongst States or organisations but rather to outline good practices to support organisations' safety management uses (e.g. benchmarking for self-improvement).

2.4 The surveys also collected responses from aviation personnel to gauge their insights on the reporting culture and level of SSP/SMS implementations.

Key observations from the survey results

2.5 Through the surveys, the following were observed:

General

a) Multiple responses from the same organisation were found. Volunteers conducted analysis with reference to data characteristics and resources (i) to analyse "full data" which comprised multiple respondents from the same organisation and (ii) to "cleanse" data first before analysis.

b) Positive engagement with over **640** responses across the region was encouraging considering the survey was launched in end November 2024 for a short window of 40 days across long holidays, and the workload to reply to a large number of questions (including open-ended ones) was significant. Taking the SRP Survey as example, out of **347** responses received, after "cleansing" the data, it revealed **117** organisations from approximately **20** States/Administrations and **95** service providers from various domains have responded. This demonstrated a keen interest amongst stakeholders in the APAC region in collaborating on safety studies and learning from each other's good practices.

Safety Reporting Systems Survey

Scope and Coverage

c) Responses revealed the scope of safety reporting systems are **largely in line with ICAO's requirements for establishing Mandatory and Voluntary Safety Reporting Systems**. All civil aviation authorities (CAAs), accident investigation authorities (AIA) and nearly all service providers (93%) operate mandatory reporting systems. Voluntary reporting systems are also widely implemented by CAAs (94%) and service providers (86%) but to a lesser extent by AIAs (60%). In terms of report coverage, most CAAs reported their systems cover aircraft operations, maintenance, air navigation services, CNS, aerodromes, and ground handlers. Some also included information from the public.

Confidentiality and Trust

d) The majority of CAAs and service providers have implemented **mechanisms to protect reports**. Most organisations use **policies, regulations, and management commitment** to reinforce confidentiality and protect reporter identity. The gaps observed amongst CAAs pertain to the law and those of service providers concerning guidance and de-identification practices. Nonetheless, trust indicators are strong, as most respondents (including staff) identified that staff can report **without fear of negative consequences**, and noted **visible leadership support** for reporting systems, and **regular communications and training sessions** to encourage reporting.

Effectiveness & Measurable Improvements

e) Feedback mechanisms (such as surveys, meetings, and direct communication) are commonly used to gather staff input on the reporting process. Taking into account Annex 19's SARPs for **States/Administrations and service providers to evaluate effectiveness of actions** taken to manage safety risks, most respondents measured safety benefits / improvements from their reporting systems, despite improvements are not always easily measurable, especially for AIAs. Common metrics were shared, such as report volume, timeliness of actions, quality/completeness of reports, reduction in accident rates/recurrences, etc.

Challenges and Strategies in Implementing Safety Reporting Systems

f) Some organisations faced **challenges** in understanding risks due to **too few reports** while some needed more resources to analyse a **large number of reports**.

g) Strategies shared included robust application of **"just culture"** to support reporting and learning cultures, **visible leadership from the top** to encourage reporting, **reward and recognition programmes**, and **positive actions by CAAs** to enforce SMS and ensure accountability, conduct audits, arrange training, share best practices and lessons-learned etc.

ANSPs' Roles in SSP/SMS/Global Safety Survey

Scope and Coverage

h) The survey on ANSPs was designed to gather insights from States/Administrations (ANSP Regulators), ANSPs, and Air Navigation Services (ANS) personnel. Its purpose was to understand the current application and maturity level of ANSPs' SMS, their role in aviation safety, and their information sharing practices with the SSP and other external stakeholders. The goal being to understand common practices in the APAC region and share the collective results at the seminar.

i) A total of **107** responses were collected, with **target groups (ANSP related)** including **40** responses from ANSPs (38%) and **28** from ANSP Regulators (26%). The unexpected windfall of responses from **non-target groups**, such as Air Operators, Airports, and Training Organizations were re-categorized as "non-ANSPs" (26 responses or 24%). All responses were included to capture all perspectives received and non-ATC insights that enriched the findings.

SMS Maturity: A Divergence in Perceptions

j) A significant 62.5% of ANSPs rated their own SMS as "mature and effective". In contrast, regulators perceived ANSP SMS as still developing. This observation highlights a "**confidence gap**", indicating that while ANSPs are confident, regulators and personnel are more cautious, and there is a clear need for ANSPs to provide stronger evidence of their SMS effectiveness.

Main SMS Implementation Challenges

k) Systemic challenges remain across all four SMS components. Identified **pain points** include the burden of documentation, challenges in coordinating Emergency Response Plans (ERP), difficulties in risk assessment and mitigation compared to hazard identification, weak performance monitoring and effectiveness evaluation, and gaps in communication and training across all groups.

Safety Reporting and Data Utilization

l) While both ANSPs and regulators conduct continuous safety data reviews through mandatory and voluntary reporting systems, a **perception misalignment was observed** in non-ANSPs' responses, such as indicating that ANSPs' data review

happens "only when incidents occur," which is a more reactive view. While trust in the reporting system is high, **insufficient feedback to reporters can disincentivise future reporting.** ANSPs may strive to **close the feedback loop visibly**.

Information Sharing

m) There is a strong proactive sharing of safety information with regulators, international bodies like ICAO, and other ANSPs. The established SSP framework is highly effective in facilitating this crucial information exchange. Despite successful sharing, key barriers to effective information exchange were identified, including **unclear policies, lack of formal data-sharing agreements, and concerns over confidentiality and data protection.**

Safety Performance Indicators (SPIs) Survey

Survey on Common SPIs in the APAC Region

n) A total of **20** States and **71** industry organizations across the Asia-Pacific region participated in this survey, which aimed to identify SPIs commonly applied at both the SSP and SMS levels. The survey questions were designed with reference to the ICAO Indicator Catalogue and the safety-related indicators in the Global Air Navigation Plan (GANP). The scope covered key safety domains including Surveillance, Occurrence-based indicators, Runway Safety, Airspace Safety, Approach Safety, and Ramp Inspections.

Common SPIs

o) The results showed that **Runway Safety, Occurrence-based, and Air Proximity (Airprox) related SPIs were the most widely monitored indicators** among both States and industry. In particular, **Runway Excursion (RE), Runway Incursion (RI), and TCAS Resolution Advisory (TCAS-RA)** correspond to ICAO's Global High-Risk Categories (RE, RI, MAC, CFIT, LOC-I) and are recognized as common priorities across the region. Conversely, indicators related to CFIT (Controlled Flight into Terrain) and LOC-I (Loss of Control In-flight) were less frequently used, suggesting a need to strengthen data-driven monitoring in these areas.

p) At the SSP level, several States **reported regulatory and oversight-related SPIs**, such as Effective Implementation (EI) being monitored, reflecting States commitment towards continuous improvement in State safety oversight capabilities. In contrast, the **industry primarily focused on operational safety indicators**, such as Runway Safety (RE, RI), Wildlife Strikes, and Accident Rate, demonstrating that safety performance monitoring is largely operational in nature. These results provide useful input for developing a regional framework of common SPIs and support the implementation of the AP-RASP (2026–2028).

Challenges

q) While the survey provided meaningful insights into the identification of common SPIs, several limitations were observed. Some responses indicated a **lack of understanding of SPI concepts**, which may have affected the accuracy of results. For example, certain Approved Maintenance Organizations (AMOs) selected indicators such as Runway Incursion, which are not directly relevant to their operational activities. In total, **169** responses were received. However, despite requesting one consolidated response per organization, multiple submissions were received from some entities. The data were therefore refined and consolidated into **91** representative responses, which may have affected the overall accuracy of the

analysis. Finally, while this survey focused on identifying the current state of SPI implementation, further discussion and **planning is needed to establish a regular and sustainable mechanism for the collection and sharing of SPIs** across States and industry in the APAC region.

2.6 The survey questionnaires are available on ICAO website[6]. Details of analysis results are provided in Attachment A to Attachment C.

Lessons Learnt

2.7 The following lessons may be considered by future survey organisers:

a) *Survey design/analysis:* During the design stage, developers should begin with clear research objectives and analytical frameworks, then construct questions anticipating how specific wording and options can shape responses. This approach ensures **instruments generate quality data** that rigorously tests hypotheses rather than confirming assumptions. Developers should also consider **how data will be utilised post-collection** (e.g. *the need to analyse by "countries", clarity regarding "official" representation etc*) when crafting the questions and include provisions for possible follow-up engagement with respondents. After receiving responses, analysts should familiarise themselves with the survey questions and data, apply data cleansing and validation processes, and **seek clarification of responses where beneficial**.

b) *Survey methodology:* Although online surveys enabled data collection from a broad range of participants, the explanatory information in the ICAO State Letter and survey website could be further enhanced to better **facilitate or identify the "official" representatives**. Organisations' official responses and responses from individuals became indistinguishable. For future surveys, when gathering perspectives from both organisations and individuals is useful (e.g. safety culture or voluntary reporting surveys), **separate channels or links** may be considered for organisations and individuals to improve clarity and data categorisation.

c) *Quantity of questions & responses:* Despite the complexities and relatively large number of questions (e.g. 28-34 questions) and some initial uncertainty about how to respond or which survey to respond to, the **response rate remained encouraging and feedback was generally constructive**, reflecting that States/Administrations and industry are committed to contributing to safety studies and value access to shared insights. Future survey developers may consider minimising the number of questions (e.g. targeting 15 or fewer).

d) *Closing the feedback loop:* The **ICAO surveys have visibly closed the feedback loop**, started by enabling respondents with the opportunity to provide their email addresses to receive updates after the seminar, followed by a brief summary sent by ICAO several months after the seminar before a comprehensive final analysis

[6] Survey Questions:
i) SRP Survey (https://www.icao.int/sites/default/files/APAC/Meetings/2025/2025%20APACSM%20Seminar/General%20Information/Attachment-B-Survey_Safety-Reporting-System.pdf)
ii) ANSP Survey (https://www.icao.int/sites/default/files/APAC/Meetings/2025/2025%20APACSM%20Seminar/General%20Information/Attachment-C-Survey_ANSP-Safety-Role.pdf)
iii) SPI Survey (https://www.icao.int/sites/default/files/APAC/Meetings/2025/2025%20APACSM%20Seminar/General%20Information/Attachment-D-Survey_Identify-common-SPI.pdf)

is presented through this paper. Future survey organisers should establish **clear commitments to share observations with respondents** following survey completion.

3. CONCLUSION

3.1 The surveys served as a quick and useful means to gain insights into various soft aspects of SSP/SMS implementation status and challenges across States in the region, providing valuable data that complements existing information sources. This approach would be beneficial for other areas to identify relevant information on priority areas for resource allocation and support, as well as to evaluate the effectiveness of AP-RASP roadmap initiatives and actions.

4. ACTION BY THE MEETING

4.1 The Meeting is invited to:

a) note the information contained in this paper;

b) recognise the joint efforts by Survey Groups in developing surveys, volunteers in analysing the surveys, and respondents in providing inputs to the ICAO; and

c) use results to inform future AP-RASP and APRAST initiatives , workshop sharing seminar topics, and assistance to States in areas for development and enhancements.

— END —

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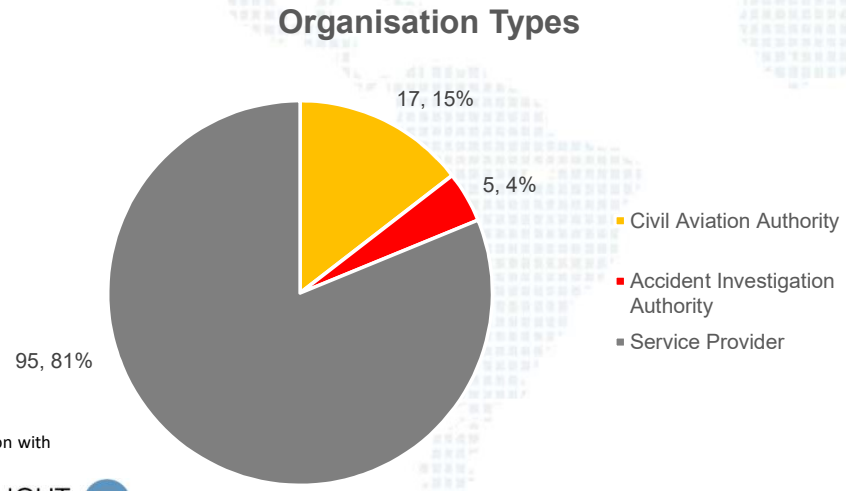
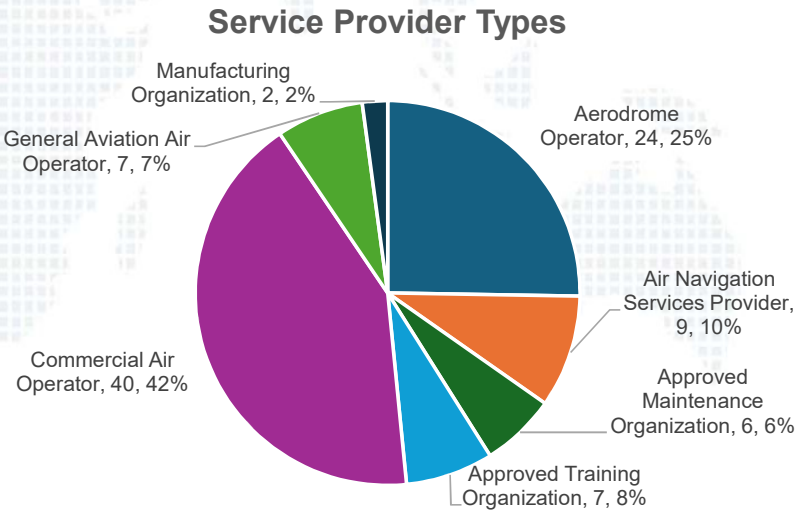
Analysis of Results
ICAO Asia Pacific Safety Management Seminar
Pre-event Survey on Safety Reporting Systems

By Civil Aviation Authority of Singapore

Survey Population

- A total of **347 responses** were received for this survey, comprising inputs from Civil Aviation Authorities, Accident Investigation Authorities, and service providers and their personnel. More than half of these responses came from **multiple individuals within the same organisations**.
- To enable a fairer comparison and avoid skewing the results due to organisations with more respondents, the survey responses were condensed and adjusted to reflect only **one response per organisation**, which was the original intent of the survey design. This adjustment resulted in a total of **117 organisations** from **20 States/Administrations**.
- The **majority** of the respondents' organisations were **service providers, followed by CAAs and AIAs**.
- The service provider group was diverse and comprehensive, encompassing **all key types**: air operators, aerodrome operators, AMOs, DPOs, ANSPs, and ATOs. Among the service providers, the **largest sub-group** were **commercial air operators**, **followed by AMOs**. The remaining service providers each represented less than 10% of the group.





