EASA
European Union Aviation Safety Agency

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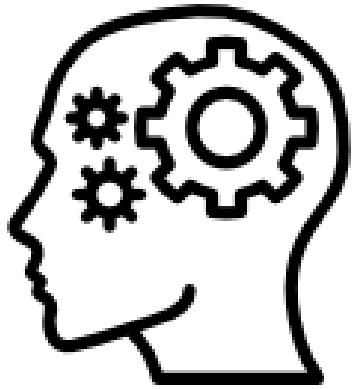
EU-Africa Safety in Aviation (EU-ASA) project
Supporting SSP implementation

Remote Workshop 16th to 20th December 2024
Day 3

Your safety is our mission.

An Agency of the European Union

The role of safety data and safety information



Safety data

Source: ICAO Annex 19 second edition

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

Note.— Such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

(a) accident or incident investigations;

(b) safety reporting (mandatory/voluntary);

(c) continuing airworthiness reporting;

(d) operational performance monitoring;

(e) inspections, audits, surveys; or

(f) safety studies and reviews.

Safety Information

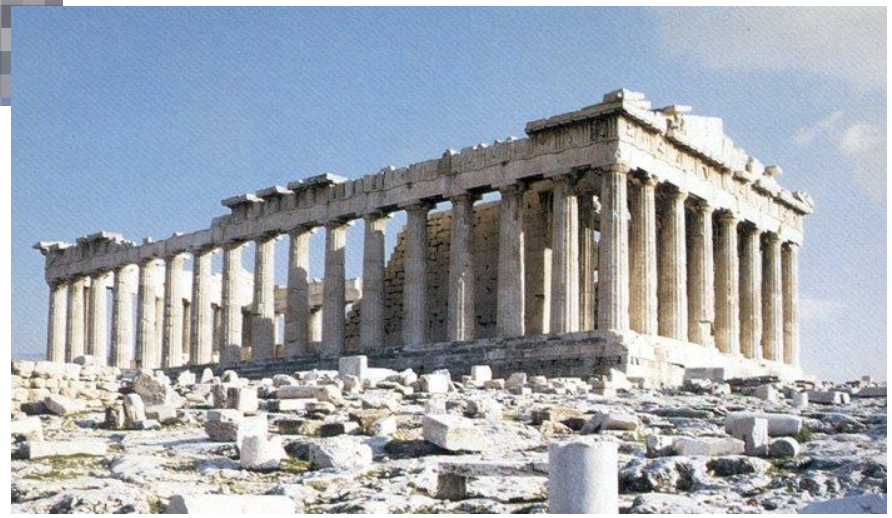
Source: ICAO Annex 19 second edition

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

Safety data & information……

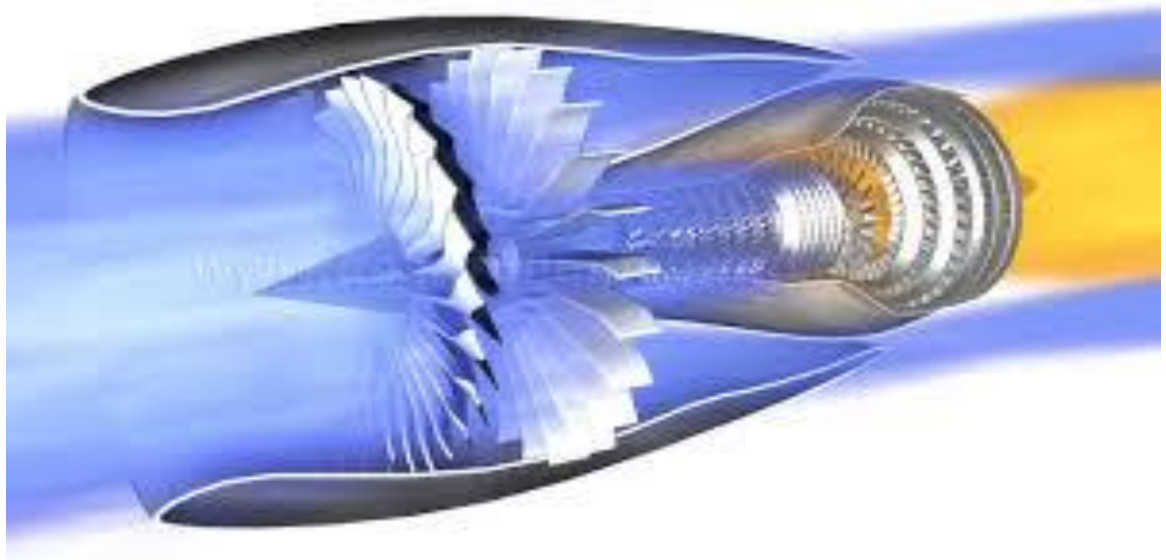
Safety data

Safety information



Safety Risk Management ‘engine’

Fuel:
data and information on hazards and risk



Thrust:
risk based decision making to improve the safety level and overall efficiency

Oil (catalyst):
Positive safety culture for risk awareness, risk based decision making and for ensuring continued availability of safety data and information.

Annex 19 Chapter 5 - Contents

5.1. Safety Data Collection and Processing Systems (SDCPS)

- STD: 5.1.1, 5.1.2, 5.1.3 REC: 5.1.4 and 5.1.5

5.2. Safety Data and Safety Information Analysis

- STD: 5.2.1

5.3. Safety Data and Safety Information Protection

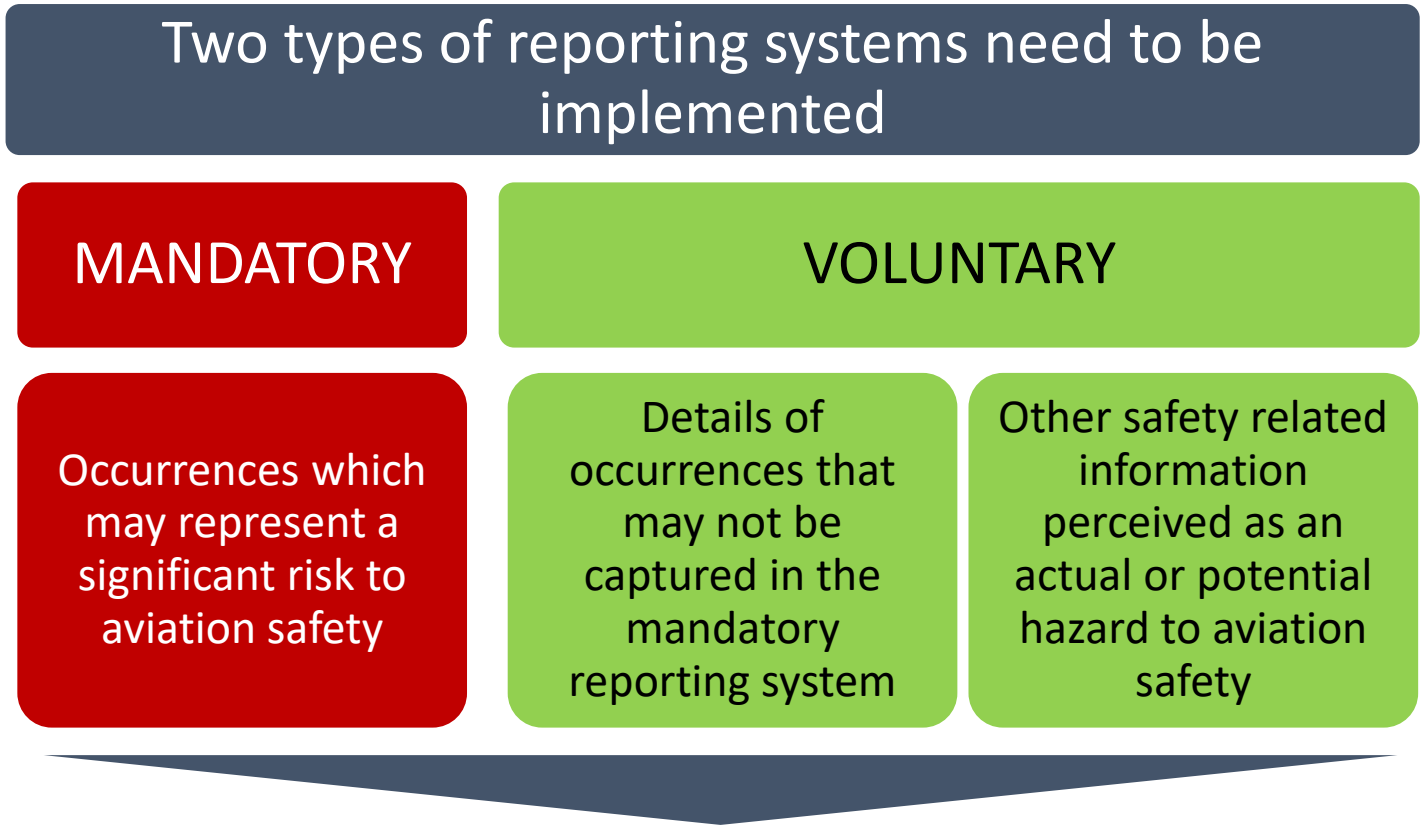
- STD: 5.3.1, 5.3.3, 5.3.4, 5.3.5 REC: 5.3.2, 5.3.6, 5.3.7

5.4. Safety Information Sharing and Exchange

- STD: 5.4.1, 5.4.2

We will review the most critical ones.

Annex 19 Standards 5.1.2 & 5.1.3



Information received from voluntary and mandatory reporting may be integrated into a single system (database).

Annex 19 Standards 5.3.1 & 5.3.2

Minor changes proposed with SL 23/18
5.3 now as 5.4

~~5.3~~ 5.4 Safety Data and Safety Information Protection

~~5.3.1~~ **5.4.1** States shall accord protection to safety data captured by, and safety information derived from, **voluntary safety reporting systems** and related sources in accordance with Appendix 3.
*Note.— **For the purposes of 5.4 and Appendix 3,** sources include individuals and organizations.*

~~5.3.2~~ **5.4.2 Recommendation**.— *States should extend the protection referred to in 5.3.1 to safety data captured by, and safety information derived from, **mandatory safety reporting system** and related sources.*

Note 1.— A reporting environment where employees and operational personnel may trust that their actions or omissions that are commensurate with their training and experience will not be punished is fundamental to safety reporting.

Annex 19 Standards 5.3.1 & 5.3.2

Safety Data and Safety Information Protection

SL 23/18: The recommendation to extend the protections to mandatory safety reporting systems has been proposed to ICAO. In recognition of existing laws that prevent this for some States there is no intention to elevate 5.3.2 to a standard.

ANC review: The elevation of this Recommended Practice to a Standard requires further discussion by the relevant expert groups and proper coordination with ICAO Member States. The Secretariat proposes that the comment be forwarded to the relevant expert groups for their consideration.

What do we mean by protection ?

Safety data and safety information protection

Meaning of protection	Taking the necessary measures to ensure the appropriate confidentiality of the details of occurrences reported to the State or stored in the national database.
	Personal details (names and address of natural persons) are made available to persons other than those designated to independently assess the original occurrence reports **only where absolutely necessary in order to investigate occurrences with a view to enhancing aviation safety.**
	Processing personal data only to the extent necessary for the purposes of maintaining or improving aviation safety.
	It is not required to fully anonymise reports collected but measures must be taken to ensure the appropriate confidentiality of the details of occurrences contained in the database.

Safety data and safety information protection

Appropriate use of the information derived from occurrence reports	**Information derived from occurrence reports shall be used only for the purpose for which it has been collected.**
	Refrain from instituting proceedings in respect of unpremeditated or inadvertent infringements of the law which come to your attention only because they have been reported (mandatory or voluntary reports), UNLESS AN EXCEPTION APPLIES.
	Do not make available or use the information on occurrences in order to attribute blame or liability, UNLESS AN EXCEPTION APPLIES.
	Do not make available or use the information on occurrences **for any purpose other than the maintenance or improvement of aviation safety**.

