



Safety Performance Indicators

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NCAA PRESENTATION BY
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***“A DATA-BASED PARAMETER [METRIC]
USED FOR MONITORING AND ASSESSING
SAFETY PERFORMANCE” - ANNEX 19***

- **Safety Performance Monitoring and Measurement**
- **Safety Data Collection and Processing System (SDCPS)**
- **What is a Safety Performance Indicator (SPI)**
- **What is a good SPI**
- **How do SPIs relate to your SMS**
- **How to determine SPIs**
- **How to set targets**
- **How to set alerts**

- ICAO Annex 13
- ICAO Annex 19
- Civil Aviation Act
- NAMCARs Part 140
- NAMCATS-SMS-140

Reference: -ICAO Document 9859
-Safety Management Manual



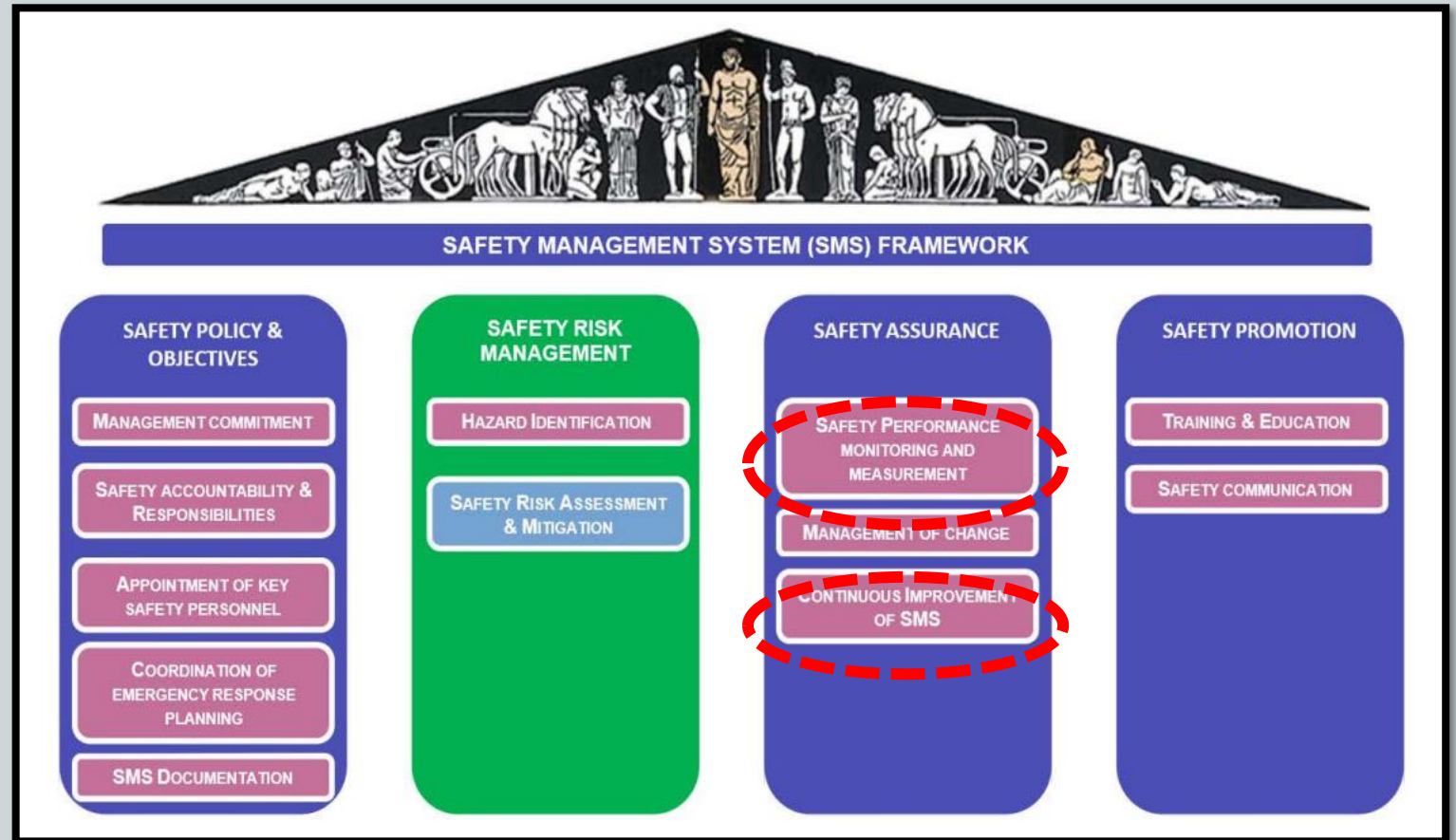
SMS definition

“A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies, and procedures.”