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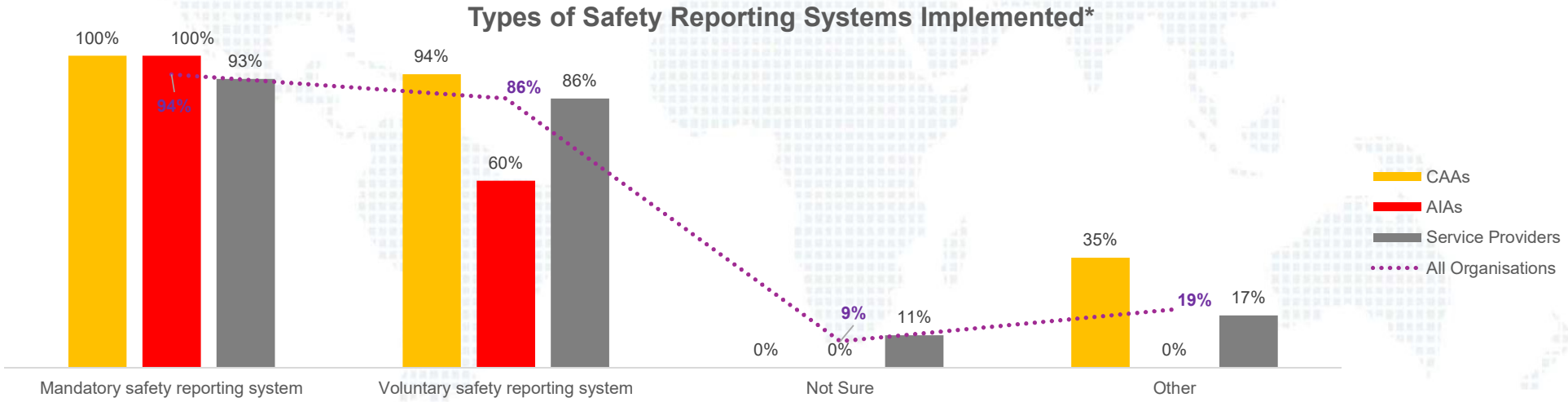
Safety Reporting Systems and Scope

- **All CAAs and AIAs**, and **nearly all service providers**, have established a **mandatory safety reporting system**, as required by law or regulation.

- **Voluntary reporting systems** are also **widely implemented by CAAs and service providers**, and to a **lesser extent by AIAs**, allowing for the reporting of issues not covered by mandatory requirements.

- Most CAAs report that their systems cover aircraft operations, maintenance, air navigation services, CNS, aerodromes, and ground handlers. Some also include information from the public.



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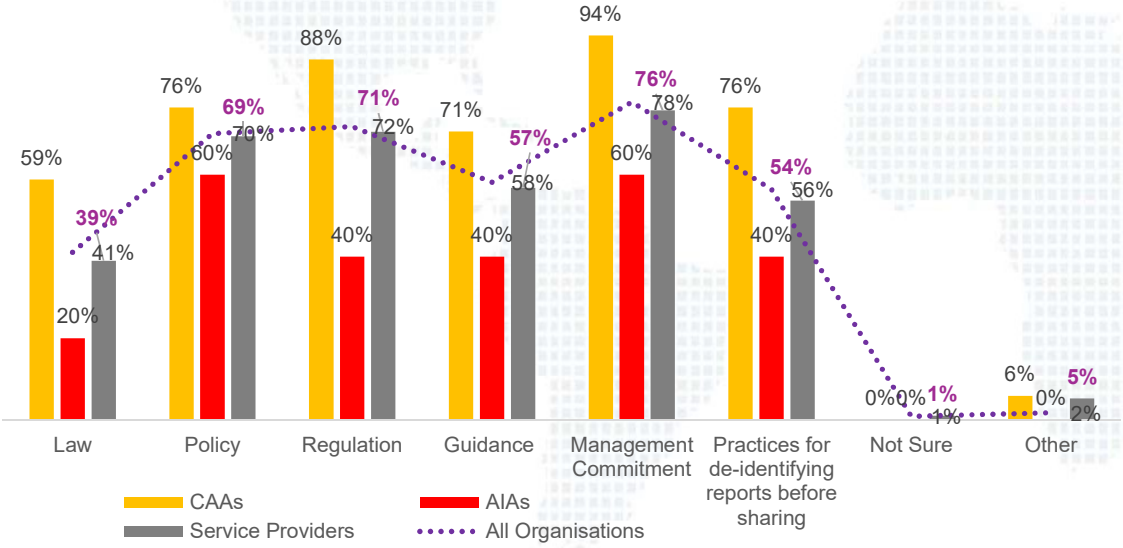
** Note: Respondents were allowed to select multiple options*

Confidentiality & Trust

- The **majority of CAAs and service providers**, and **AIAs to a lesser extent**, have mechanisms for **protect/de-identifying reports** before sharing. Most organisations use **policies, regulations, and management commitment** to reinforce confidentiality and protect reporter identity.

- **Trust indicators** are **strong**: Most respondents say staff can report **without fear of negative consequences**, and there is **visible leadership support** for reporting systems. **Regular communications and training sessions** encourage reporting.

Mechanisms in Place to Protect Safety Reports*



Individuals' Trust in the Reporting System*

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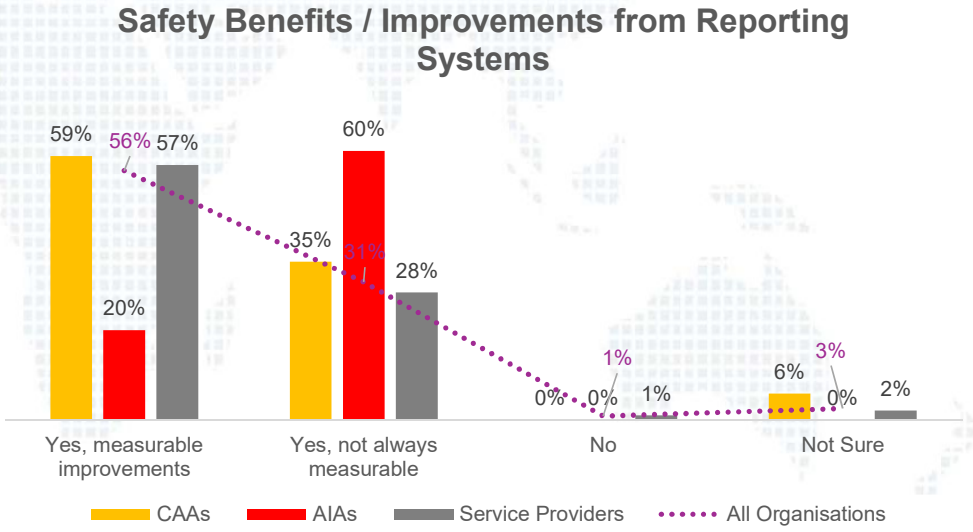
** Note: Respondents were allowed to select multiple options*

** Note: Respondents were allowed to select multiple options*

Effectiveness & Measurable Improvements

- **Feedback mechanisms** (such as surveys, meetings, and direct communication) are commonly used to gather staff input on the reporting process.
- Most CAAs report that their safety reporting systems have led to **visible improvements in safety practices**.
- However, some organisations, **especially AIAs**, note that improvements are not always easily measurable. While difficult to quantify, qualitative feedback and trend analysis are used.



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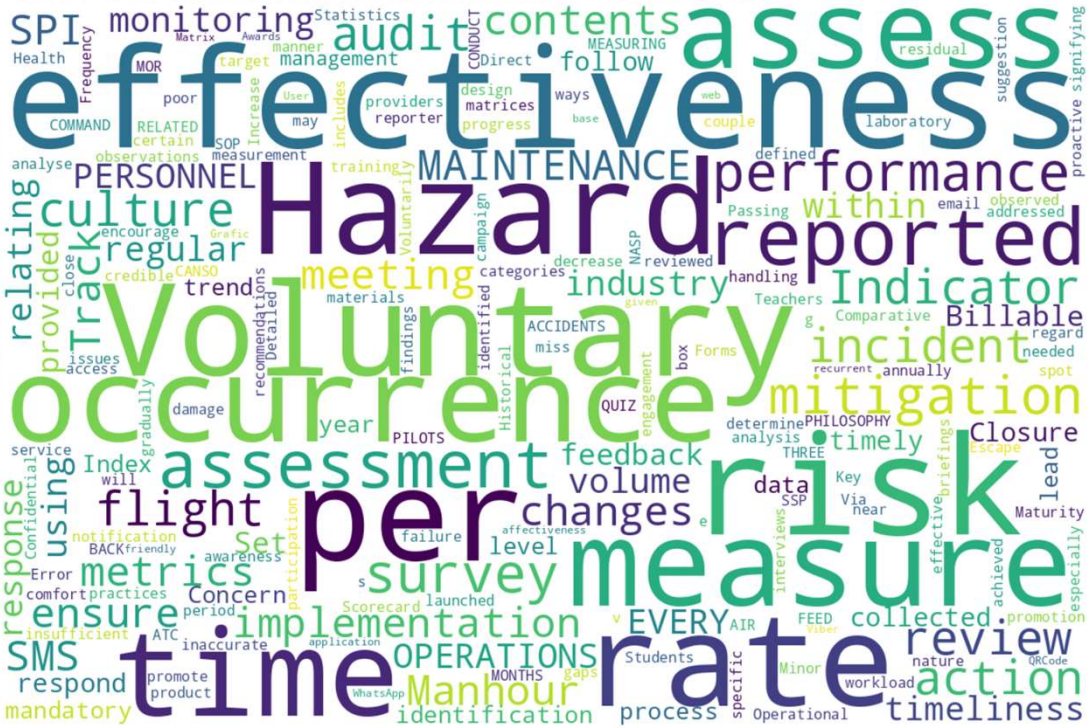
** Note: Respondents were allowed to select multiple options*

Effectiveness & Measurable Improvements

- **Common metrics** used include:
  - Number of reports submitted (per year, per 1,000 flights, etc.)
  - Timeliness of report closure and corrective actions
  - Quality and completeness of reports
  - Reduction in incident/accident rates
  - Participation in safety surveys and feedback sessions
  - Safety culture survey results
  - Frequency of repeated issues
  - Number of hazards identified and mitigated



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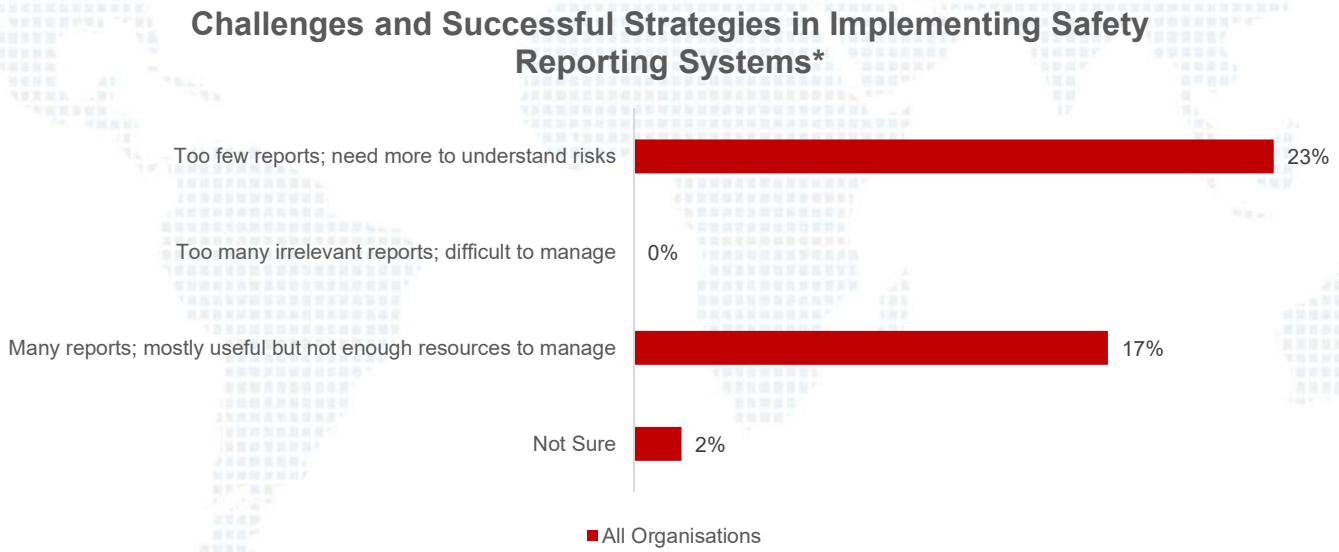
Challenges

- Some organisations note that they receive **too few** reports, and more reports are needed to fully understand risks.
- Some organisations mention having **not enough resources** to analyse and utilise all reports.
- No organisations receive too many irrelevant reports.