Exceptions to the principle of protection
ICAO Annex 19 Appendix 3 Standard 3

- Exceptions to the protection of safety data, safety information and related sources shall only be granted when the competent authority:
  - a) determines that there are facts and circumstances reasonably indicating that the occurrence may have been caused by an act or omission considered, ……. **gross negligence, wilful misconduct or criminal activity**;
  - b) after reviewing the safety data or safety information, determines that its **release is necessary for the proper administration of justice**; or
  - c) after reviewing the safety data or safety information, determines that its **release is necessary for maintaining or improving safety.**

- In the case of (b) and (c) the State must determine that the benefits of release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety information.

Two important recommendations

~~5.3~~ 5.4 Safety Data and Safety Information Protection

~~5.3.6~~ **5.4.6 Recommendation.** — *States should facilitate and promote safety reporting by adjusting their applicable laws, regulations and policies, as necessary.*

~~5.3.7~~ **5.4.7 Recommendation**.— *In support of the determination referred to in 5.4.3 (States should not make available…… unless…), States should institute and make use of appropriate advance arrangements between their authorities and State bodies entrusted with aviation safety and those entrusted with the administration of justice. Such arrangements should take into account the principles specified in Appendix 3.*

***Note* —** *These arrangements may be formalized through legislation, protocols, agreements or memoranda of understanding..*

How is safety data and safety information protection regulated in your State?

→ MOR/VOR, advance administrative arrangements, facilitating data exchange etc.

How safety data protection is regulated in Europe (1/2)

- In Europe, Regulation (EU) No 376/2014 'Occurrence Reporting Regulation' requires the same level of protection for mandatory and voluntary reports.

- Regulation (EU) No 376/2014 also requires the following:
  - Each Member State to designate an independent body responsible for the implementation of the just culture principles. Aviation personnel may report to that body any alleged infringements of the rules.

  - Each reporting organisation must adopt rules describing how 'just culture' principles are guaranteed and implemented within the organisation, after consulting staff representatives.

Reg. (EU) 376/2014

Exceeds SARPS in A19

How safety data protection is regulated in Europe (2/2):

→ Regulation (EU) No 376/2014 ‘Occurrence Reporting Regulation’ requires advance administrative arrangements:

Article 15 point 4:

→ Member States shall ensure that their competent authorities referred to in Article 6(3) and their competent authorities for the administration of justice cooperate with each other through advance administrative arrangements.

→ These advance administrative arrangements shall seek to ensure the correct balance between the need for proper administration of justice, on the one hand, and the necessary continued availability of safety information, on the other.

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Title

SAFETY DATA AND SAFETY INFORMATION COLLECTION, ANALYSIS, PROTECTION, SHARING AND EXCHANGE

New Title

DEVELOPMENT OF SAFETY INTELLIGENCE

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Note

The objective of this chapter is to ensure the continued availability of safety data and safety information to support safety management activities.

New text

The objective of this chapter is to support States in the development of safety intelligence to maintain or continually improve the effectiveness of their State Safety Programme (SSP).

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

New 5.1.1 Recommendation: States should establish a strategy for the development of **safety intelligence** that supports the management of safety and decision-making.

New Guidance related to the strategy for developing safety intelligence is contained in the Safety Intelligence Manual (Doc 10159).

Rationale: Highlight the importance of developing safety intelligence as a business capability and the need for organizational commitment to make progress in this area. The term strategy is used to convey the importance of organizational leadership in the setting of goals, defining actions and ensuring appropriate resources are available to implement them.

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Amended 5.1.1, now 5.2.1: States shall establish **a** safety data collection and processing ~~systems~~ **system (**SDCPS) **consisting of a series of integrated processes and schemes** to capture, store, aggregate, **process** and enable the analysis of safety data and safety information.

Deleted Note 1 - SDCPS refers to processing and reporting systems, safety databases, schemes for exchange of information and recorded information including but not limited to: …

Rationale: *An SDCPS is developed through a series of integrated processes which is defined as a series of activities to achieve a specific goal, and schemes for the exchange of safety data and safety information. An SDCPS provides the foundation for safety analysis which is a key enabler in supporting the development and ongoing maturity of an organization's safety intelligence capability.*

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Deleted 5.1.2: ~~States shall establish a mandatory safety reporting system that includes the reporting of incidents.~~

Rationale: *States do not need to establish a new mandatory reporting system, but rather link the sector-specific reporting provisions contained in other Annexes, PANS and guidance materials to the SDCPS that they may be using to support safety management activities.*

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

New 5.2.2 - States shall ensure that the SDCPS is based on **proactive** as well as **reactive** methods of safety data and safety information collection.

New Note - An SDCPS may include inputs from State, industry and public sources.

Rationale: *The reactive approach is the most commonly used method for data collection in today's aviation system. It is considered that proactive methods for data collection must be used to establish and improve the effectiveness of an SDCPS. The supporting note is intended to maintain the notion of the sources of inputs.*

ANC Review of 5.2.2 - States shall ensure that the SDCPS is based on both proactive and reactive methods of safety data and safety information collection.

ANC Review of New Note - An SDCPS may include inputs from State, industry and public sources. Additional guidance on methods of safety data and safety information collection are contained in the Safety Intelligence Manual (Doc 10159).

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

New 5.2.3 - States shall ensure that the safety data and safety information collected through mandatory safety reporting systems are incorporated into the SDCPS.

New Note 1 - Mandatory safety reporting systems include the reporting of hazards and safety deficiencies.

New Note 2 - The SDCPS includes mandatory safety reporting systems established by the State in accordance with sector-specific provisions contained in other Annexes, Procedures for Air Navigation Services (PANS) and supporting guidance material. In addition, Annex 13 contains information on accident/incident data reporting (ADREP). Examples of mandatory safety reporting systems are contained in the Safety Intelligence Manual (Doc 10159).

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Rationale (new Note 1): The supporting Note 1 is intended to highlight the importance of reporting hazards, such as **fatigue reporting** as required in Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, **inflight incapacitation** reporting as required in Annex 1 — Personnel Licensing as well as safety deficiencies as noted in the GASP (Doc 10004) and the Global Aviation Safety Roadmap (Doc 10161), as part of mandatory safety reporting in addition to accidents and safety events.

Chapter 5 – Main changes following ANC review

A19 amdt. 2

Delete the new Note 1 - Mandatory safety reporting systems include the reporting of hazards and safety deficiencies. **Renumber Note 2 to become Note 1.**

Rationale (State comment): We acknowledge that Safety Intelligence Manual is being reviewed and may contain this clarification, but **our understanding is that reporting of hazards to the State is not usually part of Mandatory reporting, but rather part of voluntary reporting.**

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Deleted Recommendation 5.1.4 - ~~*State authorities responsible for the implementation of the SSP should have access to the SDCPS as referenced in 5.1.1 to support their safety responsibilities, in accordance with the principles in Appendix 3.*~~

New 5.2.5 - State authorities responsible for the implementation of the SSP **shall contribute and** have access to safety data and safety information in the SDCPS to support their safety responsibilities.

Rationale: *This recommended practice is proposed to be upgraded to a standard to reflect that contributing and access to safety data and safety information is considered essential in the establishment of an SDCPS. This proposed upgrade also highlights the importance of collaboration, coordination and communication between the State authorities responsible for the implementation of the SSP.*

Chapter 5 – Main changes proposed with SL 23/18)

A19 amdt. 2

Deleted Recommendation 5.1.5 - ~~*The safety database should use standardized taxonomy to facilitate safety information sharing and exchange.*~~

New 5.2.6 - States **shall** use a taxonomy for safety reporting that is aligned with standardized taxonomies and that facilitates the:

a) identification of hazards at the State's civil aviation system level as referenced in 3.3.4;

b) consistent comparison of safety data and safety information; and

c) sharing and exchange of safety information as referenced in 5.5.

Amended Note - ~~States are encouraged to use an ADREP compatible system. More information on ADREP can be found in Annex 13, Chapter 7.~~ Guidance related to standardized taxonomies including, but not limited to ADREP taxonomy, is contained in the Safety Intelligence Manual (Doc 10159).

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Rationale: *The recommendation is upgraded to a standard to reflect the importance of using standardized taxonomies for safety reporting within a State. The use of standardized taxonomies is important for consistent comparison of safety data and safety information, sharing and exchange of safety information, particularly across multiple languages and systems.*

It also ensures the consistency and quality of safety information to support the development of safety intelligence used for decision-making.

An additional benefit of standardized taxonomies is its ability to support the development, application and maintenance of advanced analysis methods and machine learning technologies.

Chapter 5 – Main changes following ANC review

A19 amdt. 2

New 5.2.6 - States shall use a taxonomy for safety reporting that is aligned with standardized taxonomies and that facilitates the:

a) identification of hazards at the State**’~~s civil aviation system~~** level as referenced in 3.3.4;

b) consistent comparison of safety data and safety information; and

c) sharing and exchange of safety information as referenced in 5.5.

Chapter 5 – Main changes proposed with SL 23/18)

A19 amdt. 2

New Recommendation 5.2.7 - States should establish a means for the governance of safety data and safety information.

New Note - Further guidance on safety data governance is contained in the Safety Intelligence Manual (Doc 10159).

Rationale **-** *Align with the new 5.2.1 and highlight the importance of safety data and safety information governance to support the development of safety intelligence by the States - data governance is the foundation for a safety data strategy. Safety data, in turn, is important for managing safety risks and needs to be governed properly to ensure consistency and analytical value. The governance of safety data and safety information is introduced as a recommended practice to ease any perceived burden on States. It is also noted that some States are yet to improve their understanding of data management, its needs and importance.*

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Safety data and safety information analysis

Amended 5.2.1, now 5.3.1 ~~States shall establish and maintain a process to analyse safety data and safety information from the SDCPS and associated safety databases.~~

States shall establish and maintain **processes** to analyse safety data and safety information from the SDCPS. The processes shall include a variety of analysis methods to support the identification of:

a) safety performance indicators, as referenced in 3.4.2.1;

b) State's civil aviation system level hazards, as referenced in 3.3.4, that might not otherwise be identified by the individual service providers; and

c) existing practices and operational strategies that resulted in positive safety outcomes.

Deleted Notes 1/2/3

New Note 1 - Data and information from non-safety sources (for example, weather, terrain or security) may be included in the processes to support a more integrated analysis at the State level.

New Note 2 - Guidance on different types of analyses that can be conducted and the competencies required to conduct such analyses are contained in the Safety Intelligence Manual (Doc 10159).

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Safety data and safety information analysis

Rationale: *The objective of safety analysis should aim to present the safety situation in ways that enable decision makers to make data-driven safety decisions. Safety data and safety information analysis can be conducted in many ways in order to provide a more accurate understanding of the overall situation and identify relationships, connections, patterns and trends. The scope of the existing standard and supporting notes suggested that the analysis process is limited to analysis of hazards which is too narrow in scope given the objective of subchapter 5.3.*

The proposed change of "process" to "processes" in renumbered 5.3.1 highlights that a single process is not sufficient to address the different methods States may use for analysis.

Chapter 5 – Main changes following ANC review

Safety data and safety information analysis

A19 amdt. 2

5.3.1 structured and edited to improve the readability in response to State comments.