A safety management system needs performance monitoring & measurement.

Without performance monitoring and measurement,
we cannot have accountability

Performance Monitoring and Measurement is one of the 12 elements of an effective Safety Management System



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An **SMS** is **not effective without** safety performance monitoring and measurement

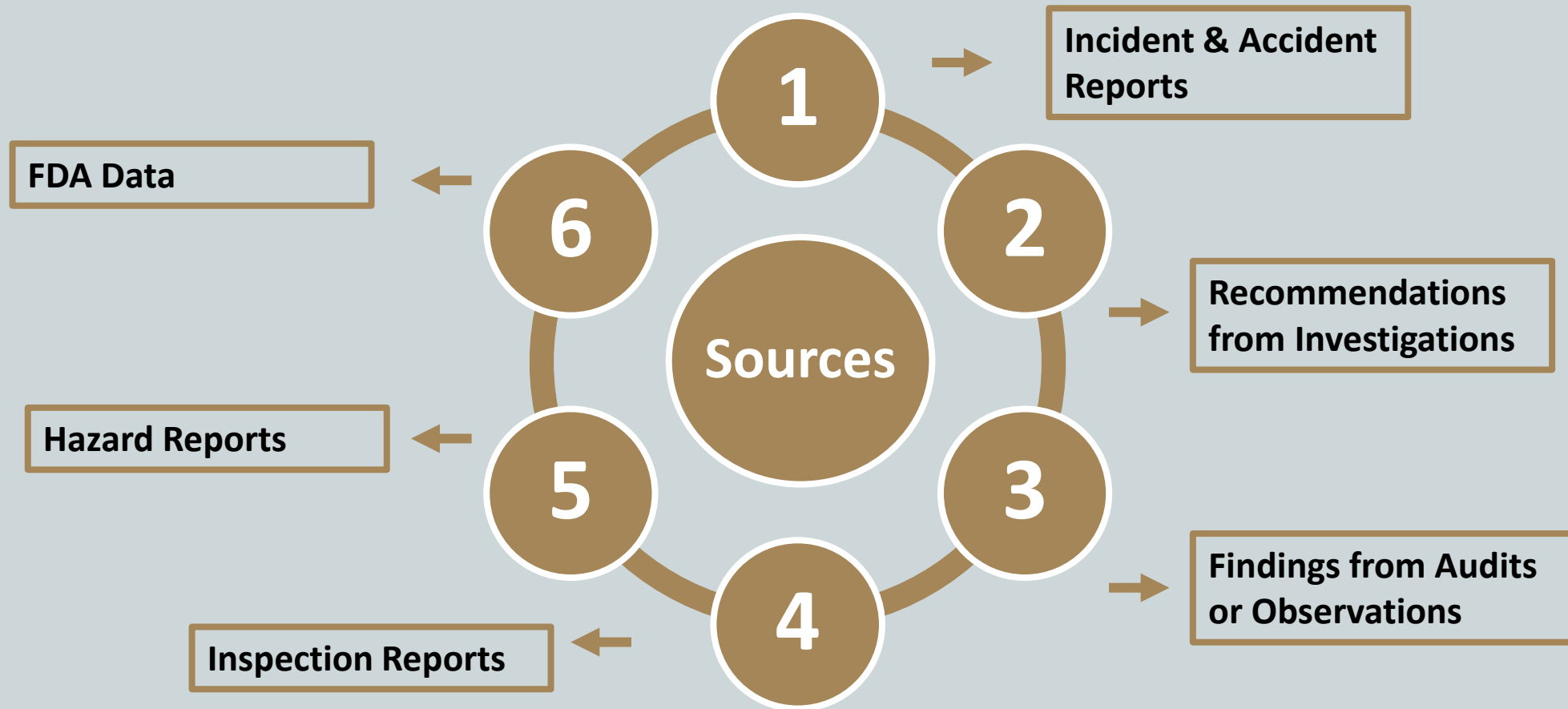
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To complete effective monitoring and measurement, we need a robust **safety data collection and processing system (SDCPS)**