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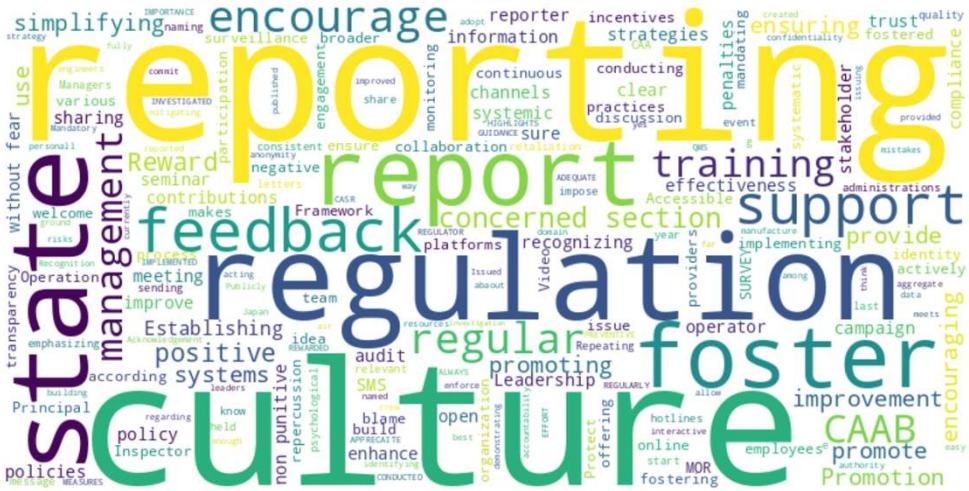
** Note: Respondents were allowed to select multiple options*

Best Practices & Strategies

- **Just Culture**: Promoting a non-punitive, learning- and improvement-focused environment is a recurring theme.
- **Leadership involvement**: Regular reviews, visible support, and recognition for reporting are seen as critical.
- **Training and communication**: Ongoing training, safety seminars, and regular communication about the importance of reporting are widely used.
- **Reward and recognition**: Some CAAs have implemented (reward) programs for quality reporting.
- States/Administrations support safety culture by:
  - **Enforcing** regulations and ensuring **accountability**
  - Mandating SMS (**Safety Management Systems**)
  - Conducting **audits** and providing **training**
  - Sharing **best practices and lessons** learned



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Appendix:

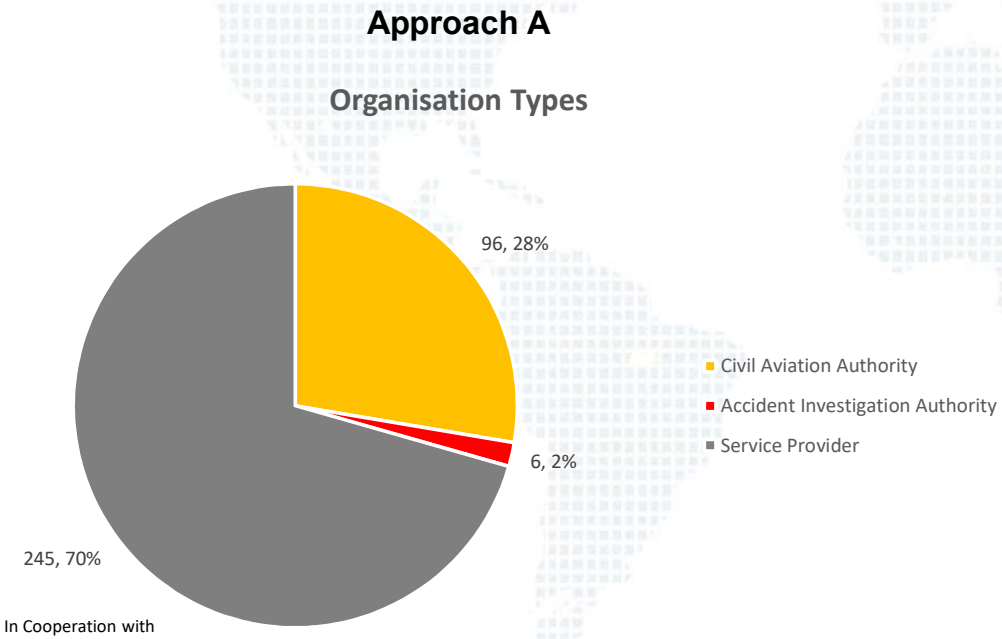
Comparison of raw survey results vs clean responses

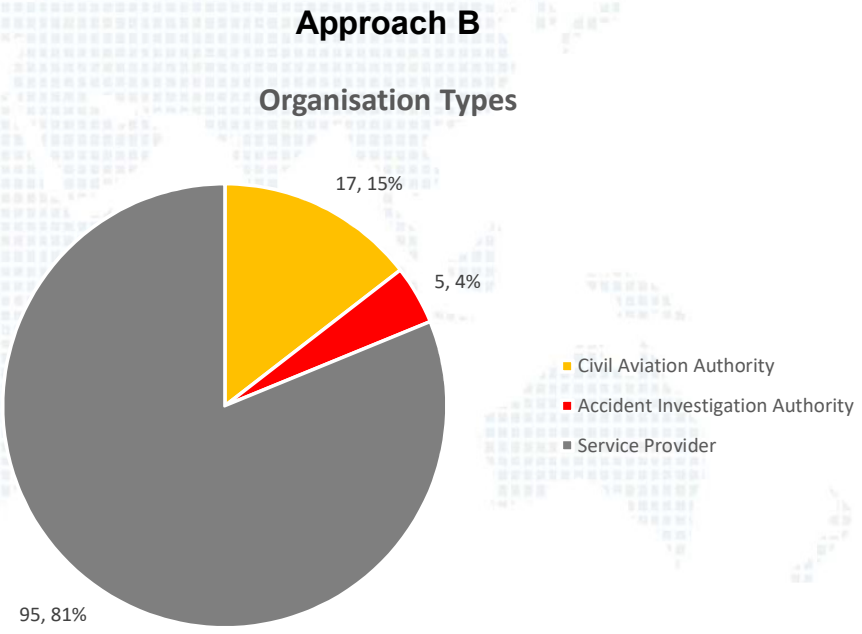
Methodology

Approach A	**“Raw results" - Multiple responses per organisation, including unidentified organisations**
1	Start with raw responses collected from online forms.
2	Plot charts based on these trends and conclusions, taking the raw responses as a single population.
Approach B	**"Clean responses" - One response per organisation**
1	Start with raw responses collected from online forms.
2	Ensure that key categories including State/Country, organisation type, organisation name, etc. are standardised for every response. Also correct any errors, including typos, empty cells, contents in the wrong column, etc in these columns, on a best-effort basis.
3	Identify responses with many empty cells or obviously incorrect information. Use a different font colour and/or insert a new column and assign appropriate tag(s).
4	Sort out responses by the State/Country, then by organisation type, then by organisation name.
5	Where there are multiple responses for an organisation, create a new row for that organisation and select either the most credible response and/or the response that appears the most number of instances.
6	Calculate and tabulate statistics to plot charts and derive analysis based on survey questions.

Comparison of survey respondents

- Moderate differences between the two approaches:
  - Both approaches yield similar outcomes in terms of which organisation type had the largest and smallest representation.
  - Approach B shows a significantly lower proportion of responses from CAAs, while the proportion of responses from AIAs is larger.





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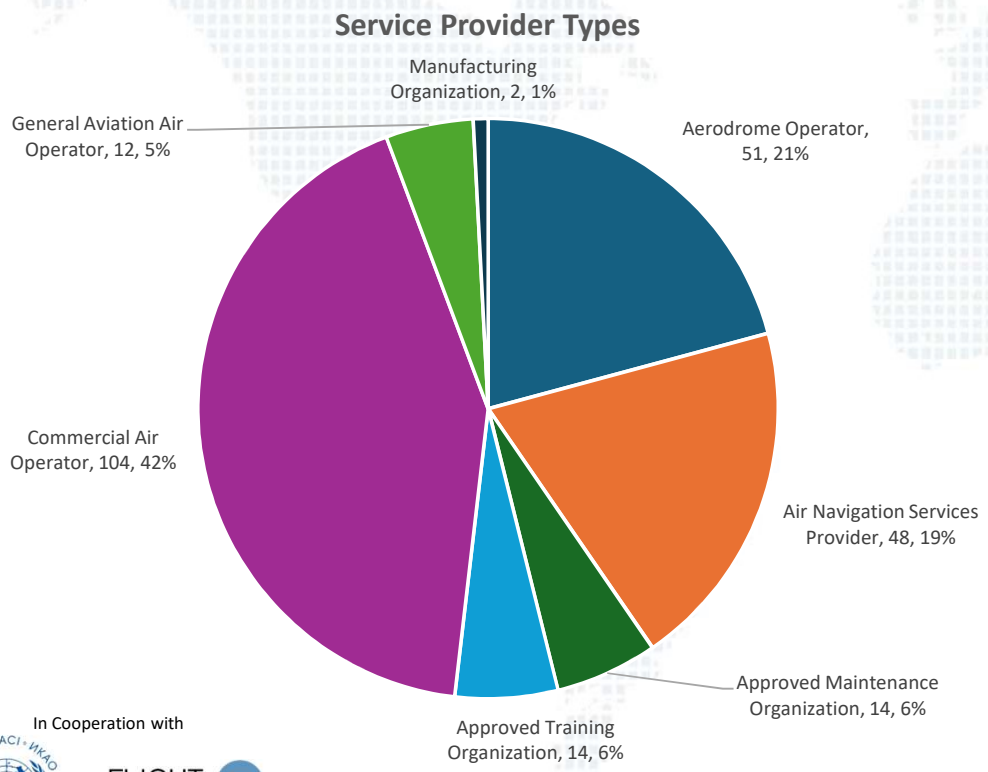
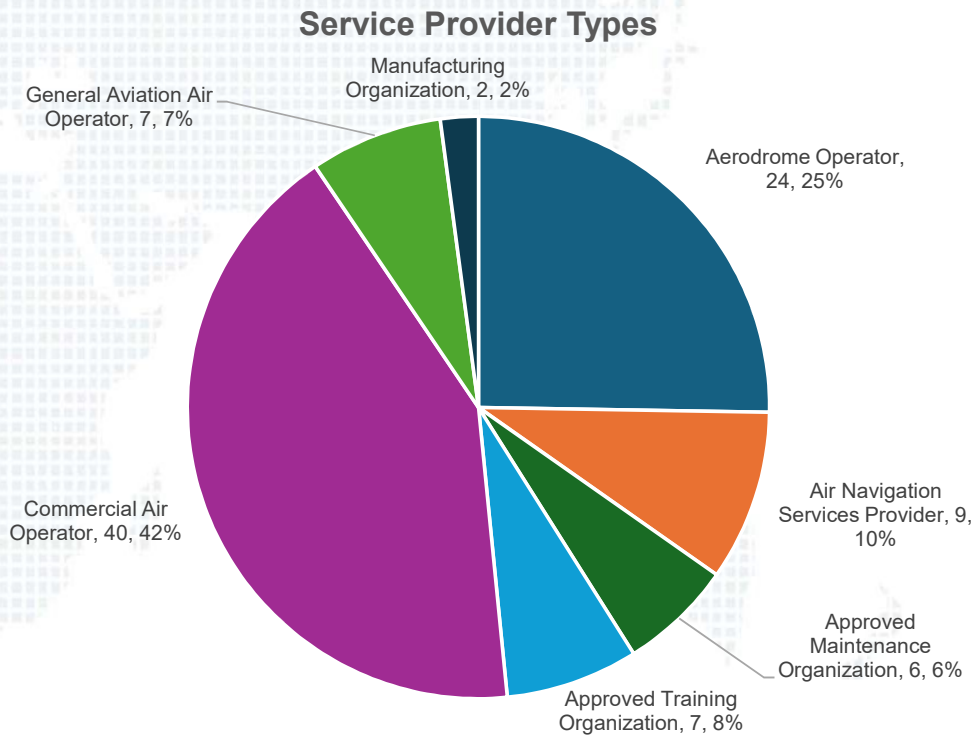
Comparison of survey respondents

Approach A



Approach B



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Comparison of survey respondents

Approach A

Approach B

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Conclusions

- Representation Differences:
  - The cleaning process in Approach B has filtered out more responses from the industry.
  - This was due to inconsistencies or errors in the raw data that were corrected in Approach B.

- Data Quality:
  - Approach B's emphasis on data quality and standardisation results in more reliable and accurate insights.
  - The lower proportion of industry responses in Approach B might indicate that many industry responses in the raw data were incomplete or incorrect.
  - However, the differences in the proportions of the bars in the charts appear to be minor, suggesting that either approach would likely produce similar results and conclusions.

- Implications for future surveys:
  - The differences between the two approaches highlight the importance of data cleaning and standardisation in survey analysis.
  - When planning survey questions, it's important to consider what the responses might look like in order to craft both the questions and answer options effectively.