Amended 5.2.1, now 5.3.1 States shall establish and maintain **processes** to analyse safety data and safety information from the SDCPS. The processes shall include a variety of analysis methods to support the ~~**identification of:**~~

a) **Development of** safety performance indicators, as referenced in 3.4.2.1;

b) **Identification of hazards at the State level** ~~**State's civil aviation system level hazards,**~~ as referenced in 3.3.4~~**, that might not otherwise be identified by the individual service providers**~~; and

c) **Identification of** existing practices and operational strategies that **result** ~~**resulted**~~ in positive safety outcomes, and

d) **Development of safety intelligence.**

NEW

Chapter 5 – Main changes proposed with SL 23/18

A19 amdt. 2

Safety information sharing and exchange

Amended 5.4.2, now 5.5.2 States shall ~~promote~~ **facilitate** the establishment of **means for timely** safety information sharing or exchange ~~networks among users of the aviation system~~ **to promote collaboration within the aviation community**, ~~and facilitate the sharing and exchange of safety information, unless national law provides otherwise~~ **provided that the proper measures are taken to ensure that safety information is only used for maintaining and improving safety.**

New Note - Means for timely safety information sharing or exchange may include agreements, partnerships, collaborative safety teams, forums and digital/physical platforms

Rationale: *Replacing "promote" with "facilitate" strengthens the responsibility of the State in creating an environment for the sharing and exchange of safety information. The term "networks" typically refers to limited platforms like forums and group meetings. To clarify on the scope of sharing and exchange, the term "network" is replaced with "means" and the new note is introduced.*

Chapter 5 – Main changes proposed with SL 23/18

A19
amdt. 2

Safety information sharing and exchange

New Recommendation 5.5.3 States should promote the sharing and exchange of relevant safety information and safety intelligence amongst service providers, provided that the proper measures are taken to ensure that safety information and safety intelligence are only used for maintaining and improving safety.

Rationale: *Recognizing that the sharing and exchange of relevant safety information and safety intelligence among service providers cannot be mandated, the promotion of these activities is introduced as a recommendation. A caveat on protection conditions is added to align with the provisions in 5.4.*

Most important changes proposed with SL 23/18

→ New Chapter Title "DEVELOPMENT OF SAFETY INTELLIGENCE"

→ New Recommendations

- → 5.1.1 establish a strategy for the development of safety intelligence that supports the management of safety and decision-making.
- → 5.2.7 establish a means for the governance of safety data and safety information.
- → 5.5.3 promote the sharing and exchange of relevant safety information and safety intelligence amongst service providers, provided that the proper measures are taken to ensure that safety information and safety intelligence are only used for maintaining and improving safety.

Most important changes proposed with SL 23/18

- New Standards:
  - 5.2.2 States shall ensure that the SDCPS is based on **proactive** as well as **reactive** methods of safety data and safety information collection.
  - 5.2.3 States shall ensure that the safety data and safety information collected through mandatory safety reporting systems are incorporated into the SDCPS.
- Recommendations upgraded to Standard level:
  - 5.2.5 State authorities responsible for the implementation of the SSP **shall contribute and** have access to safety data and safety information in the SDCPS to support their safety responsibilities.
  - 5.2.6 States shall use a taxonomy for safety reporting that is aligned with standardized taxonomies and that facilitates the
    (a) identification of hazards at the State's civil aviation system level as referenced in 3.3.4;
    (b) consistent comparison of safety data and safety information; and
    (c) sharing and exchange of safety information as referenced in 5.5.

Most important changes proposed with SL 23/18

→ Clarifications provided

- → SDCPS consists of a series of integrated processes and schemes
- → SDCPS based on **proactive** as well as **reactive** methods of safety data and safety information collection
- → Hazards and safety deficiencies also need to be reported (VOR)!

SDA Protocol Questions (SSPIA)

Themes for the SDA Protocol Questions

- → Safety Data Collection & Processing Systems (SDCPS)
- → Mandatory Reporting System (MOR)
- → Voluntary Reporting System (VOR)
- → Protection of safety data
- → Safety database (national database)
- → Ensuring State authorities' access to the data
- → Safety analysis capacity & competencies
- → Hazard identification and safety risk assessment
- → Taking action following risk assessment -> NASP
- → Just culture

Reg. (EU) 376/2014

goes further than Annex 19

Safety Data Collection and Processing Systems

SSP.SDA.01	Level 'Present' means that:
What safety data collection and processing systems (SDCPS) has the State established to support safety data analysis at State level?	• There is a mechanism in place to ensure the collection, processing and analysis of safety data at State level. • The sources for safety data and safety information include data and information derived from accident and incident investigations, mandatory occurrence reporting systems and other sources, including voluntary reporting • There is a mechanism in place at the State level to ensure the categorization of safety data and an agreed upon taxonomy at the State level, with supporting definitions.

→ Safety data is not limited to occurrence reports. According to Annex 19, "safety data" is a defined set of facts or set of safety values collected from various aviation-related sources, which is used to maintain or improve safety,

Voluntary Reporting

SSP.SDA.02	Level 'Present' means that:
How and to what extent has the State established and implemented a State-level voluntary reporting system to facilitate the collection of safety data and safety information that may not be captured by mandatory safety reporting systems?	• There is an established voluntary reporting system. • The voluntary reporting system is being used -> **ensure that a distinction can be made between mandatory and voluntary reports!** • The system is known to relevant State authorities and service providers' personnel, accessible, and easy to use. • The system enables the submission of voluntary reports by both individuals and organisations.

Protection of safety data

SSP.SDA.03	Level 'Present' means that:
To what extent do the State's legislation, policies, procedures and/or practices protect safety data captured by, and safety information derived from, mandatory and voluntary safety reporting systems and related sources?	• The State has legislative provisions to protect safety data, safety information and related sources. • The State has policies and procedures, including agreements between State authorities as applicable, to protect safety data, safety information and related sources. • The legislative provisions, policies and procedures contain exceptions for the protection of safety data, safety information and related sources.

Safety database or databases

SSP.SDA.04	Level 'Present' means that:
To what extent has the State established and maintained a safety database or databases to store and process relevant safety data, including data on hazards and safety risks?	• The State has established a safety database(s) to store and process relevant safety data, including data on hazards and safety risks, that is commensurate with the State's risk picture. • There is a mechanism in place to process the data collected and maintained on hazards and safety risks, including data that are collected, maintained and stored in different industry-level databases.

Hazard identification and risk management

SSP.SDA.05	Level 'Present' means that:
How are the data and information contained in the safety database(s) used as part of the hazard identification and risk management processes of the State?	• There is a mechanism in place to utilize the processed data and information, as part of the hazard identification and risk management, at the State level. • These data and information are used to define and prioritize mitigating actions to address safety risks at the State level. • There is a mechanism in place to ensure that the information serves as a basis for risk-based surveillance at the State level. • There is a mechanism in place to ensure that the information is reflected in the SSP related documentation. • There is a mechanism in place to ensure that the information is used to refine the State level SPIs.

Taking action

SSP.SDA.06	Level 'Present' means that:
How does the State act on identified safety risks and assess the effectiveness of safety mitigations?	• There is a mechanism in place, which defines when the State needs to take actions based on identified risks and the nature of these actions. • There is a mechanism in place to continuously assess the effectiveness of the State's safety mitigating actions. • There is a mechanism in place to evaluate the effectiveness of mitigating actions, including assurance that the mitigation actions do not result in creating greater risks or having a significant negative impact on safety. • There is a mechanism in place to identify and mitigate new risks that may be caused by mitigating actions.

→ Start with defining which group will discuss the identified hazards/safety issues.
→ Use a risk tolerability matrix.

Access to data and information

SSP.SDA.07	Level 'Present' means that:
To what extent do State authorities involved in the implementation and maintenance of the SSP have access to the data and information contained in the safety database(s) to support their functions and responsibilities?	• There is a mechanism in place to identify the access needs of the State authorities, which are involved in the implementation of the SSP, for the data and information contained in the database(s). • There is a mechanism in place to facilitate the access of the State authorities involved in implementation of the SSP to the data and information contained in the database(s).

→ Mechanism may be an IT tool with access policies

Safety analysis capacity & competencies

SSP.SDA.08	Level 'Present' means that:
To what extent has the State ensured the availability of the required resources and competencies to perform the safety data analysis function in support of State safety risk management and State safety assurance activities?	• There is mechanism in place to identify and define the required resources and competencies to perform the safety data analysis function in support of State safety risk management and State safety assurance activities. • There is a mechanism in place to ensure the personnel responsible for data collection, storage, processing and analysis, have adequate competencies (K/S/A) to perform their functions. • There is a mechanism in place to ensure the various resources (i.e. IT tools) are made available to the relevant personnel who are responsible for data collection, storage, processing and analysis of safety data.

→ Recommendation to include the staff involved in safety analysis in the overall training needs analysis for SSP/SMS

→ Which IT tools are envisaged to perform safety data analysis?

The role of Accident and Incident investigation

ICAO Annex 19 ‘Safety Management’ SARPs

- stress the importance of coordination and collaboration among relevant stakeholders
- promote an integrated approach to safety management
- promote the sharing of safety data and safety intelligence
- promote an informed and learning culture for aviation safety

How can AIG contribute to the success of the SSP ?

Expertise

- highly trained and experienced personnel with expertise in various aspects of aviation safety
- Investigation reports are a valuable source of safety intelligence & support safety issue assessment

Transparency

- With AIG being part of the SSP trust and confidence in the investigation process is fostered
- This promotes accountability within the aviation industry

Cooperation

- AIG cooperates with other state authorities responsible for safety management to address safety deficiencies,
- AIG facilitates the exchange of information, coordination of safety initiatives, and implementation of safety recommendations.

Advisory role

- AIG may provide expert guidance on safety-related matters
- AIG may contribute to the development of safety regulations and policies
- AIG may advocate for safety enhancements based on investigation findings

Should the AIB/SIA be part of the SSP coordination group?

- Refer to the ICAO SSPIA Protocol Question SSP.GEN.02

  'How does the State ensure that the relevant State authorities are involved in the implementation and maintenance of the SSP?'

- Markers for level 2 'Present'

1. There is an established SSP coordination group (or groups) at the State level, chaired by the designated authority in charge of coordinating the SSP implementation and maintenance.

Where more than one SSP coordination group is established the responsibilities, interfaces and reporting lines to the State authority in charge of coordinating the implementation and maintenance of the SSP are defined.

2. All relevant State authorities (including, but not limited to, Civil Aviation Authority, Accident Investigation Authority and Military Aviation Authority) are represented in the coordination group.

3. The coordination group (or groups) addresses both strategic and operational aspects.

4. The coordination group meetings have defined objectives and established meetings frequency.

AIB/SIA part of the SSP coordination group - Benefits

Enhanced Coordination	The SIA can provide valuable input and expertise to the coordination group regarding accident and incident investigation processes, methodologies, and findings -> ensures that investigation activities are aligned with broader safety management objectives and strategies.
Integrated Approach to Safety Management	Collaboration between the SIA and other stakeholders allows for the sharing of information, identification of common safety issues, and development of coordinated safety initiatives.
Timely Exchange of Information	SIA will receive timely information about safety-related initiatives, concerns, and priorities from other stakeholders -> facilitates proactive engagement in safety management activities and ensures that investigation findings are considered in decision-making processes.
Facilitation of Safety Improvement	Coordination group serves as a forum for discussing safety trends, emerging risks, and lessons learned from investigations -> by actively participating in these discussions, the SIA can contribute insights that inform the development of safety improvement strategies and the prioritisation of corrective actions.
Stakeholder Engagement	Promotes a shared understanding of safety priorities and objectives. This collaborative approach encourages buy-in from all stakeholders and strengthens the overall effectiveness of the SSP.

Should the AIB/SIA approve the SSP document ?

- ICAO does not address the need to formally approve the SSP document.
- ***SSP.GEN.03*** *'What documentation has the State established for SSP implementation, including top-level documentation that describes the specific activities and responsibilities related to the management of safety that each State authority under the SSP is in charge of?'*
  - None of the maturity markers addresses approval of the SSP documents.
- Marker 4 in level 3 'Present and effective':

  All SSP-related documents (as applicable) are reviewed regularly by all relevant State authorities and fully updated so as to support the modifications of the methodology, processes and activities for further maturation of the SSP, as applicable'

The SSP document does not provide details on how investigations should be performed, but should explain how the results of those are used for State Safety Management.

Should investigators be included in the SSP competency framework ? (1/2)

→ Refer to the ICAO SSPIA Protocol Question SSP.GEN.06:

'How does the State determine the SSP-related training needs at all levels of the organization to ensure that personnel of the State authorities involved in SSP implementation are qualified and competent to perform their functions and responsibilities?'