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From the data in the SDCPS safety performance monitoring and measuring also requires establishment of **Safety Performance Indicators (SPIs)** and **Safety Performance Targets (SPTs)**

- The SDCPS should collect safety data from as many sources as possible, for example:



What is an SPIs

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A Safety Performance Indicator is a data driven parameter which is used for monitoring and assessing safety performance



What is an SPIs

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SPIs should be:

**Related to the safety objective
they aim to indicate**

**Selected or developed based on available
data and reliable measurement**

1

2

4

3

**Realistic, by considering the possibilities
and constraints of the organization**

**Appropriately specific and
quantifiable;**

-Safety management manual document 9859

Development of SPIs

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- SPIs should be developed from safety deficiencies identified as a result of the SDCPS
- A safety deficiency should become a safety objective (an overarching statement of intent without a numerical value)
- A safety objective should give rise to the Safety Performance Indicator (SPI) (metric)
- The Safety Performance Indicator should allow for establishing a Safety Performance Target (SPT) (projected metric)
- The Safety Performance Target will establish an Acceptable Level of Safety Performance (ALoSP)



- Safety Performance Indicators should be developed from the data provided by the SDCPS
- SPIs can be selected from the top occurring events in the safety data:

1.

They may be high severity low frequency events

2.

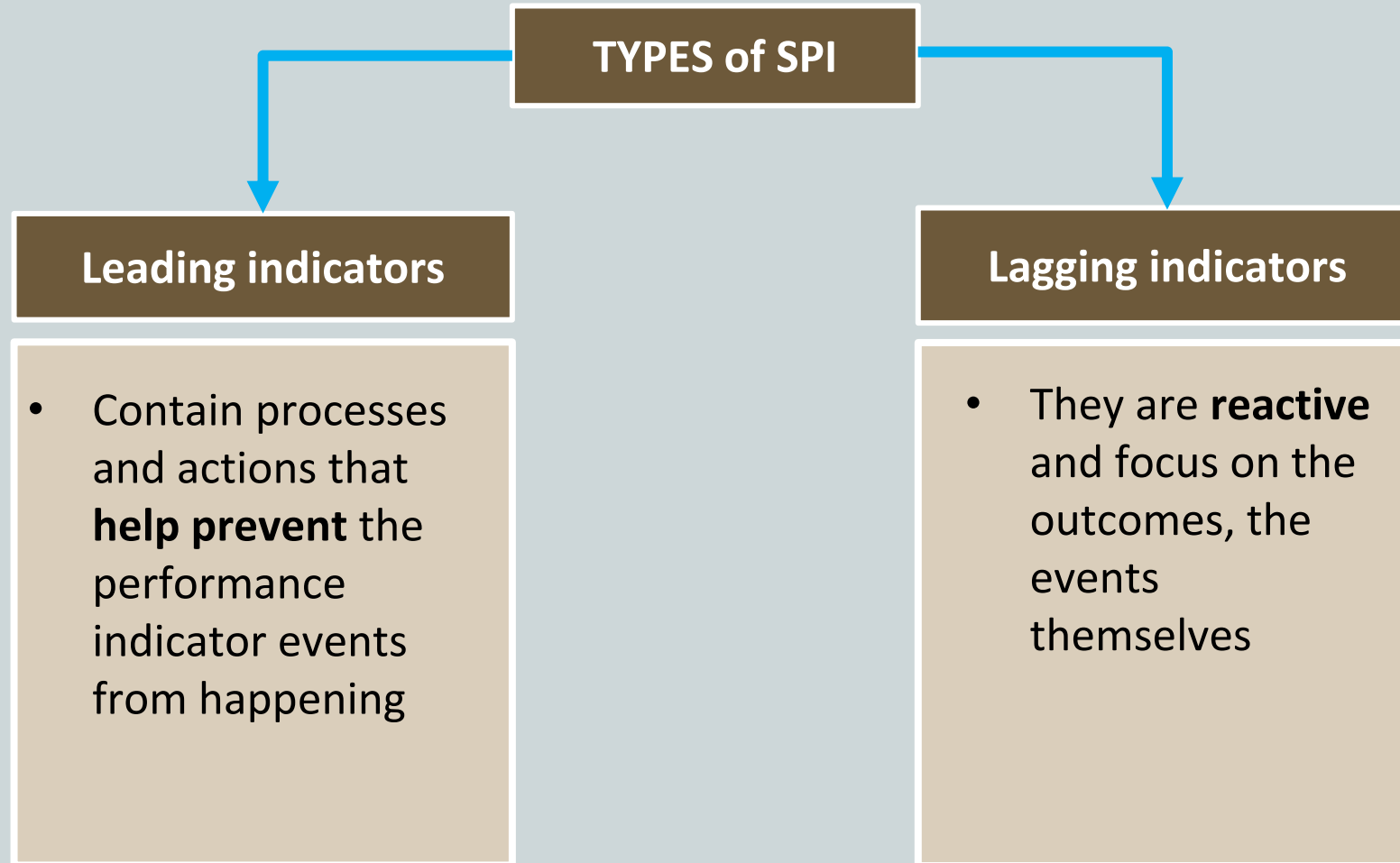
They should also include high frequency low severity precursor events