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Analysis of Results ICAO Asia Pacific Safety Management Seminar

Pre-event Survey on ANSPs' Role in SSP/SMS/Global Safety

By Civil Aviation Authority of Thailand (CAAT)

Survey Background & Objectives

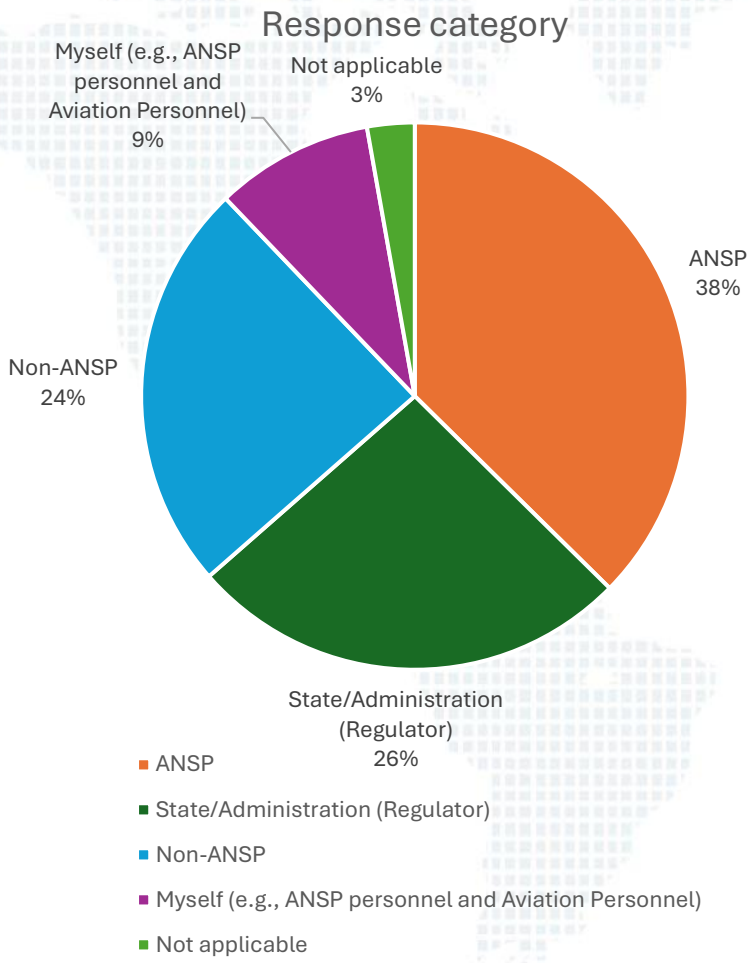
Purpose:

- To gather valuable insights from States/Administrations (Regulator), ANSPs, and ANS personnel on:
  - Current application and maturity level of ANSPs' Safety Management Systems (SMS).
  - ANSPs' role in aviation safety.
  - Information sharing with SSP and other external stakeholders.

Goal:

- Understand common practices in the Asia-Pacific region, with collective results shared during this seminar.

Respondent Profile



<u>Respondent Overview & Data Management</u>

- Target Groups:
  - ANSPs: 40 responses (38%)
  - State/Administration (Regulator) : 28 responses (26%)
  - *Note:* All responses, including duplicate organizations, were included to reflect all received perspectives.
- Additional Respondents (Outside Target):
  - Responses received from Air Operators, Airport Operators, Training Organizations (also with some duplicates).
  - These were re-categorized into ”Non-ANSPs": 26 responses (24%)
- Other Categories:
  - Myself (e.g., ANSP personnel and Aviation personnel): 10 responses (9%)
  - Not Applicable: 3 responses (3%) - (Respondent info provided, but survey not completed)
- Total Responses: 107

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Key Takeaway

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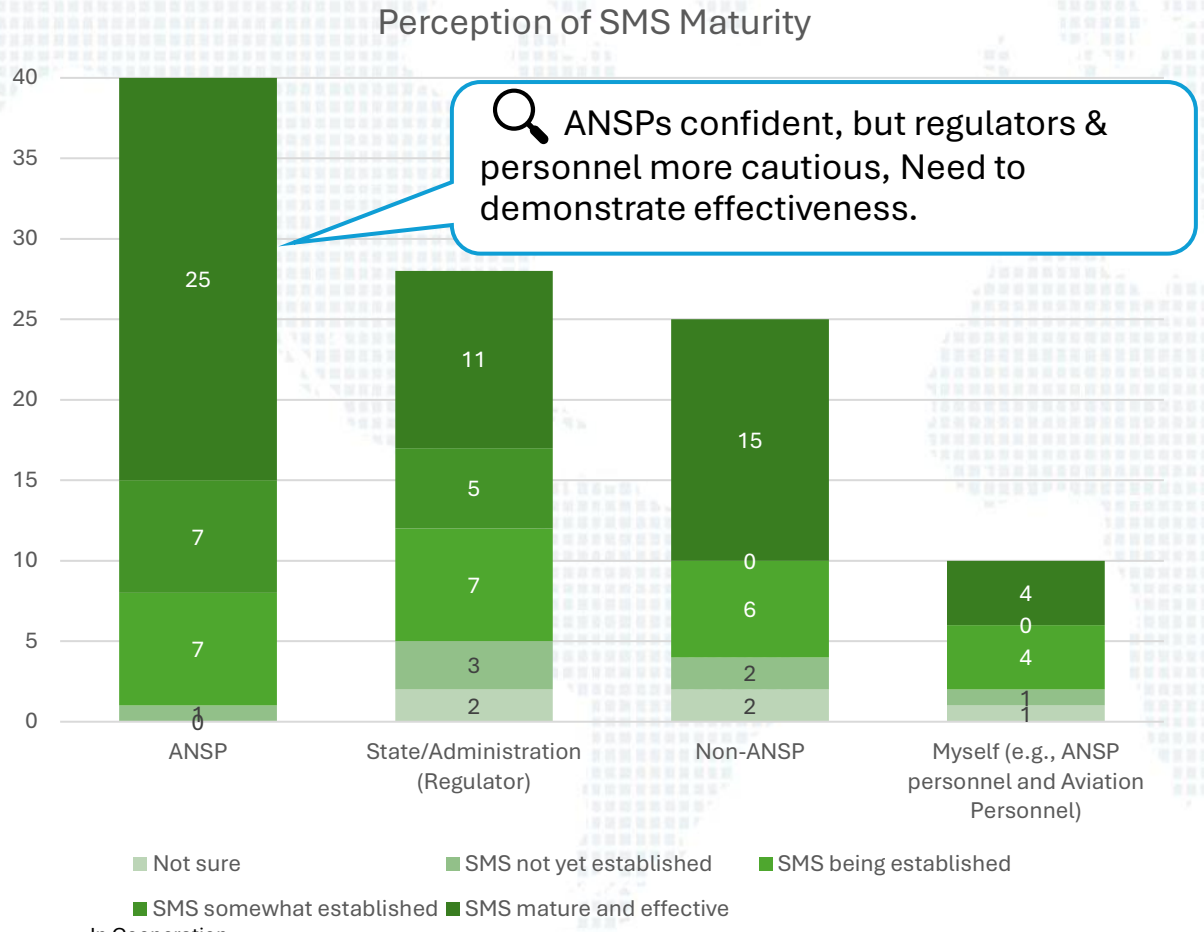
SMS Maturity: Divergent Perceptions



- **ANSPs:** 62.5% rate their SMS as *"mature and effective."*
- **Regulators:** Results reflect how regulators perceive ANSP SMS - majority see them as still developing.
- **Non-ANSP:** may answer based on their organization 'SMS. However, they believe that their SMS is *"mature and effective."*
- **Personnel (Myself):**
  - *ANSP personnel* - may answer based on their own ANSP's SMS.
  - *Other aviation personnel* - may answer based on the SMS of their own organization.

Key message: Confidence gap exists – stronger evidence of SMS effectiveness is needed.

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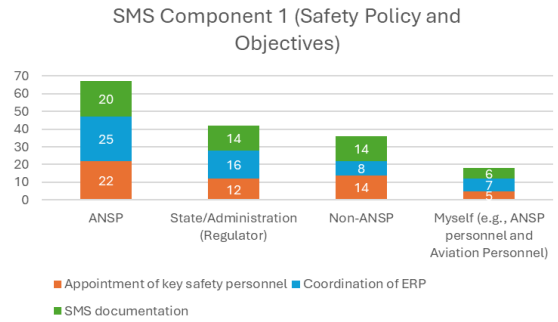
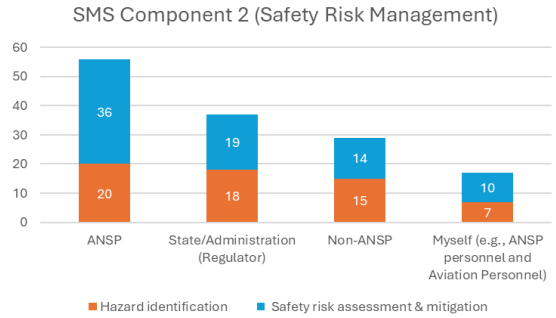
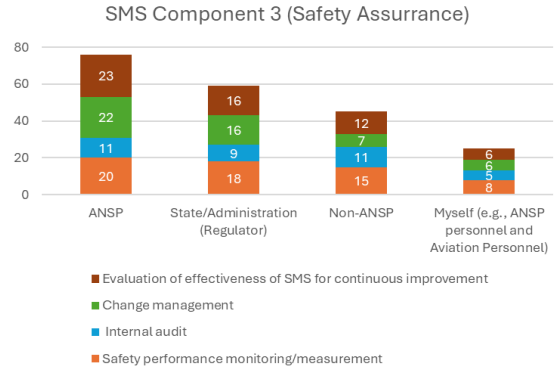
Main SMS Implementation Challenges

Documentation and ERP

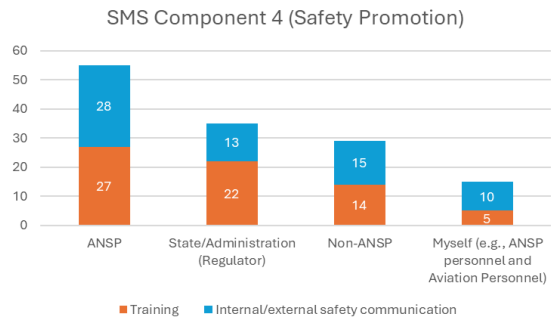


Risk





Monitoring & Effectiveness



Communication

Pain Points

- Documentation burden and ERP Coordination.
- Risk assessment & mitigation harder than hazard identification.
- Performance monitoring & effectiveness evaluation weak.
- Communication & training gaps across all groups.

Key message: Systemic challenges remain across all four SMS components.

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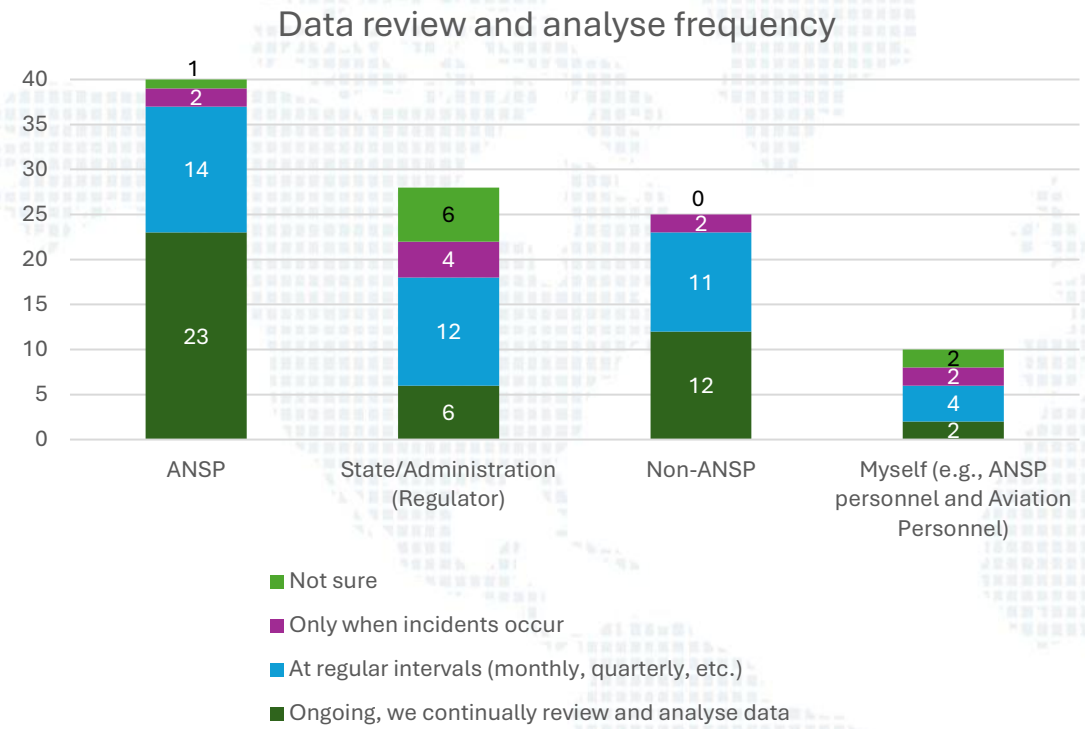
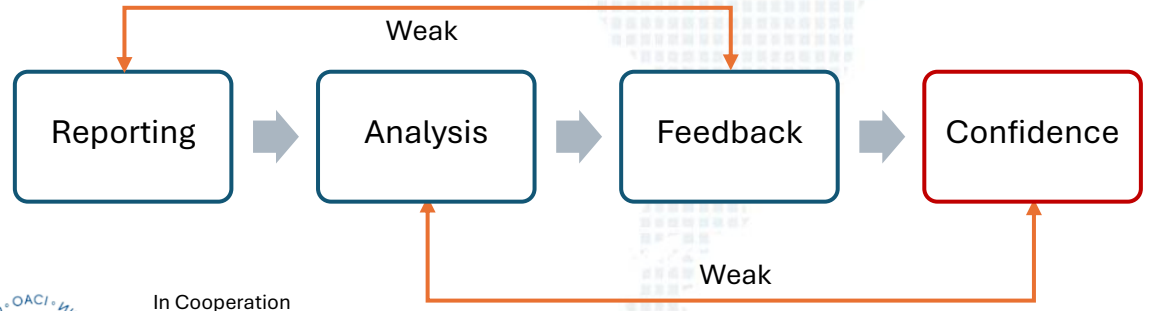
Data Review & Safety Reporting