→ Markers for level 2 'Present'

1. SSP-related training programme has been developed, including a training needs analysis (TNA) to determine the relevant training needs of each pertinent State authority.

2. Where appropriate, a competency-based approach is applied to address K/S/A (knowledge/skills/attitude) requirements.

3. The SSP-related training programme caters to the different safety management training needs of different personnel, based on their duties and responsibilities*.

4. There is an SSP training plan in place, which considers both initial and recurrent training requirements.

* i.e. inspectorate, data analysts, top management, mid-level management, , legal department, AIA, Military, etc.).

Should investigators be included in the SSP competency framework ? (2/2)

→ Refer to the ICAO SSPIA Protocol Question SSP.AIG.01:

'How does the investigation authority ensure that the personnel responsible for addressing safety management-related aspects in aircraft accident and serious incident investigations develop the required competencies?'

→ Markers for level 2 'Present'

1. The competencies required for addressing safety management-related aspects in aircraft accident and serious incident investigations are identified and documented.

2. A training plan that addresses K/S/A concepts, recurrent training and OJT for the personnel responsible for addressing safety management-related aspects in aircraft accident and serious incident investigations is in place.

3. The training plan addresses safety management-related aspects.

4. There is a mechanism in place to ensure the competency of the relevant personnel.

SSPIA – AIG Protocol Questions

→ ***SSP.AIG.01***

'How does the investigation authority ensure that the personnel responsible for addressing safety management-related aspects in aircraft accident and serious incident investigations develop the required competencies?'

Present	Present and effective
1. The competencies required for addressing safety management-related aspects in aircraft accident and serious incident investigations are identified and documented. 2. A training plan that addresses K/S/A concepts, recurrent training and OJT for the personnel responsible for addressing safety management-related aspects in aircraft accident and serious incident investigations is in place. 3. The training plan addresses safety management-related aspects. 4. There is a mechanism in place to ensure the competency of the relevant personnel.	1. The investigation authority periodically reviews the competencies required of their personnel responsible for addressing safety management-related aspects in aircraft accident and serious incident investigations. 2. The training plan is reviewed periodically to identify new training needs, in order to acquire the competencies required for addressing safety management-related aspects in aircraft accident and serious incident investigations. 3. Challenges in investigators' capabilities to address safety management-related aspects in aircraft accidents and serious incident investigations are recognized and addressed (when applicable). 4. The mechanism to ensure the competency of personnel is applied consistently.

SSPIA – AIG Protocol Questions

→ ***SSP.AIG.02***

'What guidance material has been established for use by the personnel of the State's accident investigation authority to help ensure that safety management related aspects are appropriately addressed in investigations when relevant?'

Present	Present and effective
1. Guidance material for the personnel of the State's investigation authority has been established to ensure that safety management related aspects are appropriately addressed in investigations (when relevant).	1. Guidance material is used by the personnel responsible for addressing safety management-related aspects in investigations. 2. Guidance material is regularly reviewed and amended (if needed).

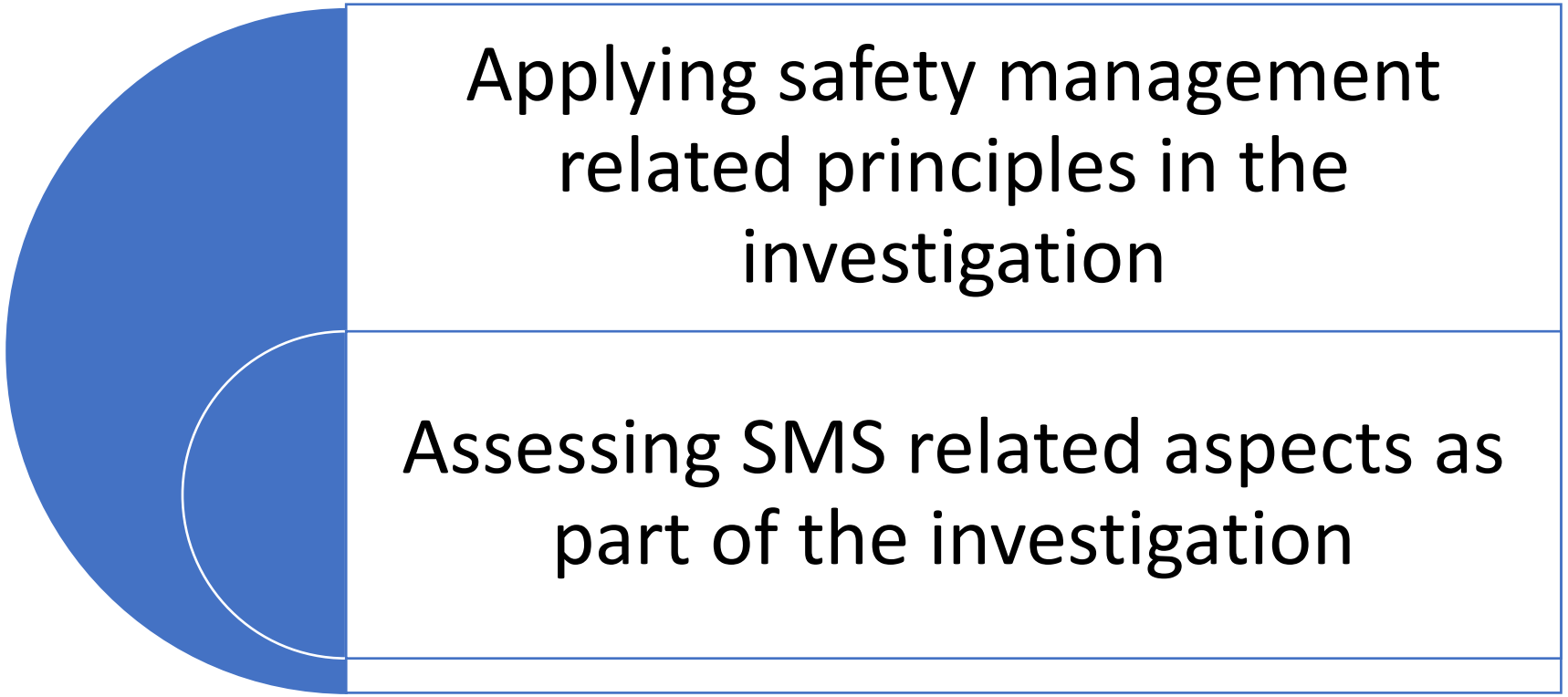
SSPIA – AIG Protocol Questions

→ ***SSP.AIG.03***

'To what extent has the investigation authority addressed safety management-related aspects in its investigations, when relevant?'

Present	Present and effective
1. There is a mechanism in place to ensure that safety management-related aspects are being addressed adequately in the investigation authority investigations.	1. Relevant final reports consistently address safety management-related aspects. 2. Interfaces between different organizations' SMS are being addressed.

Two interrelated subjects



Assessing safety management related aspects in the investigation

SMS & safety culture	SMS interfaces between organisations	CAA oversight of the SMS
• effectiveness of the safety management systems of all organisations involved • safety culture of all organisations involved	• focus on the identification and management of shared risks • focus on how responsibilities for risk management were established	• reduced/increased 'level of involvement' in the context of performance-based oversight • regulator/regulated • impact of the oversight regime

Applying safety management principles in the investigation

Systematic Approach	ICAO encourages accident investigators to follow a structured and systematic approach to investigations. This includes establishing clear procedures for data collection, analysis, and reporting to ensure consistency and reliability in the investigation process.
Human Factors Consideration:	Safety management principles underscore the importance of understanding human factors in accident causation. Investigators should analyze human performance, decision-making, and organizational factors to identify contributing elements to the accident.
Risk-Based Analysis:	ICAO emphasizes the importance of conducting risk-based analysis during accident investigations. Investigators should assess the risks associated with identified causal factors and prioritize recommendations based on the potential impact on aviation safety.
Focus on systemic factors:	Investigators are encouraged to conduct causal analysis that allows identifying underlying systemic issues that contributed to the accident. This involves digging beyond immediate causes to uncover organizational, procedural, or cultural factors that may have played a role.
Safety Culture Evaluation:	ICAO stresses the significance of assessing safety culture within organisations involved in the accident. Investigators should examine the organization's safety culture to determine whether cultural factors influenced decision-making, risk management, or safety practices.

Safety Culture – Just Culture

Fair and Just culture

- Protection for those who report and for persons mentioned in the report
- Rules on confidentiality of identity
- Refrain to institute proceedings and limitation of information used in proceedings
- Protection from prejudice by employer
- In Europe, organisations must adopt an internal Just Culture policy
  - possibility for employees to appeal

How to implement Just Culture principles?

- At Service Provider level
  - Define responsibilities and a procedure for determining what is acceptable and what is not.
  - This needs to be agreed with staff representatives/unions.

- Example:
  - *Baines Simmons FAIR model*

Free download

Definitions (many different ones exist)

Annex 19 does not provide any

Safety Culture : *An enduring set of values, norms, attitudes, and practices within an organization concerned with minimizing exposure of the workforce and the general public to dangerous or hazardous conditions. In a positive safety culture, a shared concern for, commitment to, and accountability for safety is promoted.*

Source: CASA (Australia)

Safety culture cannot be mandated by Law. Annex 19 requires that both States and Service Providers promote a positive safety culture to support effective SSP/SMS implementation.

Definitions

Just Culture : *A culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, wilful violations and destructive acts are not tolerated.*

Source: Regulation (EU) 376/2014 'Occurrence Reporting'

JUST CULTURE – Balancing Safety and Accountability – Sidney Dekker, 2007

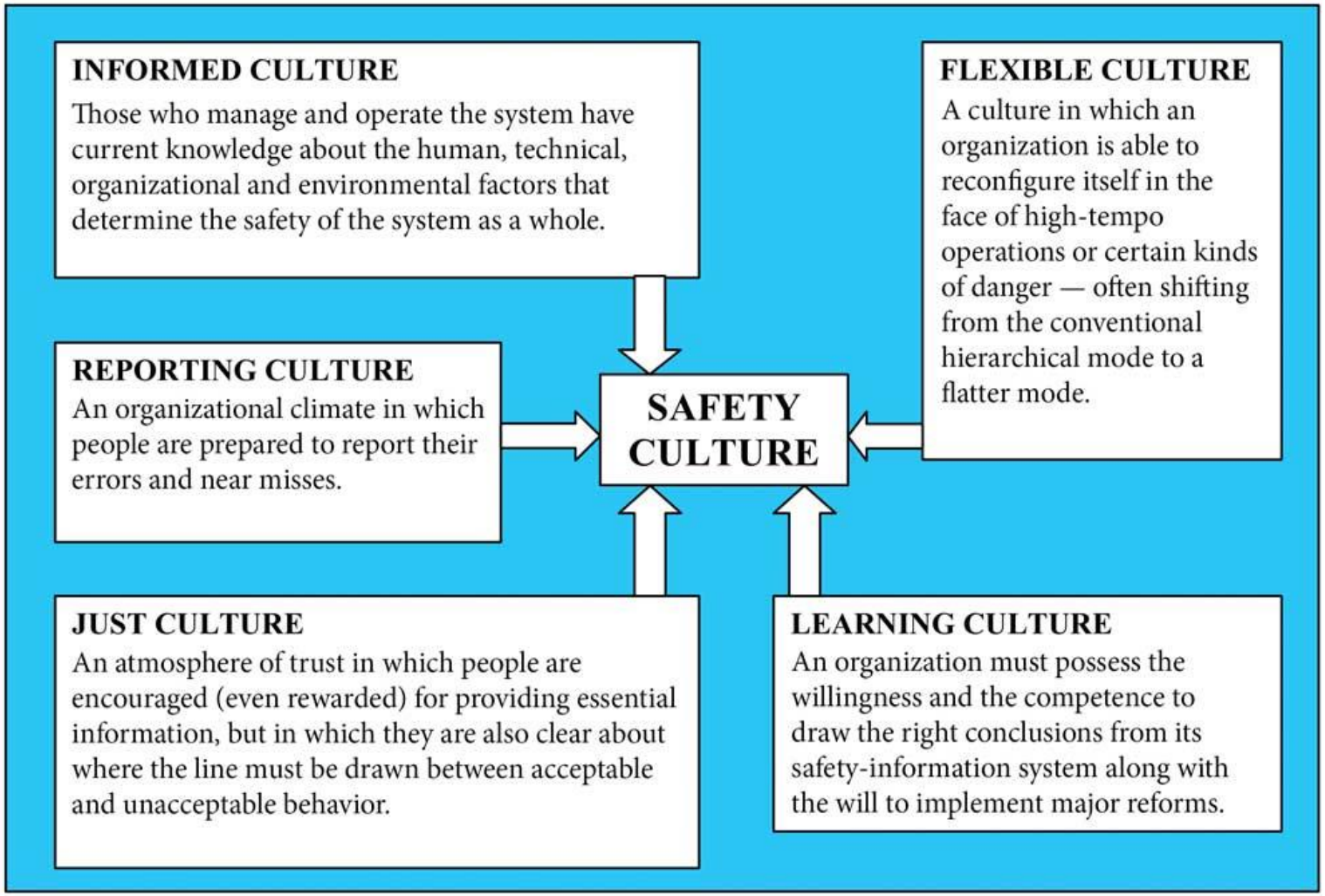
Safety culture is the ‘catalyst’ for SRM

Safety Culture is the way safety is perceived, valued and prioritised in an organisation.
It reflects the real commitment to safety at all levels in the organisation.
The better the safety culture, the more the organisation will be able to ‘tap into pockets of safety information’.