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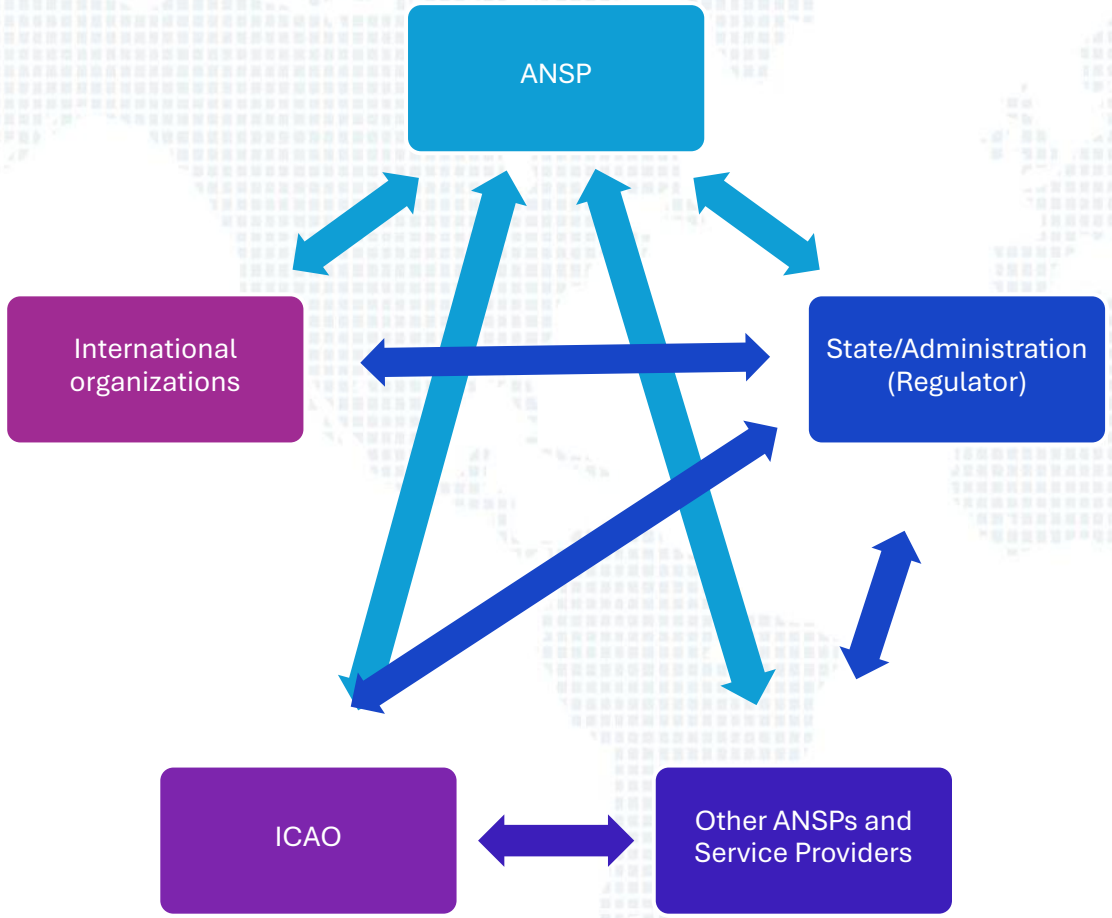
Key Points

- ANSPs: Conduct continuous, ongoing safety data review through both mandatory and voluntary reporting systems.
- State/Administration (Regulator): Also maintain mandatory and voluntary systems to capture safety data at the national level.
- External Perception: A perception gap exists with external stakeholders. For example, a higher proportion of ANSP and Aviation Personnel, and Non-ANSP organizations reported that reviews happen "only when incidents occur," a more reactive view compared to the ANSP and State/Administration groups.
- Voluntary reporting adoption: Indicates a proactive reporting culture among ANSP personnel.
- Trust & feedback gaps: Confidence in the reporting system exists, but feedback to reporters remains inconsistent, limiting full trust.
- **Key message:** Safety data use is proactive and well-structured, but **perceptions of its effectiveness and feedback loop vary** among stakeholders.

Information Sharing



Key Point

- Strong Proactive Sharing: Organizations actively share safety information externally. The data shows widespread engagement with regulators (States/Administrations), international bodies like ICAO, and other ANSPs. This proactive sharing is a cornerstone of collaborative safety management.
- SSP Drives Exchange: The established State Safety Programme (SSP) frameworks are highly effective in facilitating this crucial information exchange and cooperation among stakeholders, serving as a powerful mechanism for a well-structured safety culture.
- Existing Barriers: Despite the successful sharing, the document identifies several key barriers that hinder effective information exchange. These include:
  - Unclear policies and regulations.
  - Lack of formal data-sharing policies.
  - Concerns over confidentiality and data protection.
  - Inconsistent or ineffective formal agreements.
- In conclusion, the foundation for external information sharing is strong, but there is a clear opportunity to enhance efficiency and effectiveness by addressing the identified barriers related to policy clarity and consistency.

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Lessons & Next Steps

Lessons Learned

- Broad survey distribution can result in responses from non-target organisations, such as entities that are not ANSPs, leading to unexpected or inconsistent data.
- Multiple responses from the same responders may provide conflicting answers, reflecting differences in understanding or interpretation even within a single organisation.

Observations

- Some data may not fully reflect the perspectives of the target group, as non-target respondents may skew results.
- Using one response per organisation helps reduce bias, but variations in individual responses can still create inconsistencies.

Recommendations for Improvement

- Clearly define the target respondent group and communicate who should complete the survey to avoid irrelevant responses.
- Limit multiple responses from the same organisation or consolidate answers through a designated representative.
- Simplify and clarify survey questions to minimize different interpretations among respondents.
- Consider follow-up surveys or targeted interviews with key stakeholders to validate and enrich the survey findings.

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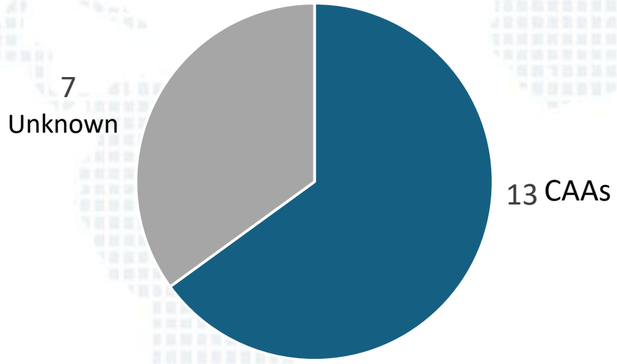
Analysis of Results
ICAO Asia Pacific Safety Management Seminar
Pre-event Survey on
Safety Performance Indicator (SPI)

By India and Republic of Korea

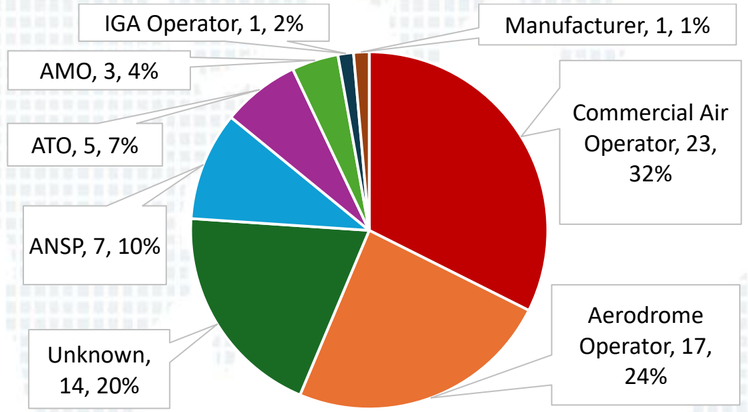
Survey Overview

- **Background** : Support the Goal IV(Data-driven regulatory oversight) under the ICAO APAC Regional Aviation Safety Plan 2023-2025
  - Action Item A.IV.1 “Establish a mechanism to collect and analyze SSP SPI data from APAC States and common industry Indicators”
- **Objective** : Identify and Analyze common Safety Performance Indicators (SPIs) between States/Administrations and industry in the APAC region.
- **Total Responses** : 169 (91 valid responses across 20 States/Administrations and 71 Industry)
  - The responses were condensed and adjusted to reflect only one response per organization
  - Respondent Categories : Regulators, Aerodrome Operators, ANSPs, AMOs, ATOs, Commercial Air Operators, International General Aviation Air Operator, Manufacturer.

Regulator (20)



Industry (71)



13 CAAs : Australia, Hong Kong China, India, Indonesia, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, ROK, Singapore, USA, Thailand

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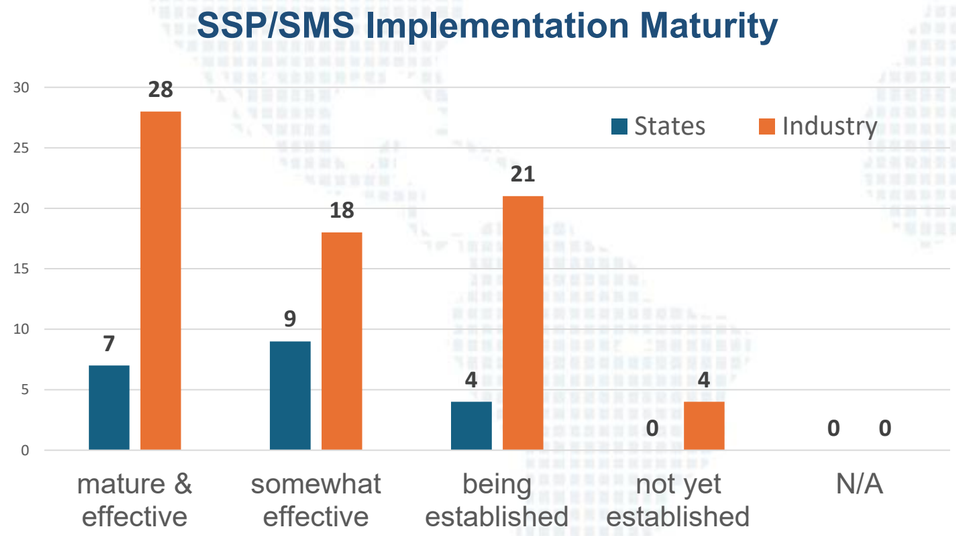
Structure of Survey Questions

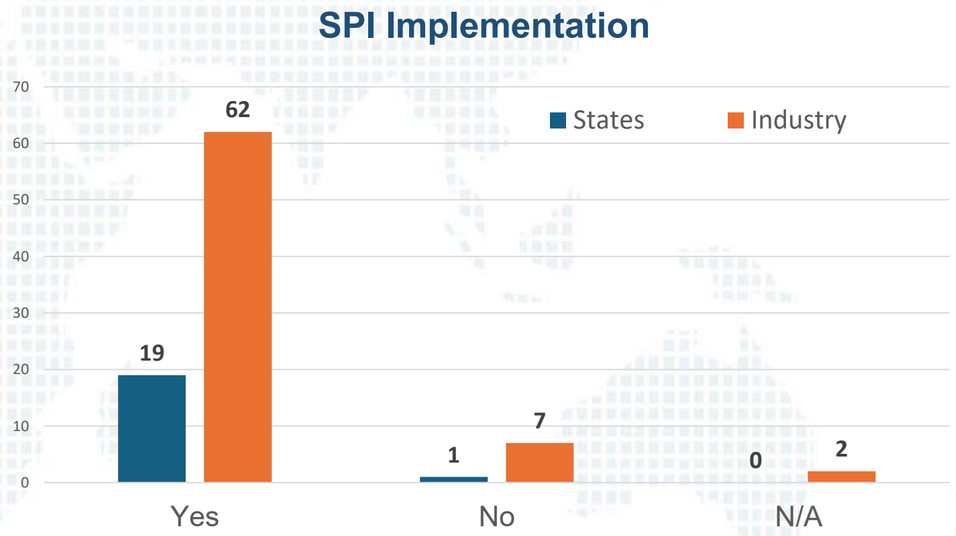
- **Structure of Survey Questions** : The SPI Survey was structured into nine sections (A–I) and 43 questions to collect both organizational context and detailed information on SPI practices across operational domains.
  - **Sections A–B** (Q1~10) – Respondent profile and overall SSP/SMS and SPI implementation status (organization type, SSP/SMS maturity, data-sharing practices)
  - **Sections C–H** (Q11~42) – Domain-specific SPI questions covering key safety areas such as Surveillance (2 SPIs), Occurrence (5 SPIs), Runway Safety (7 SPIs), Airspace (7 SPIs), Approach (3 SPIs), and Ramp Inspection (2 SPIs)
  - These Sections are based on the ICAO Indicator Catalogue and the Global Air Navigation Plan (GANP) performance indicators
  - Each question followed a common format, asking to indicate whether the SPI is: Yes (currently used) / Planned / Not useful / N/A
  - **Section I** (Q43) – Additional comments

C. Surveillance SPIs	D. Occurrences SPIs	E. Runway Safety SPIs	F. Airspace SPIs	G. Approach SPIs	H. Ramp Inspection SPIs
Effective Implementation	Accident rate by occurrence type and occurrence category	Runway safety occurrences by occurrence category and occurrence class	IFR-IFR Loss of Separation	Missed approaches	Ratio of zero findings inspections
Runway inspections by finding category and inspection period	No. of accidents by operation type, category, risk category and injury level	Wildlife strikes by occurrence class and flight phase	Large height deviation in RVSM airspace	EGPWS alert events	Ratio of findings per inspection
	Fatality rate by operation type and occurrence category	Long landings	TCAS events by advisory type	Continuous descent operations	
	Number of fatalities by operation type and risk category	Tailwind landings by threshold level	Emergency by squawk code		
	No. of aircraft accidents *	Runway remaining	Horizontal flight efficiency – local		
		No. of runway incursions *	Horizontal flight efficiency – network		
		No. of runway excursions *	No. of airprox / TCAS alert / loss of separation / near mid-air collisions(MAC) / MAC *		* based on GANP

SSP/SMS and SPI Implementation (Section B)

- **SSP/SMS Implementation Maturity (Q6) :** Among States, 7 out of 20 reported mature and effective implementation of the State Safety Programme (SSP), 09 states reported that SSP is implemented but not effective and 04 states reported SSP is being implemented. with only a few indicating full maturity. In contrast, the Industry sector (Commercial Air operators, ANSPs, AMOs) showed a higher rate of fully implemented Safety Management Systems (SMS).
- **SPI Implementation** (Q8) : Among States, 19 out of 20 reported that SPIs established. In the Industry sector, 62 out of 71 organizations reported having established SPIs. The majority of both States and industry organizations have SPIs in place.





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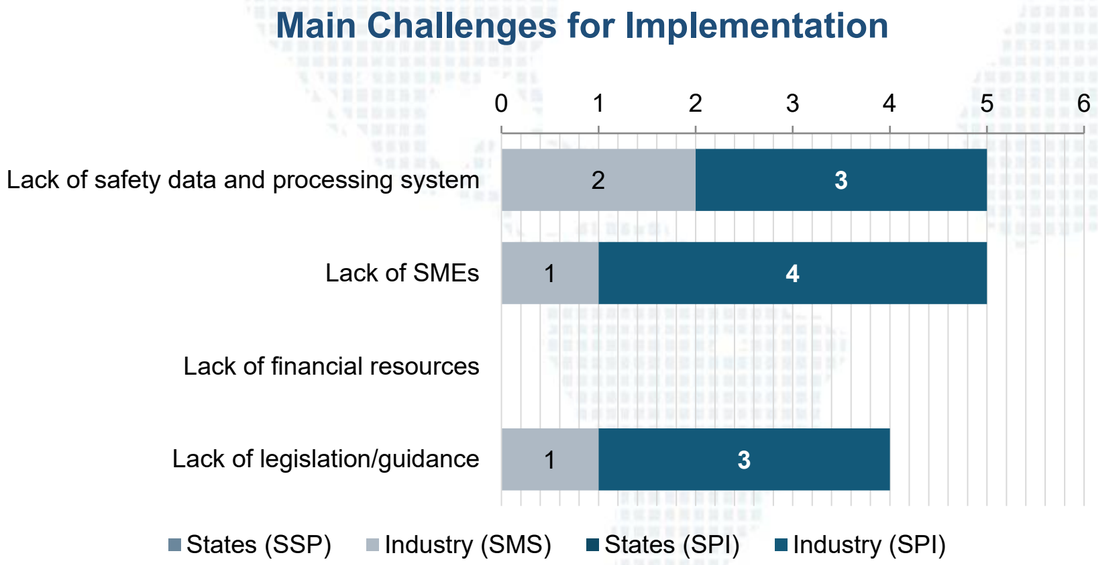
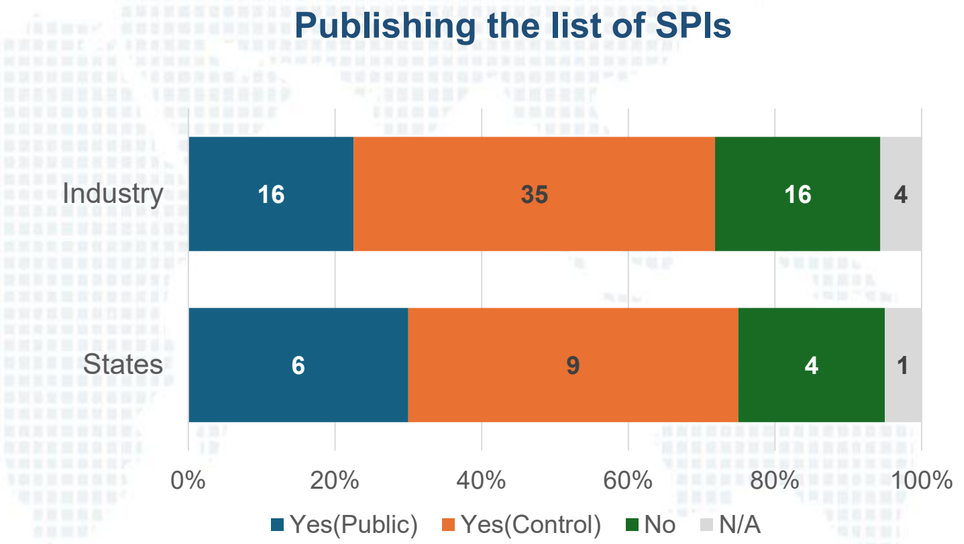
SSP/SMS and SPI Implementation (Section B)

- **SSP/SMS Implementation Maturity (Q6-2)** : A lack of safety data and processing system is reported by 2 in the industry. 1 industry responded that lack of subject matter expert. Furthermore, Industry indicates the lack of legislation as main challenges for SSP/SMS Implementation.
- **SPI Implementation (Q7-2)** : A lack of subject matter expert is responded by 4 in the industry as main challenge for not establishing any SPIs. A lack of legislation/guidance is also reported by 3 in the industry. A lack of safety data and processing system is indicated by 3 industry.
- **Publishing the list of SPIs (Q8)** : Approximately 75% of States indicated that they publish their SPI lists, and similarly, around 72% of industry organizations reported doing so. However, most of these publications are restricted rather than fully public.





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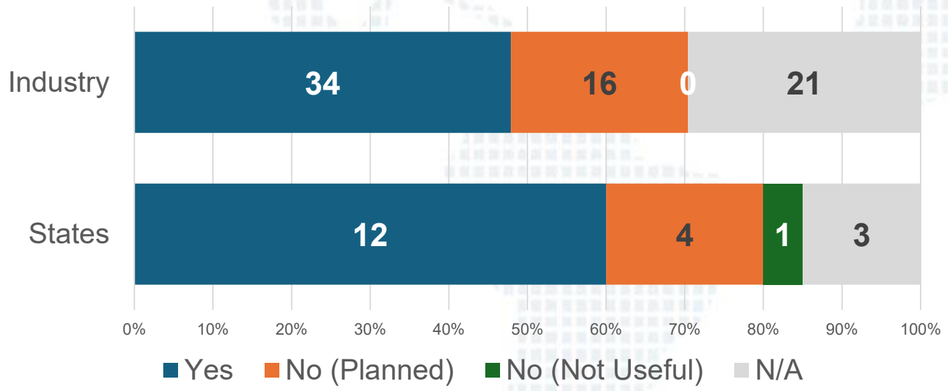
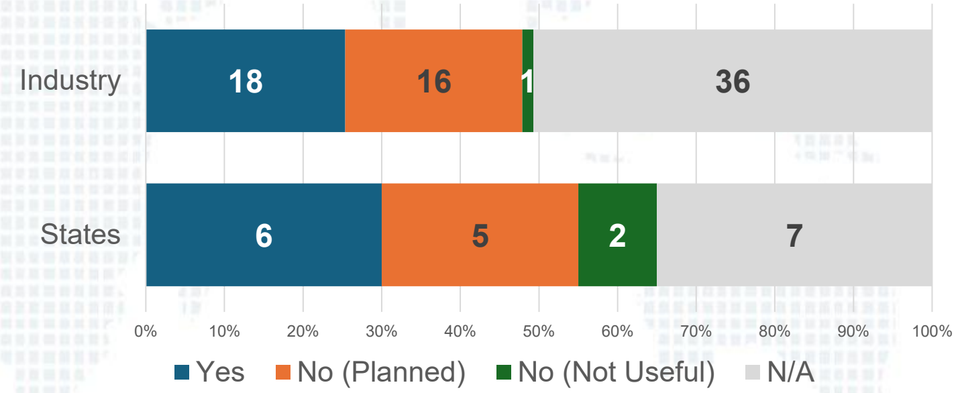
Surveillance SPIs (Section C)

- **Effective Implementation (Q11)** : Most States reported that EI SPIs are partially or fully implemented as part of SSP evaluation, while only a few have them under planning. Industry respondents also indicated moderate use, but many consider it not directly applicable within SMS contexts. EI measurement is more established at the State level than in industry sectors.
- **Runway Inspections (Q12)** : Both States and Industry respondents reported low levels of adoption for runway inspection SPIs. Only a small number indicated current or planned use, while a considerable share—especially among industry participants—responded that the indicator is not applicable.
- In addition to these two SPIs, respondents also reported establishing indicators such as SMS Oversight Activities, ICAO Corrective Action Plans (CAPs), Safety Concerns, and Regulatory Audit Findings.

Effective Implementation (EI)



Runway Inspections by finding category and inspection period



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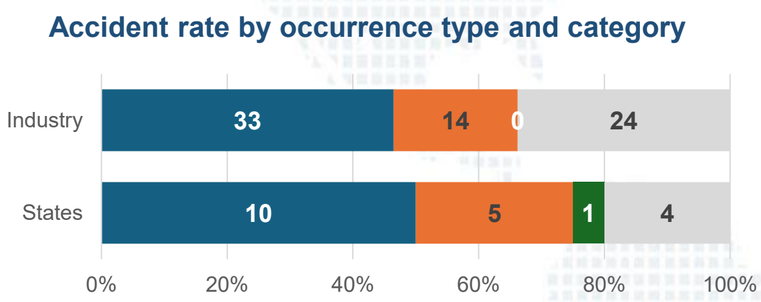
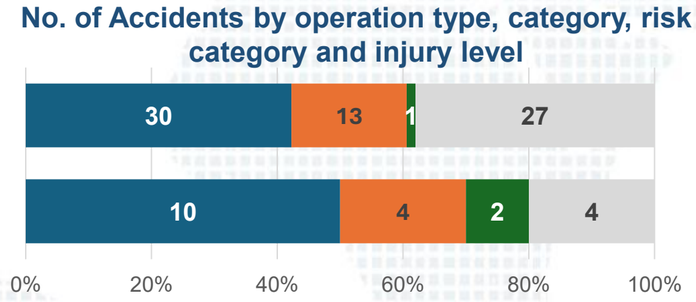
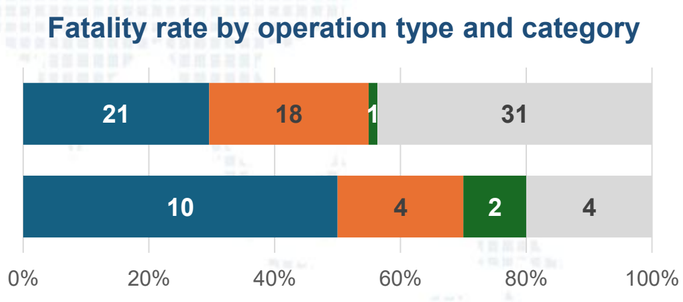
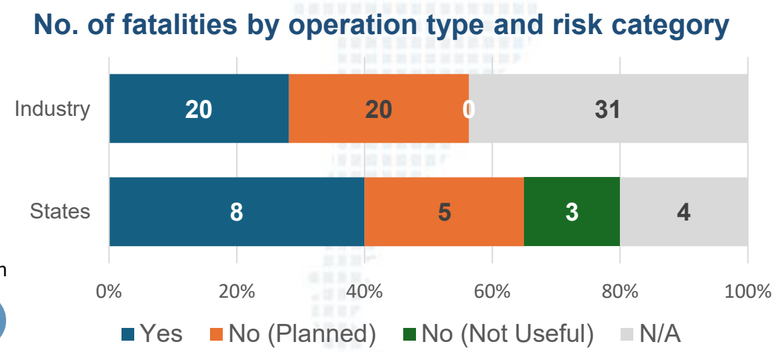
Occurrences SPIs (Section D)

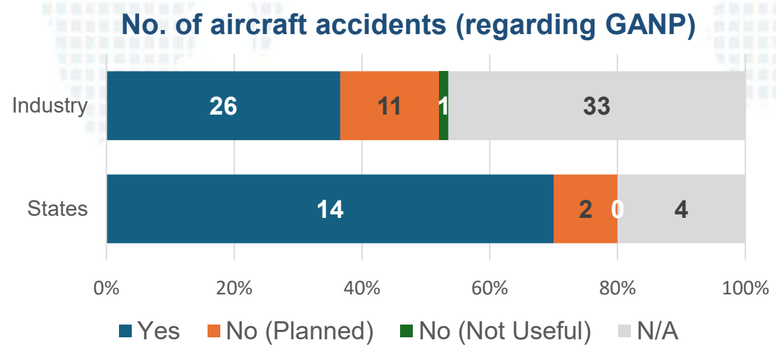
- **Accident Rate (Q14)** : Among States, about 75% reported that the accident rate SPI is established or planned for use. In the Industry sector, around 66% indicated that they are using or planning to use this indicator as part of safety performance monitoring. The accident rate remains the most widely applied SPI across both groups.
- **No. of Accidents (Q15)** : Approximately 70% of States and 60% of Industry respondents reported this SPI as used or planned.
- **Fatality Rate (Q16)** : 70% of States and about 55% of Industry respondents indicated use or planned use of the fatality rate SPI.
- **No. of fatalities (Q17)** : Around 65% of States reported using or planning to use this SPI. In contrast, 56% of Industry reported its use.
- **No. of aircraft accidents (Q18)** : Approximately 80% of States indicated this SPI is established or planned, compared to about 52% of Industry respondents.