It is often influenced by senior & line managers’ attitudes & behaviours towards safety.

Just culture is a subset of safety culture.

Safety Culture models break this down into various ‘dimensions’ (features)



Safety Culture model according to Prof. James Reason

Markers of a positive Safety Culture

- a top-down commitment from management - management is actively motivating its staff to care for safety and creates working conditions that support safety
- staff input is actively encouraged – management remains open to hearing bad news
- staff and management remain aware of risks even when performance is high
- staff is provided with safety relevant information and feedback is sought
- there is an agreed way for distinguishing between acceptable and unacceptable behaviour

Further guidance from SMICG

→ Industry Safety Culture Evaluation Tool and Guidance

→ Organizational Culture Self-Assessment Tool for Regulators

Further guidance from EUROCONTROL

→ Safety Culture Enhancement Toolbox for ATM

→ Toolkit: Systems Thinking for Safety: Ten Principles

How do/can regulators influence Safety Culture?

- Positive, negative or neutral effect
- Provide an external perspective, while recognising that there are multiple ways to meet the requirements
- Positive regulator/service provider relationship can be fostered through
  - Routine audit, inspections discussions
  - Industry/regulator seminars (trust and fairness)
  - Working groups, e.g. to discuss the State Risk Picture
  - Safety promotion
- Promote and stimulate development of the SMS
  - Recognise the organisation's initiatives to improve their SMS
  - Encourage and provide feedback and positive re-enforcement
  - Adapt your oversight to the maturity of the SMS and the risks entailed by the service provider's activities
- Do not 'misuse' information obtained through SMS oversight

- It is very much a matter of motivation, influence, involvement and leadership
- Build trust but remain aware of your role

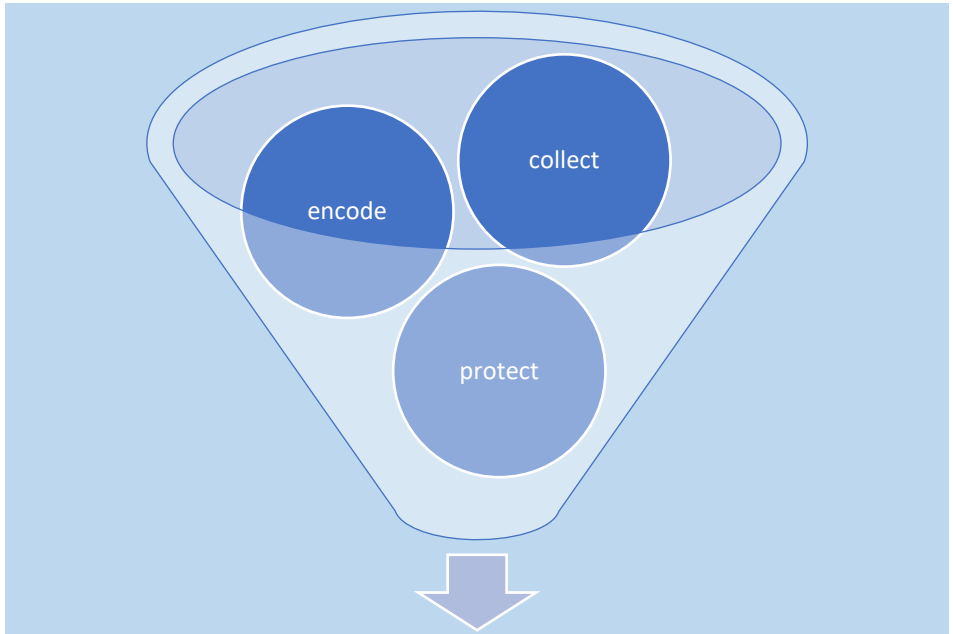
Safety culture key points:

- → Safety Culture
  - → constitutes the catalyst for safety management
  - → cannot be directly regulated
  - → can be influenced and sometimes damaged by the regulator
  - → is not easy to measure, but can be assessed
- → Aviation Authorities may consider assessing
  - → safety culture at Industry level
  - → their own safety culture

SDCPS synopsis

Governance

- A set of policies and processes defining:
  - Quality standards
  - Access
  - Data use
  - Protection
  - Sharing & Exchange
  - Etc.



Safety Culture

- Continued availability of data
- Just Culture
- Informed Culture
- Culture for continual improvement
- Etc..

Safety data/information exchange between States

Safety Information, including SPIs

Safety data/information exchange within the SSP

Priorities for the NASP

Risk-Based Surveillance

Use of safety intelligence to make decisions

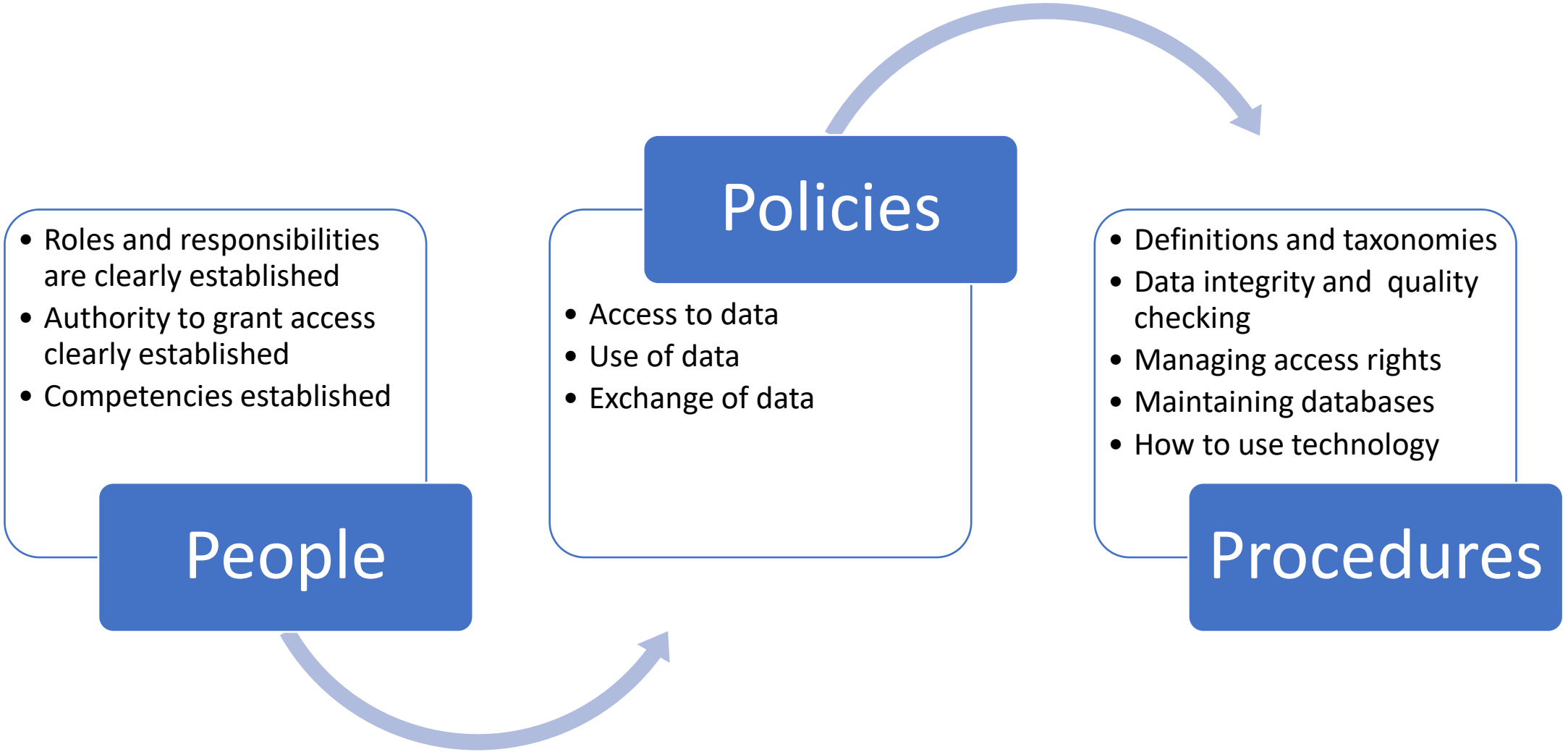
→ Which are the most critical safety risks across the aviation system?

→ Are the current regulations sufficiently addressing the risk?

→ Where does the State need to act?

→ Where should the issue be addressed by the Service Provider?

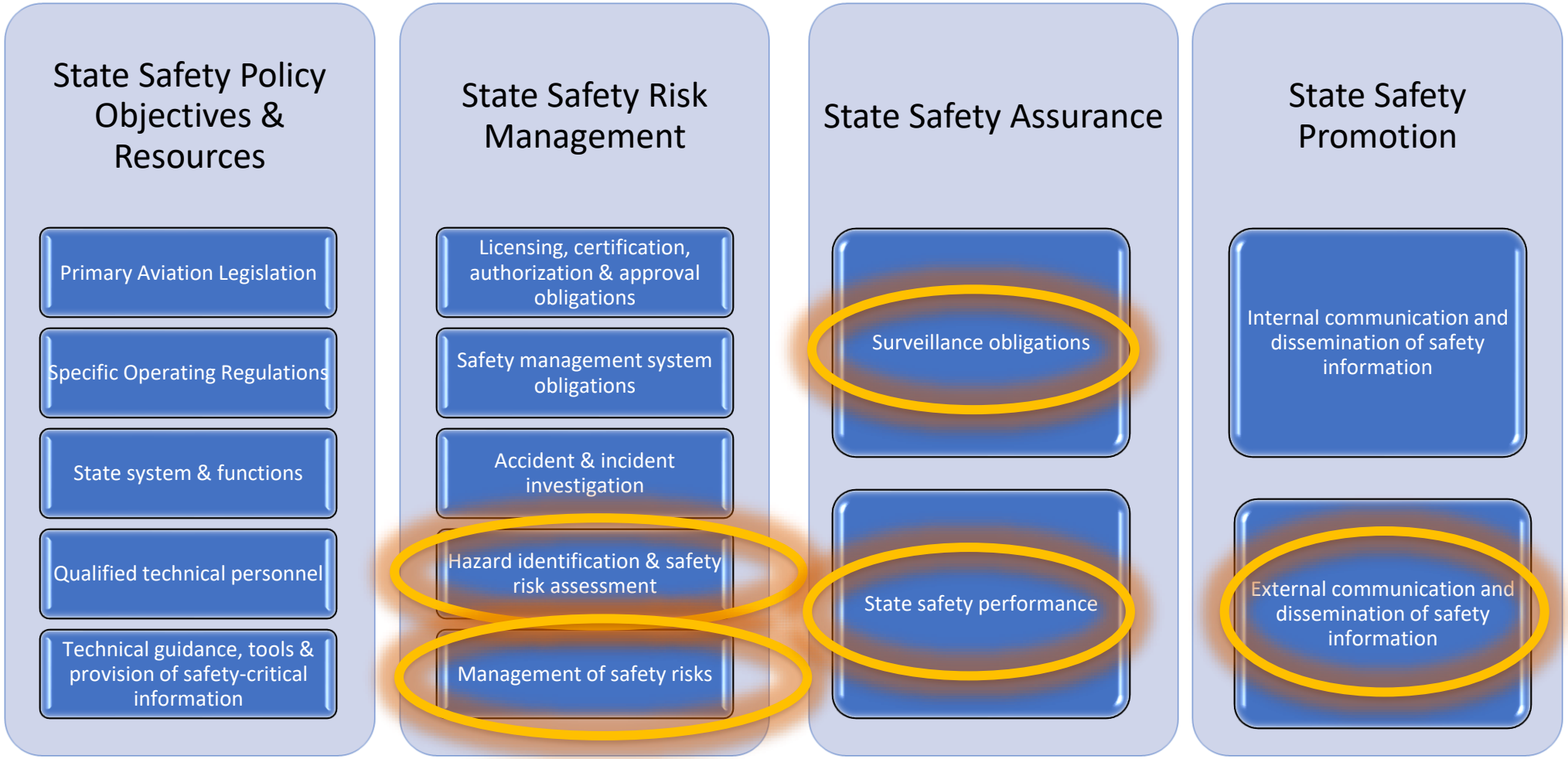
What is data governance?