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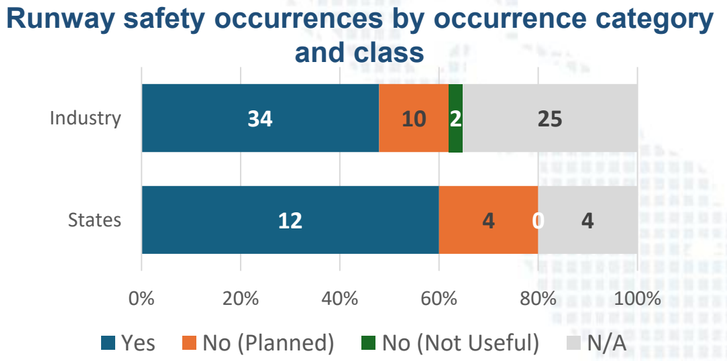
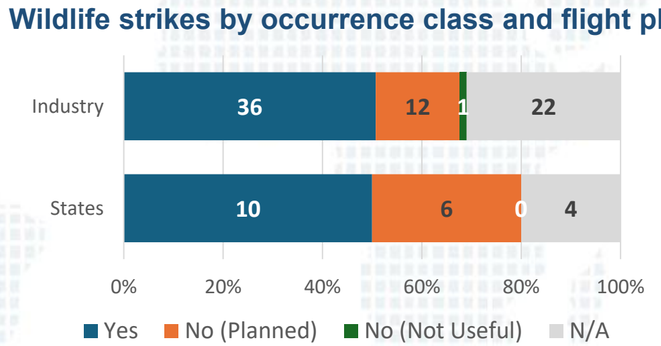
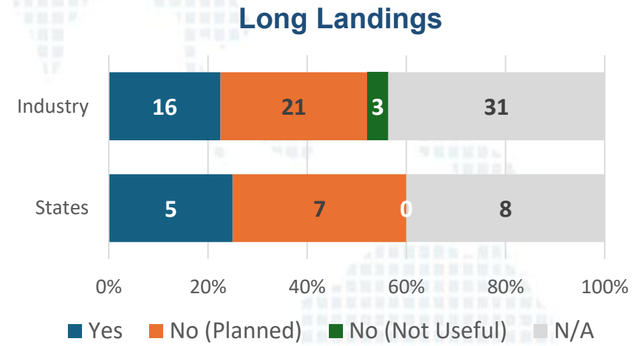
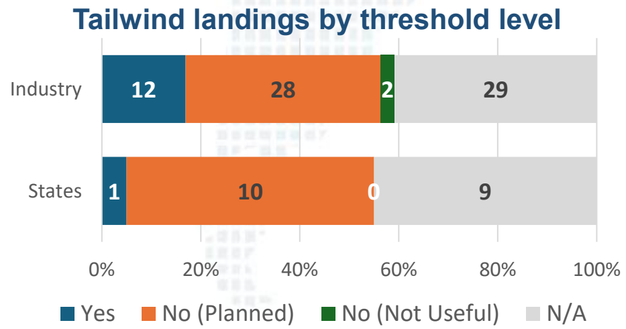
Runway Safety SPIs (Section E)

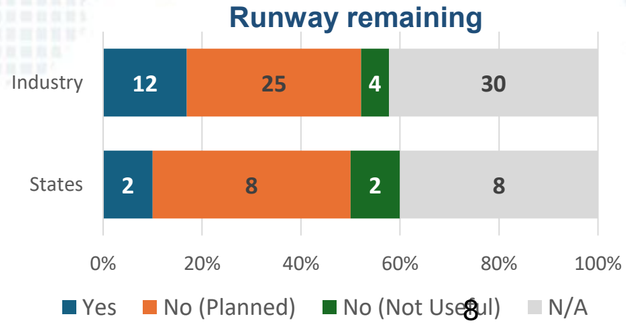
- **Runway safety occurrences (Q20)** : Among States, 80% reported that runway safety occurrences SPIs are in use or planned, indicating strong integration into SSP frameworks. Within industry, 62% reported current or planned use, showing a moderate level of adoption. Overall, States demonstrate more consistent implementation compared with industry.
- **Wildlife strikes (Q21)** : About 80% of States indicated current or planned use of wildlife strike SPIs, reflecting regulatory attention to aerodrome safety. 67.6% of industry respondents reported use or plans to adopt this indicator. Both groups show relatively high awareness of wildlife strike monitoring.
- **Long landings (Q22)** : Among States, 60% reported this SPI as used or planned, 52% of Industry indicated use or plans to implement.
- **Tailwind landings (Q23)** : For States, 55% reported this indicator as in use or planned, while 56% of industry respondents indicated similar adoption. Usage is mostly planned rather than fully implemented, suggesting early integration stages in both groups.
- **Runway remaining (Q24)** : Approximately 50% of States and 52% of industry respondents reported current or planned use of this indicator. While roughly half of respondents across both groups are considering or using this SPI, most responses fall in the “planned” category rather than “in use.”











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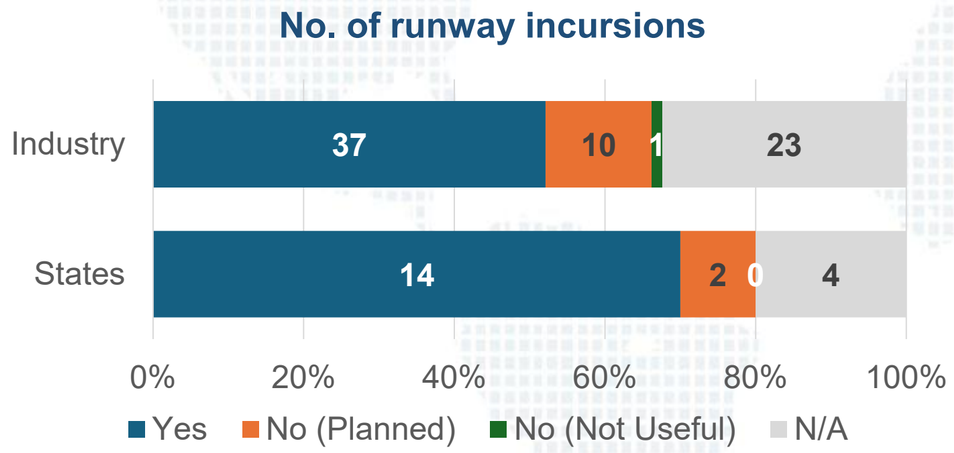
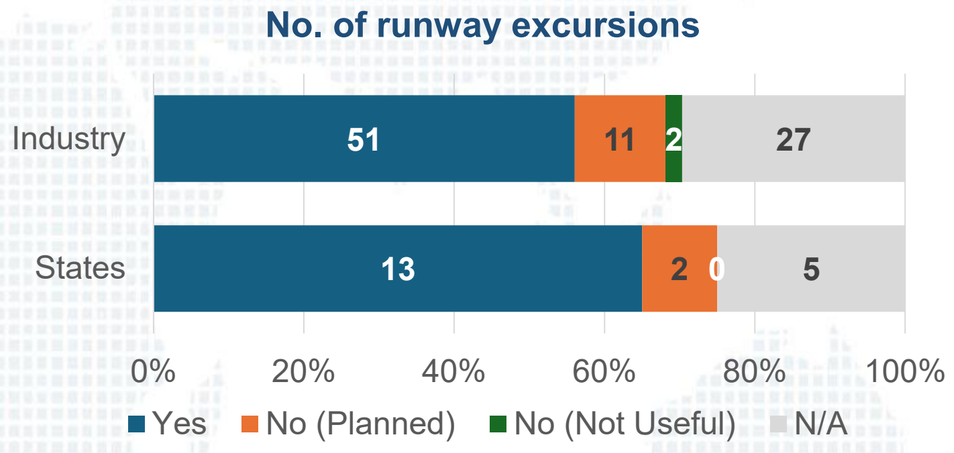
Runway Safety SPIs (Section E)

- **No. of Runway incursions (Q25)** : Among States, 80% reported runway incursion SPIs as used or planned, confirming strong alignment with ICAO safety priorities. Within industry, 66% indicated adoption or plans to adopt. This indicator is one of the most established runway safety metrics across the region.
- **No. of Runway excursions (Q26)** : 75% of States and 87% of industry respondents reported that runway excursion SPIs are in use or planned. This indicator has the highest industry-level adoption rate among runway safety SPIs, reflecting its importance in regional safety management.





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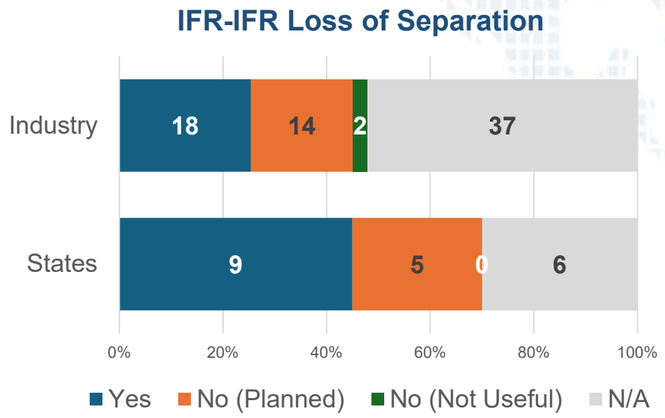
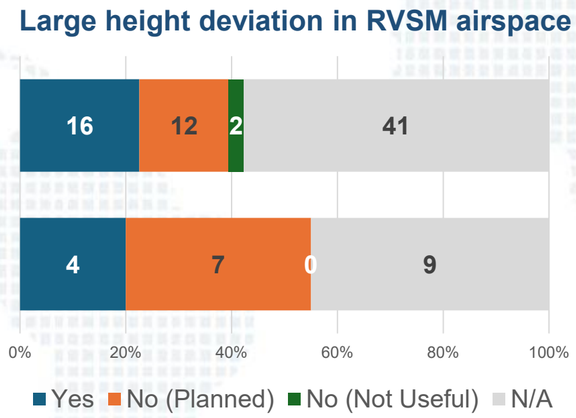
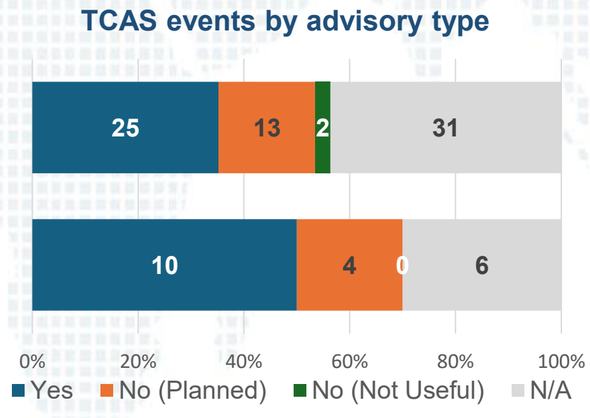
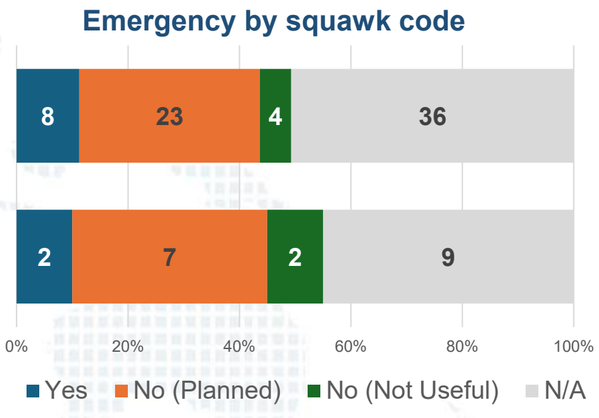
Airspace SPIs (Section F)

- **IFR-IFR Loss of Separation (Q28)** : Among States, 70% reported that the SPI is in use or planned, while only 45% of Industry reported that the SPI is in use or planned.
- **Large height deviation in RVSM airspace (Q29)** : Among States, 55% reported that the SPI is in use or planned to use, while 40% of Industry respondents reported same.
- **TCAS events by advisory type (Q30)** : 70% of States reported that the SPI is in use or planned, 53% of Industry reported in use or planned. This SPI is widely adopted Airspace SPI across both groups.
- **Emergency by squawk code (Q31)** : Only 10% of States and 11% of Industry reported that the SPI is in use, however both groups indicate an intention to adopt.