Purpose of safety data analysis

- → Understanding risk, identifying causal factors and their frequency
- → Analysing accident precursors, proactively identify and prioritise safety issues
- → Building safety knowledge
- → Monitoring effectiveness of risk mitigation actions
- → Implementing risk-/performance based oversight
- → Monitoring safety performance
- → Maintaining awareness on safety risks in the aviation system
- → Supporting the definition of risk mitigation actions
- → Supporting the establishment and maintenance of the State Risk Picture

SSP: Where is safety data most needed?



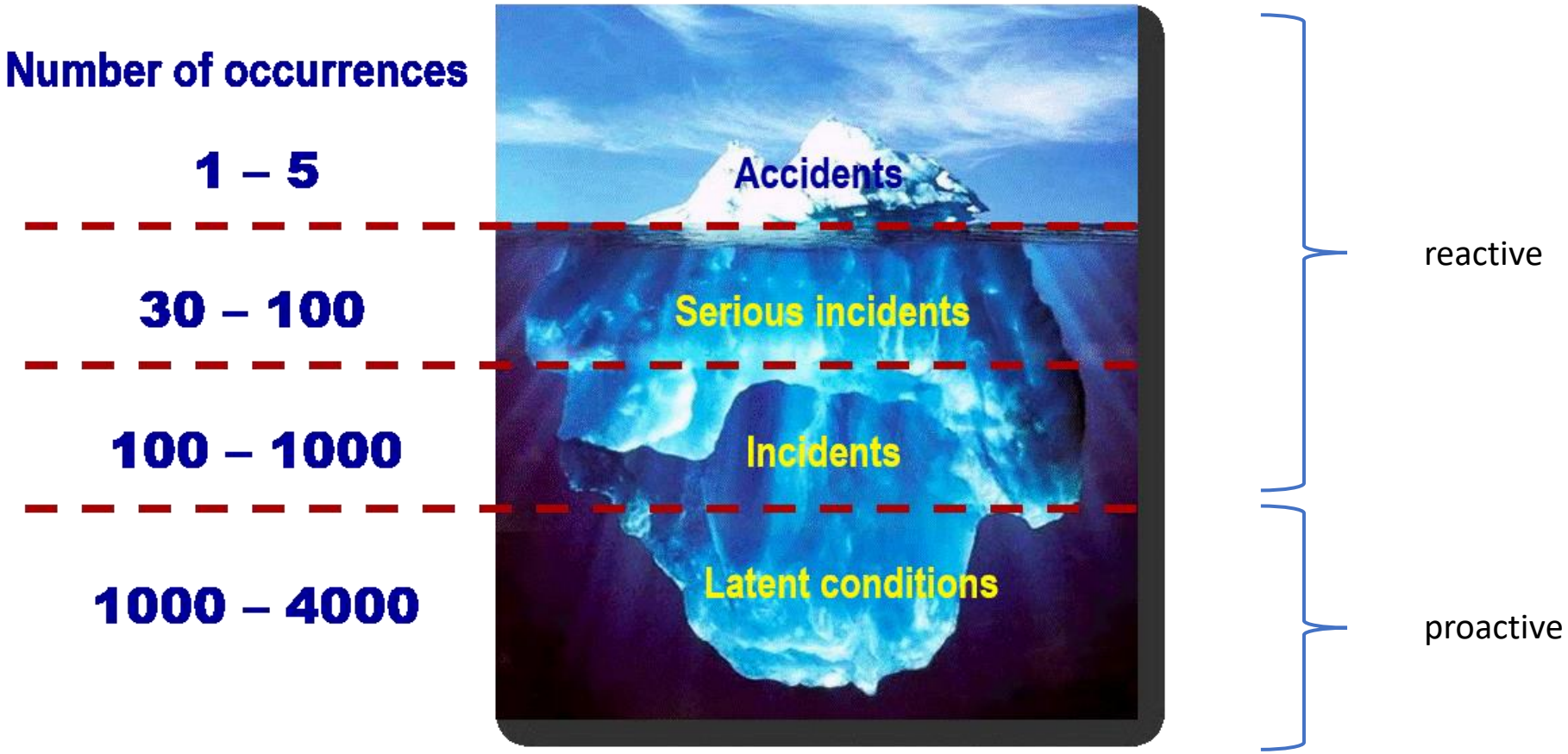
Most accidents have « precursors »

Factors were visible in previous incidents or accidents

Is it possible to predict accidents from incidents?

80

The iceberg….


Number of occurrences
1 – 5
30 – 100
100 – 1000
1000 – 4000
Accidents
Serious incidents
Incidents
Latent conditions
reactive
proactive

accident precursors

Example

82

Radio-altimeter failure during approach to Schiphol

Negative Radio-altimeter reading (- 8 feet)

Activation of « retard flare » autothrottle mode

Animated reconstruction

B737-800 Amsterdam, 25 Feb 2009, 9 Fatalities
(source: Dutch Safety Board accident report)

B737-800 Amsterdam, 25 Feb 2009, 9 Fatalities
(source: Dutch Safety Board accident report)

'… two incidents were discussed in Boeing's Safety Review Board in 2004, where the 'retard flare' mode was activated at 2100 feet and 1200 feet respectively, as a result of negative readings from the radio altimeter system.

This too shows that Boeing was aware of the possibility of the occurrence of the specific consequences that arose in this particular case.
Following statistical analysis and the performance of flight simulator tests,

Boeing concluded that this was not a safety problem, because, among other things, the pilots obtained adequate warnings and notifications to allow them to intervene in time, in order to recover the situation and land safely. …'

B737-800 Amsterdam, 25 Feb 2009, 9 Fatalities
(source: Dutch Safety Board accident report)

… The problems with radio altimeter systems in the Boeing 737-800 fleet had been affecting several airlines, including Turkish Airlines, for many years and were known to Boeing and the FAA

Several airlines, including Turkish Airlines, regarded the problems with radio altimeter systems as a technical problem rather than a hazard to flight safety. As a result, the pilots were not informed of this issue.

Despite the fact that Boeing and the FAA had been aware for many years that the radio altimeter system was causing many problems and was affecting the operation of other systems, this situation was not designated as a safety risk.

Why collect and analyse safety data?

Analysis of safety data has the potential to contribute to preventing accidents

Only if :

- the analysis is based on the right data,
- the analysis is properly conducted,
- the analysis outputs reach the right organisations/people, and
- the right safety actions are taken.

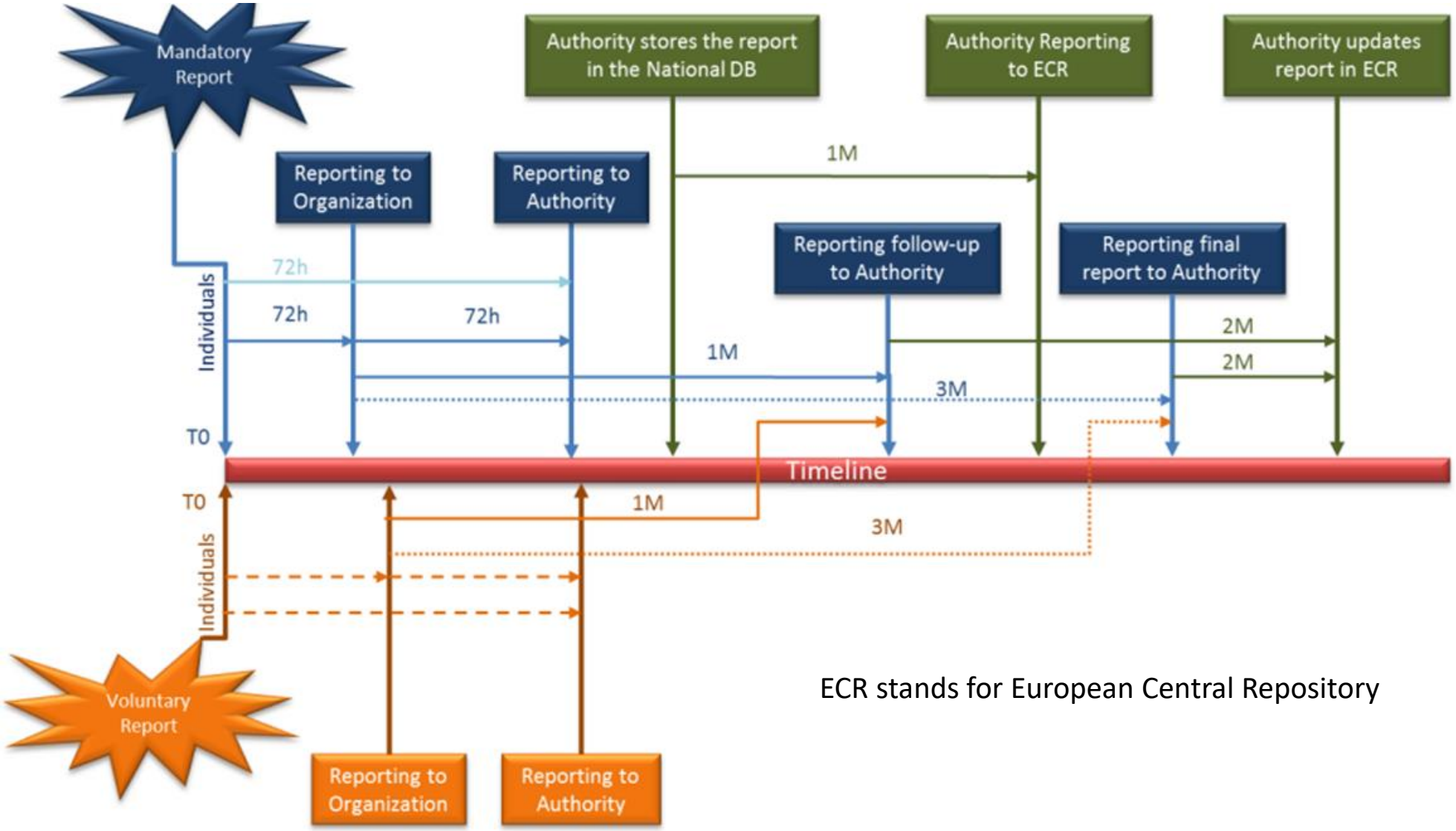
Reporting systems

- Mandatory reporting systems
- Voluntary reporting systems
- Confidential reporting systems
- Automatic data collection systems – Flight Data Monitoring

- Internal reporting within an organisation (SMS)
- From organisations to authorities (SSP)
- From individuals to authorities (SSP)
- Between organisations (collaborative SMS)
- Etc…

Reporting flows and timelines

Example: Europe

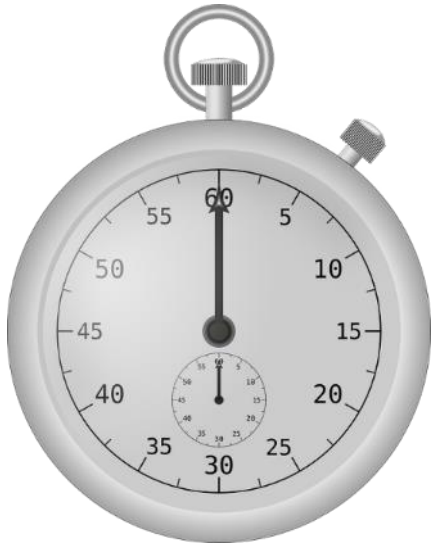


ECR stands for European Central Repository

EU Regulations - 72-hour rule

- The “72 hour rule” is causing lots of confusion – when does the clock start ticking?
  - In principle, each reporter has 72 hours to report to the next organisation in the chain once it realises that there has been an occurrence.
  - Not the same as 72 hours from when the occurrence happened.
  - Periodic (daily… weekly…) review of safety reports to identify reportable occurrences
  - In some cases, on completing an investigation
  - In others after several of the same event type

- **Important to see a regular process for identifying mandatory occurrences**



Coding occurrence data

- → What is a taxonomy?
- → Why coding occurrence data?
- → ECCAIRSs

What is a Taxonomy?

- A taxonomy is simply a cut-down version of a language, used to create categorical data from information.
- Aviation examples:
  - **Commercial Aviation Safety Team/ICAO Common Taxonomy Team (CICTT) Occurrence Categories**
  - **Accident/Incident Data Reporting (ADREP)**
  - **Human Factors Analysis and Classification System (HFACS)**

- There is no such thing as a perfect taxonomy
  - Specific vs Consistent (not too long)

Why coding occurrence data?

- To help answering questions like
  - How often is a certain phenomenon found in the data?
  - Is a certain phenomenon found in the data?
  - What phenomena are found in the data?
- Coded data is already information
- Can be language independant
- Enables statistical analysis of large amounts of textual data.

High Risk Categories of Occurrence (HRCs) versus safety issues

- HRCs provide a ‘common taxonomy’ for the most severe accident outcomes.
  - LOC-I
  - MAC
  - CFIT
  - RE
  - RI
- HRCs in isolation cannot be the basis for safety risk assessment.
- The causal and contributing factors involved in each occurrence (accident) need to be identified and prioritised.
- Risk mitigation will target the prioritised causal and contributing factors, also referred to as ‘safety issues’.

Safety issues (EASA definition)

- Safety issues are safety deficiencies related to one or more hazards. They are the actual manifestation of a hazard or combination of several hazards in a specific context. (ARMS methodology). The Safety Issue has been identified through the systematic Hazard Identification process of the organisation.

- A safety issue could be
  - a local implication of one hazard
    - e.g. deicing problems in one particular aircraft type or
  - a combination of hazards in one part of the operation
    - e.g. operation to a demanding airport.

- **Safety issues, not HRCs, can be risk assessed and practically managed (mitigated).**

Identification of Safety Issues

- In order to identify Safety Issues, analysis can be done at different levels of **aggregation**, for example:
  - At the level of an aviation sector
    - examples:
      - Offshore helicopter operations
      - CAT aeroplanes
      - General Aviation
  - At the level of an accident category (ICAO GASP: High Risk Category of Occurrence)
    - example:
      - Loss of Control in Flight (LOC-I)
      - Runway Incursion (RI)

Analysis at the level of an accident category

→ *Which questions do we want to answer?*

- → What are the relevant occurrences?
- → What are the main accident scenarios?
- → What are the main contributing factors?
- → What are the top underlying safety issues?

What are the main accident categories? (CAT)

- ICAO HRCs
  - Loss of Control in Flight (LOC-I)
  - Mid Air Collision (MAC)
  - Runway Excursion (RE)
  - Runway Incursion (RI)
  - Controlled Flight Into Terrain (CFIT)

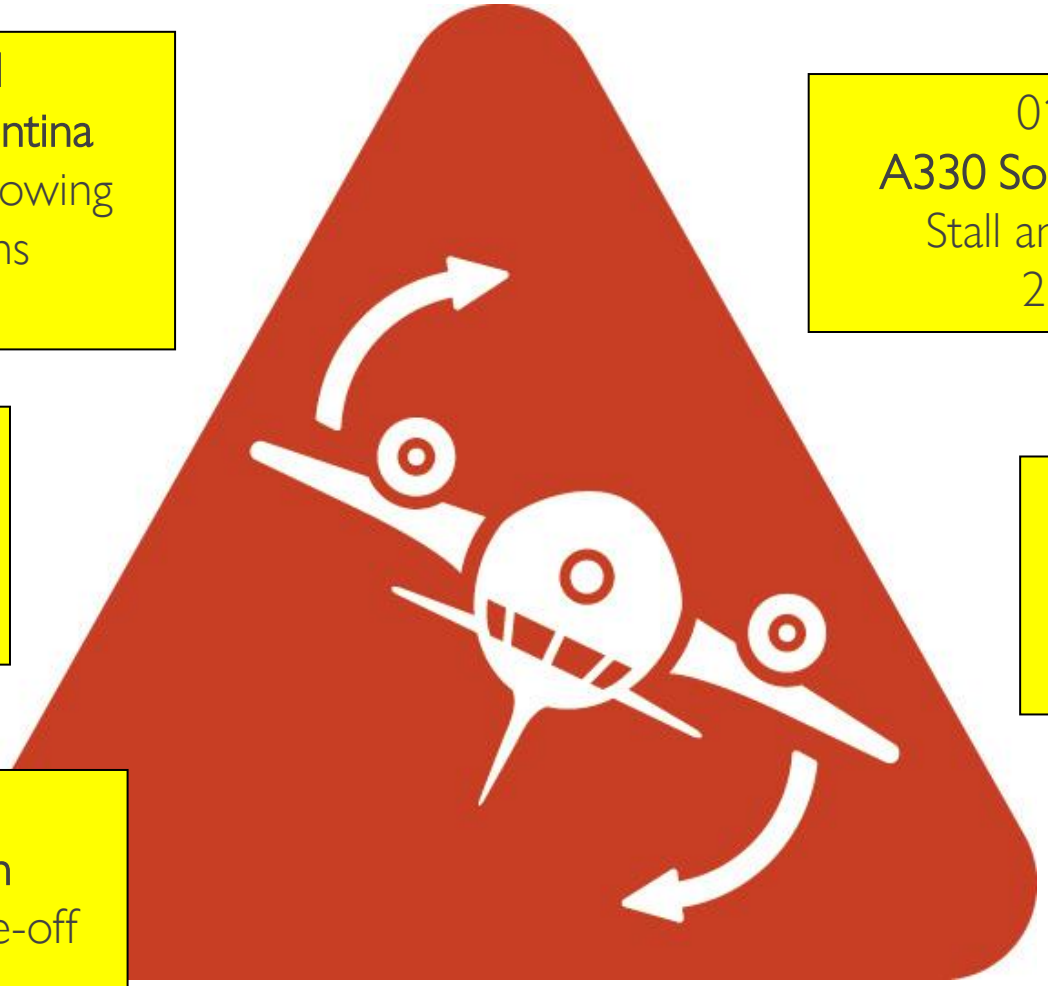
- Other, for example
  - Abnormal Runway Contact (ARC)
  - Fire (F-POST or F-NI = post-impact or non-impact)

Example: Loss of Control in Flight

18 May 2011
Saab 340 in Argentina
Loss of control following
Icing conditions
22 Fatalities

01 June 2009
A330 South Atlantic Ocean
Stall and LOC in cruise
228 Fatalities

27 January 2001
Shorts 360 Forth Estuary
LOC & ditching
2 Fatalities

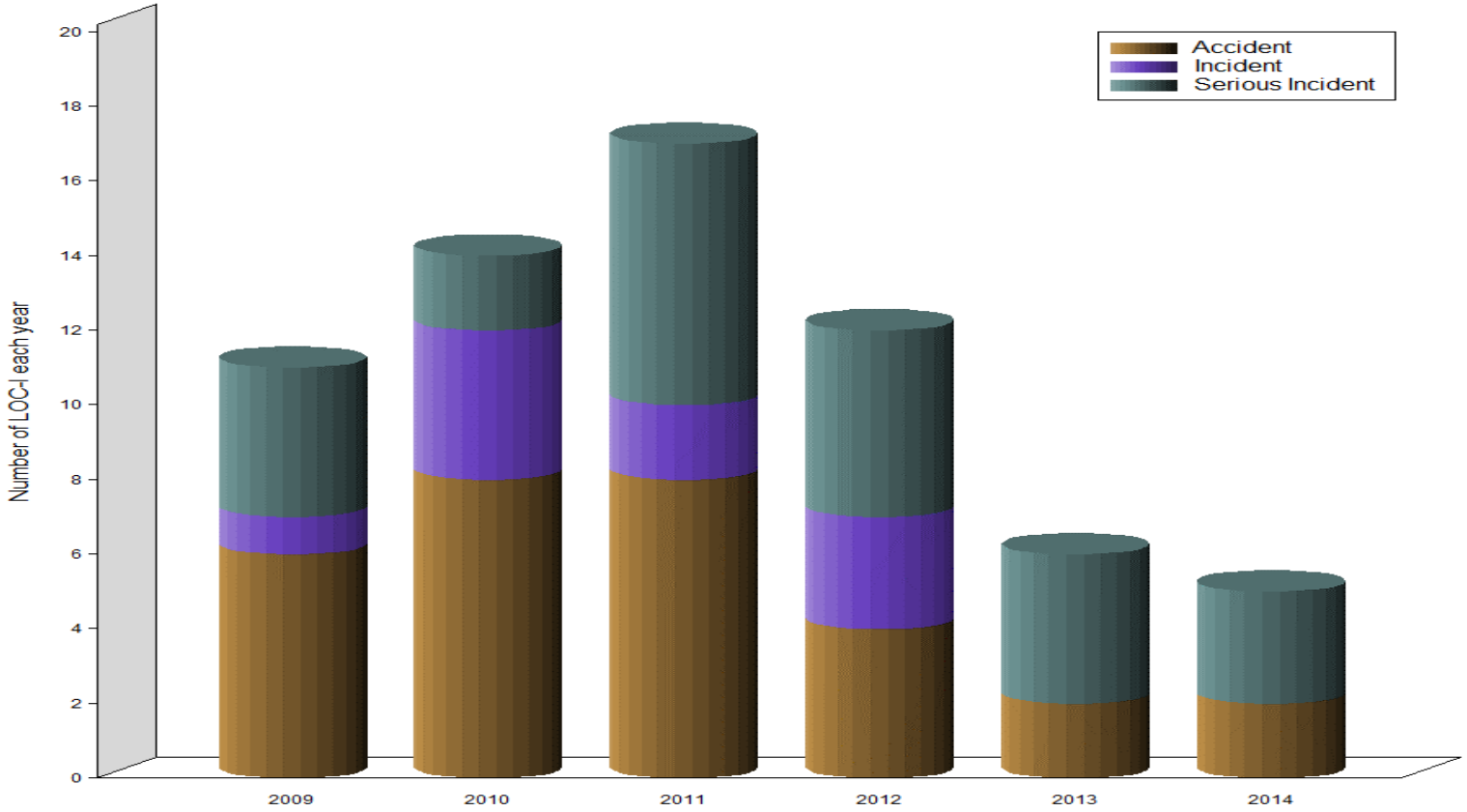


28 December 2014
A320 in Indonesia
Aircraft lost height, stalled
162 Fatalities

29 April 2013
B747 in Afghanistan
Loss of control on take-off
Due to CG shift
7 Fatalities

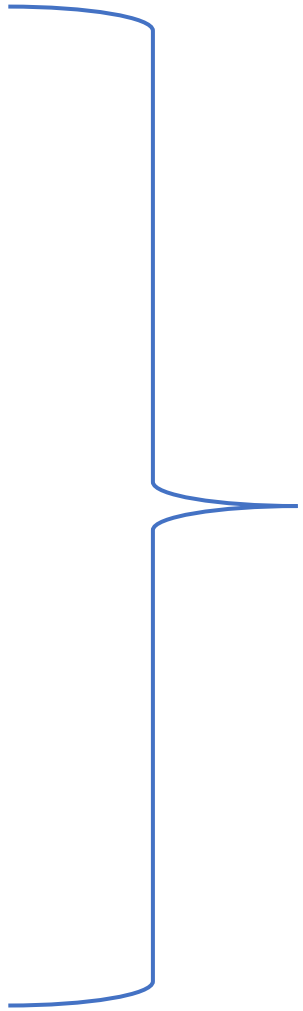
LOC-I EASA Study -> *What are the relevant occurrences?*

- LOC-I occurrences between 2009 and 2014
- Fixed Wing Aircraft
- MTOW above 5.700 kg; Commercial Air Transport
- 65 events



LOC-I- What are the main scenarios?