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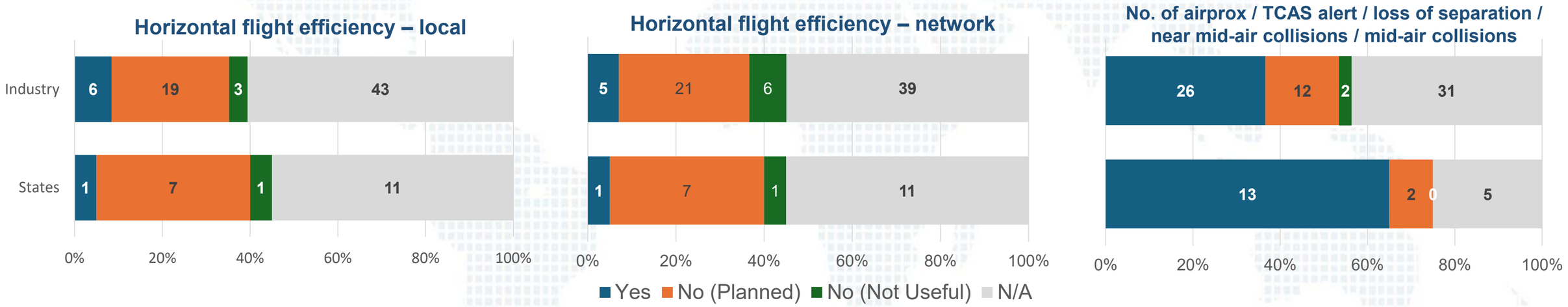
Airspace SPIs (Section F)

- **Horizontal flight efficiency – local (Q32)** : Only 5% of States and 8% of Industry reported that the SPI is in use, however both groups indicate an intention to adopt.
- **Horizontal flight efficiency - network (Q33)** : Only 5% of States and 7% of Industry reported that the SPI is in use, however both groups indicate an intention to adopt.
- **No. of airprox / TCAS alert / loss of separation / near mid-air collisions / mid-air collisions (Q34)** : 75% of States reported that the SPI is in use or planned, also 54% of Industry reported same. This SPI was most widely adopted Airspace SPI across both groups.



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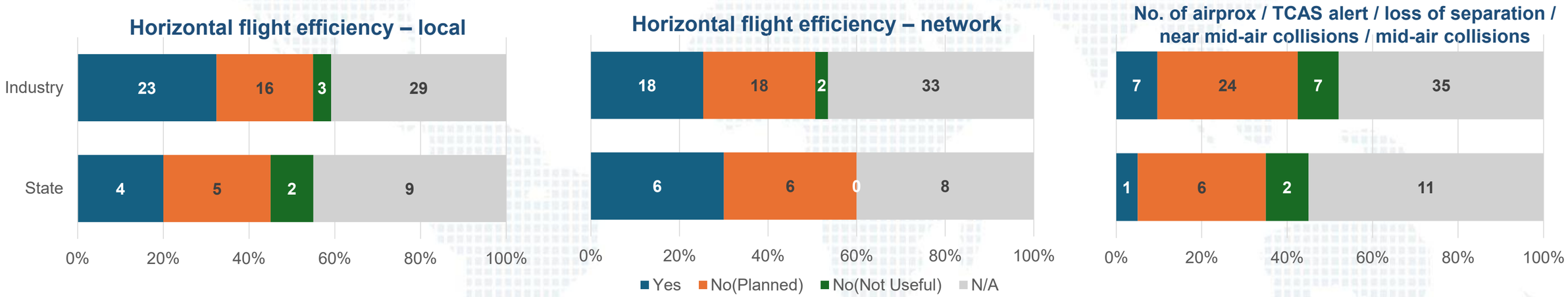
Approach SPIs (Section G)

- **Missed approaches (Q36)** : Around 45% of States reported using or planning to use this SPI. In contrast, 55% of Industry respondents reported its use.
- **EGPWS alert events (Q37)** : Approximately 60% of States and 51% of Industry respondents reported this SPI as used or planned.
- **Continuous descent operations (Q38)** : 35% of States and about 44% of Industry respondents indicated use or planned use of the Continuous Descent Operations SPI.



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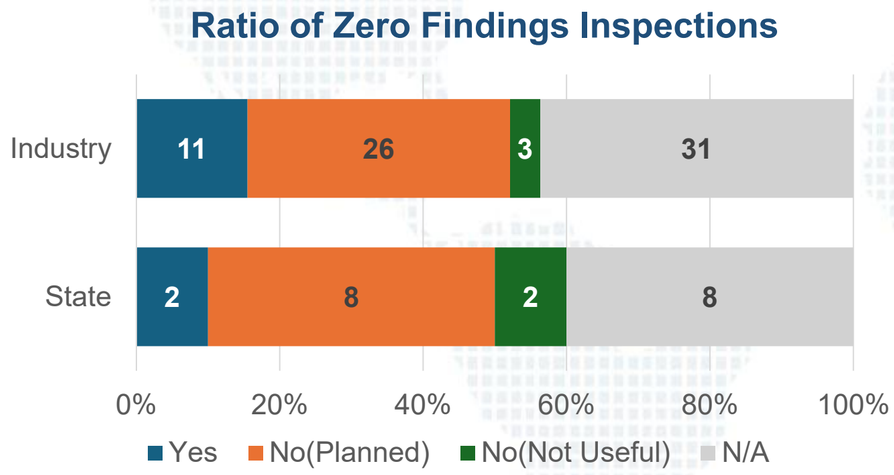
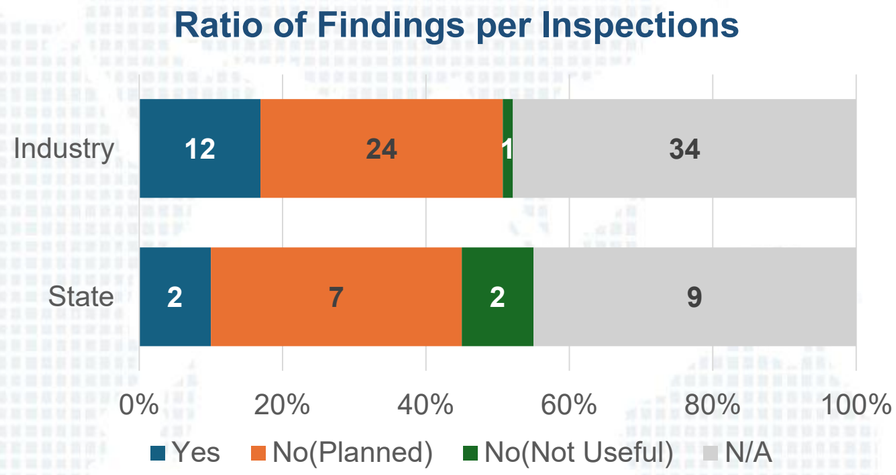
Ramp Inspection SPIs (Section H)

- **Ratio of zero findings inspections (Q40)** : Among States, about 50% reported that the Ratio of zero findings SPI is established or planned for use. In the Industry sector, around 52% indicated that they are using or planning to use this indicator.
- **Ratio of findings per inspection (Q41)** : Around 45% of States reported using or planning to use this SPI. In contrast, 51% of Industry respondents reported its use.





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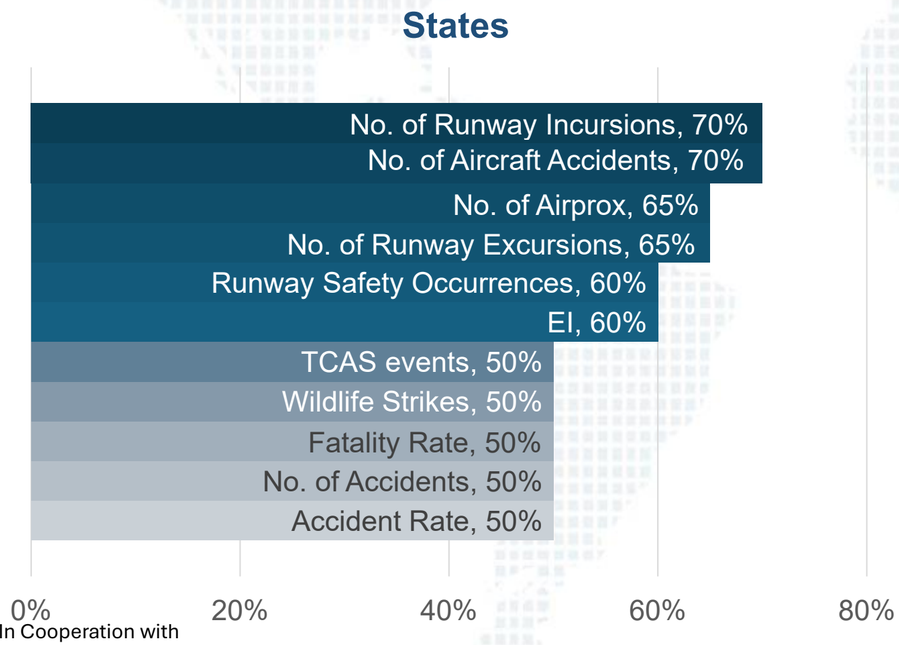
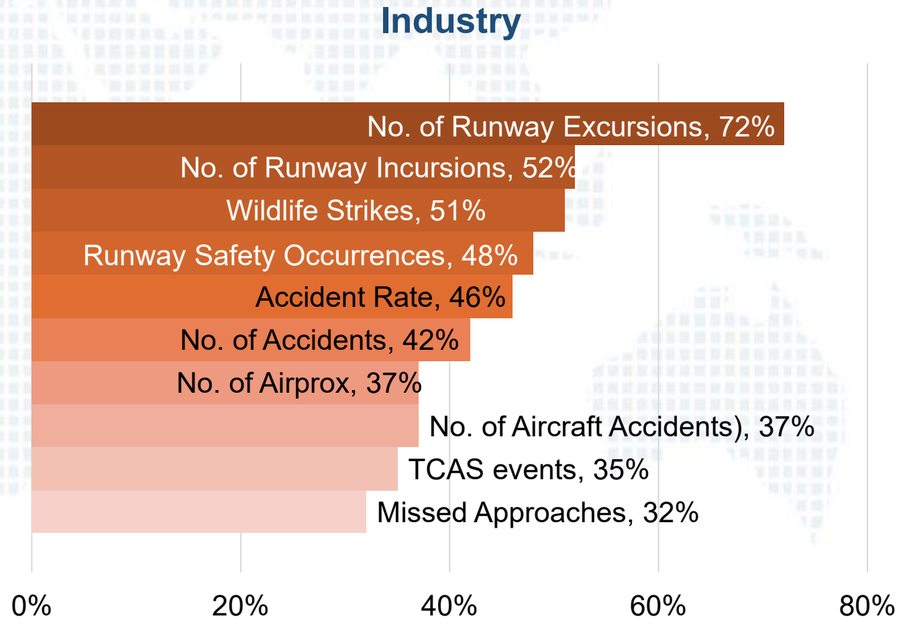
Key Takeaways : Top SPIs by States and Industry

- Both States and industry showed high levels of implementation in items related to Runway Safety, occurrence-based SPIs and Airprox/TCAS events, reflecting ICAO's emphasis on preventing RE, RI and MAC.
- Despite ICAO's Global High-Risk Categories (G-HRC), SPIs associated with Runway Excursion (RE), Runway Incursion (RI), and Mid-air Collision (MAC) are widely implemented, whereas those linked to CFIT and LOC-I remain limited, indicating the need for greater focus and further development in these areas.
- States consistently show slightly higher implementation across most indicators, suggesting more structured regulatory integration.
- States also tend to adopt oversight-oriented SPIs such as EI, reflecting their regulatory monitoring responsibilities under SSP frameworks.
- The industry is showing strong engagement in operational SPIs such as Runway Excursions, Incursions and Wildlife Strikes.





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Key Takeaways : Top SPIs by Industry Group

- Each industry group tends to select SPIs closely aligned with its operational domain.
  - Certain AMOs selected Runway Incursion as an SPI, which is not directly relevant to their operational scope. This indicates potential misunderstanding of SPI definitions.

	Aerodrome Operator	ANSP	AMO	ATO	Commercial Air Operator	IGA Operator
1	Runway safety occurrences	IFR-IFR Loss of Separation	Effective Implementation	No. of aircraft accidents	Runway excursions	Ratio of findings per inspection
2	Wildlife strikes	TCAS events by advisory type	Runway excursions	Fatality rate by operation type and occurrence category	Runway incursions	Ratio of zero findings inspections
3	Runway incursions	No. of airprox / TCAS alert / loss of separation / near mid-air collisions / mid-air collisions	Runway incursions	No. of accidents by operation type, category, risk category and injury level	No. of airprox / TCAS alert / loss of separation / near mid-air collisions / mid-air collisions	
4	Runway excursions	Missed approaches	Wildlife strikes	Accident rate by occurrence type and occurrence category	TCAS events by advisory type	
5	Accident rate by occurrence type and occurrence category	Effective Implementation	No. of aircraft accidents	Wildlife strikes	Wildlife strikes	

Challenges

- Some responses may lack accuracy — for example, certain AMOs selected Runway Incursion as an SPI, which is not directly relevant to their operational scope. This indicates potential misunderstanding of SPI definitions.
- In total, 169 responses were received; however, despite requesting one consolidated response per organization, multiple submissions were received from some entities. The data were therefore refined and consolidated into 91 representative responses, which may have affected the overall accuracy of the analysis.
- While this survey focused on identifying the current state of SPI implementation, further discussion and planning will be needed to establish a regular and sustainable mechanism for the collection and sharing of SPIs across States and industry in the APAC region.