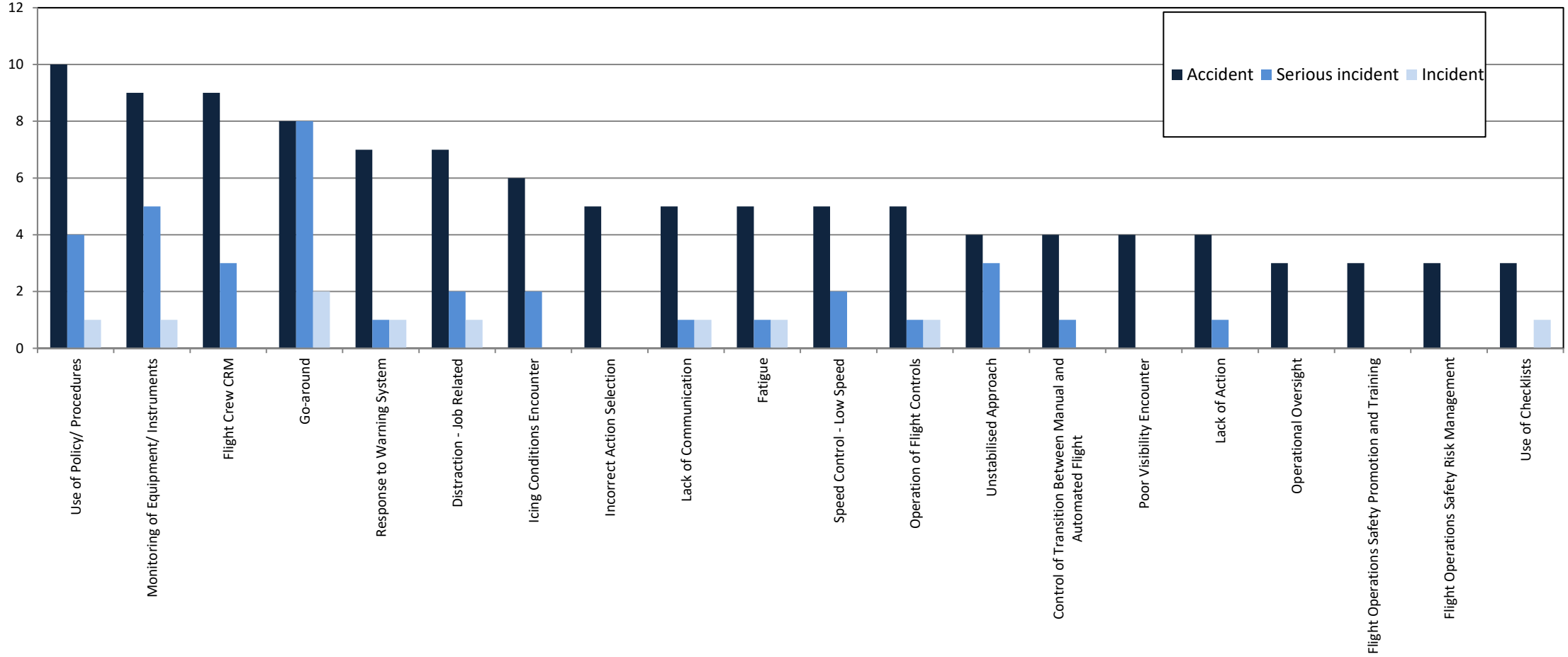
- Environment
  - Icing
  - Windshear
  - Turbulence
- Technical
  - System failures
- Other
  - Loading
  - Crew action
  - Etc



Identified from the Occurrence Reports
Quality of the reports is essential

Example: analysis at the level of an accident category

→ Causal and contributing factors for LOC-I accidents:



LOC-I -> Top 5 safety issues involved

- → Inadequate functioning of management systems and oversight
- → Inadequate knowledge of aircraft systems and procedures
- → Crew awareness
- → Management of adverse weather conditions
- → Inadequate Crew Ressource Management, communication and decision making

EASA
European Union Aviation Safety Agency

- end of presentation -

easa.europa.eu/connect

Your safety is our mission.

An Agency of the European Union

Backup: How to perform the data analysis ?

→ Example: ARMS

ARMS

An industry working group, ARMS (**Aviation Risk Management Solutions**) was set up 2007 in order to develop a new and better methodology for Operational Risk Assessment (ORA).

The primary target group for the methodology is airlines but it is also fully applicable to other aviation organisations.

It is an overall end to end Risk Assessment process, starting from hazard Identification and leading to safety actions.

Main steps in ARMS -> Event Risk Classification

- Overall end to end Risk Assessment process, starting from Hazard Identification and leading to Safety Actions defined.
- All new incoming 'Safety Event Data' (occurrence report) needs to be reviewed within an acceptable timeframe so that there can be an immediate reaction to any urgent issues.
  - Event Risk Classification (ERC) -> the first step in the ARMS Risk Assessment process.
  - The actual event is extrapolated into what accident outcome (HRC/KRA) could credibly have occurred.
    - The question is: what was the risk, at the time when the event occurred.
  - ERC -> quick initial estimate on the risk inherent in the event.
  - Result: risk class (colour) indicating what needs to be done with the event & a numerical value of risk (the ERC risk index value) to be used in quantitative risk analysis.
- Once risk assessed, all events are stored in a safety event database with the risk class and the numerical value.

Main steps in ARMS – Safety Issue Assessment

- When the aggregate Safety Data in the database is analysed (Data Analysis), the main focus is on **identifying any Safety Issues** that affect the current operation.

- All identified Safety Issues are then risk assessed using the Safety Issue Risk Assessment (SIRA) technique.

  - Risk is calculated as the product of four factors
    - prevention,
    - avoidance,
    - recovery and
    - minimisation of losses

  - The output from SIRA is a risk value for each Safety Issue.

ARMS -> Safety Issue Risk Assessment

- In carrying out a Safety Issue Risk Assessment (SIRA), the analyst should first define and scope the Safety Issue before risk assessing it.

- A precisely defined safety issue is much easier to assess quantitatively.

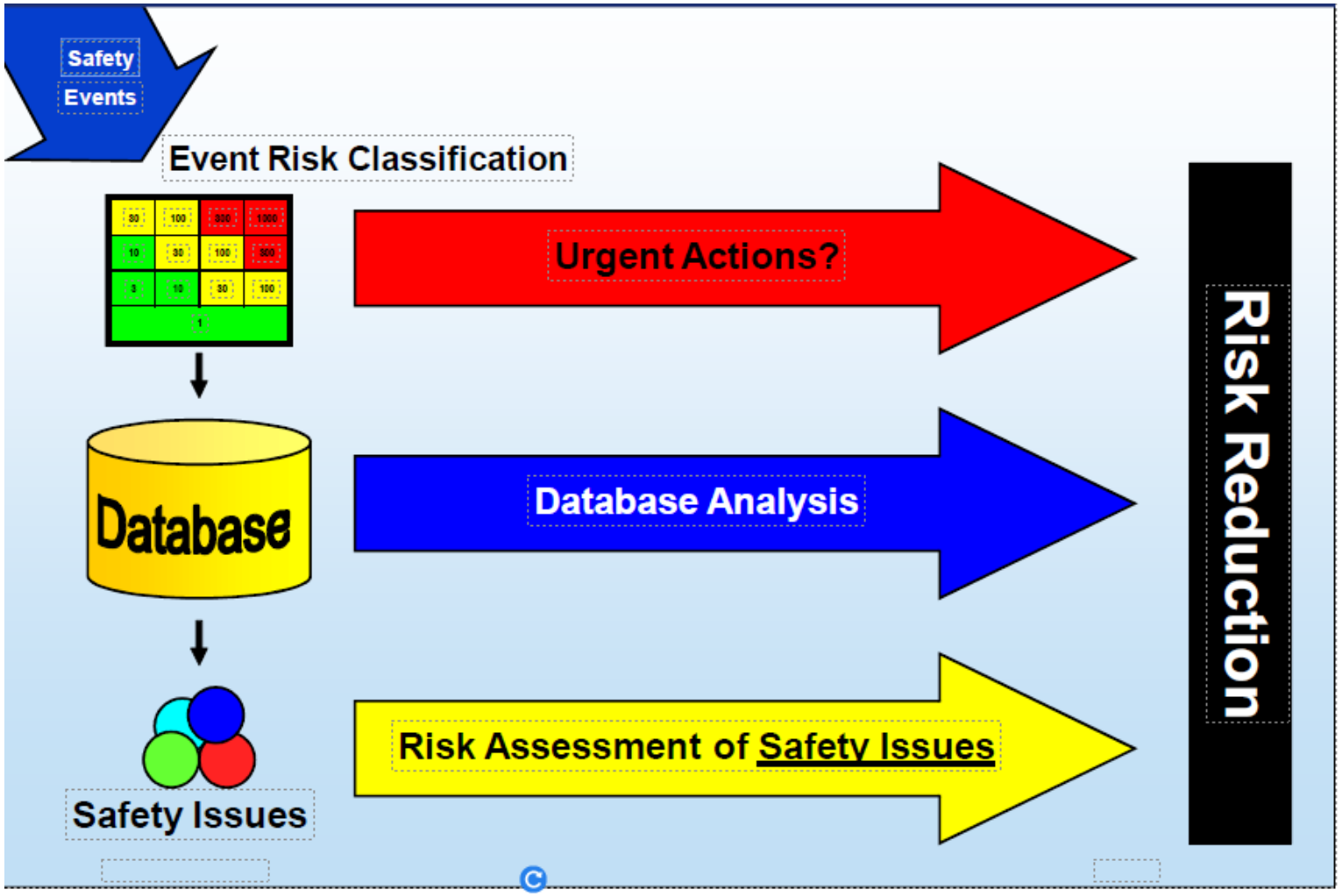
  - *For example a **windshear** Safety Issue that concerns only one aircraft type and one airport is easier to examine than one that covers the whole airline fleet and route network.*

Definition of safety issues (ARMS)

- A manifestation of a hazard or combination of several hazards in a specific context.
  - The Safety Issue has been identified through hazard Identification.
  - Usually, the Safety Issue is highlighted through recurrence of similar events, but sometimes one single potentially severe event may lead to raising the Safety Issue.
  - The Safety Issue could be a local implication of one hazard (e.g. de-icing problems in one particular aircraft type) or a combination of hazards in one part of the operation (e.g. operation to a demanding airport).

- Important:
  - Past events as such cannot be managed. Safety Management is about managing the Safety Issues which cause/contribute to the events.

Summary of the ARMS methodology



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