3.

Leading and Lagging indicators should be selected

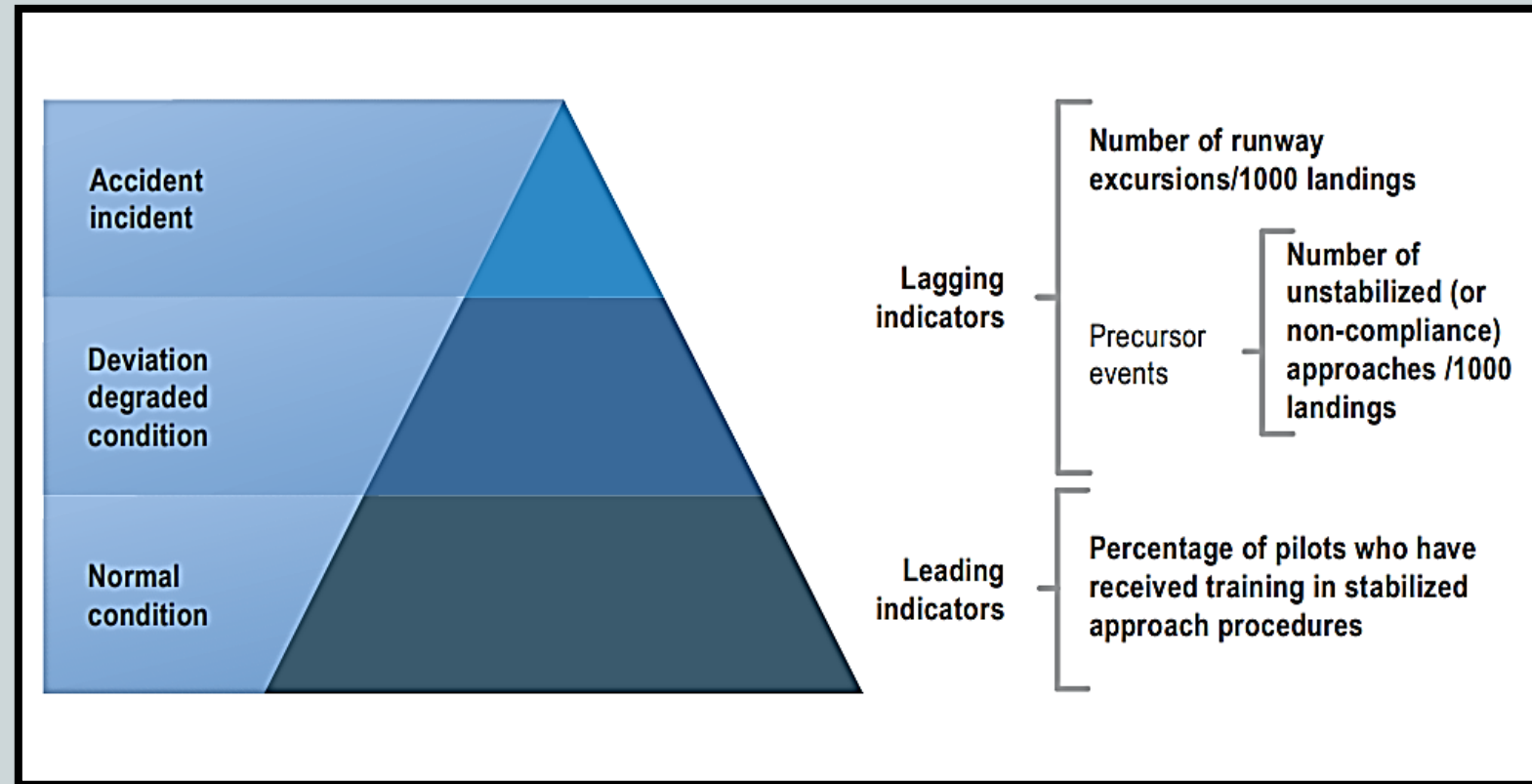
Types of SPI

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Types of SPI

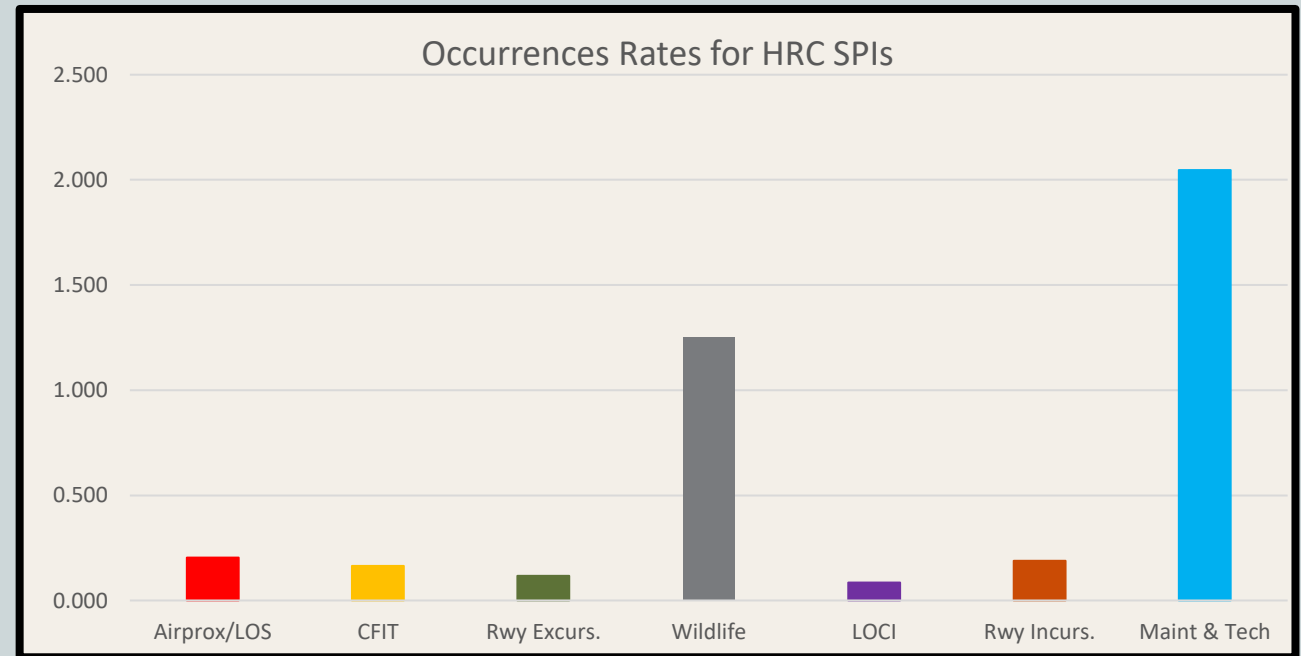
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Selection of SPIs

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- When establishing a SMS, you may **not have sufficient data** to establish accurate SPIs.
- You still need to develop them, using **best estimates** of what might be important to your organization's safety or,
- it could be based on **regional or global metrics**.



Selection of SPIs

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Once the SMS gains an effective SDCPS the SPIs should be refined based on what factors are:

- Most relevant and/or

- Most hazardous to your operating environment

ICAO identifies five high risk events that can be used, as they aim to have globally harmonized indicators.



Loss of Control In-flight (LOC-I)



Controlled Flight Into Terrain (CFIT)



Runway Incursions (RI)



Runway Excursions (RE)



Loss of Separation/Mid Air Collision (LOS/MAC)

Setting of Targets and Alerts

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A target should use the **SMART** concept:
Specific, **M**easurable, **A**chievable, **R**elevant, **T**imebound

Targets can be:

→ **based on an incremental improvement on previous performance**

- e.g. in the previous year you reduced occurrences by 10%, the next year you aim to improve performance by 12%; or

→ **based on a projected target**

- e.g. Abuja target is for 50% reduction in runway events from 2020 to 2025, so each year from 2020 to 2025 requires a 10% reduction

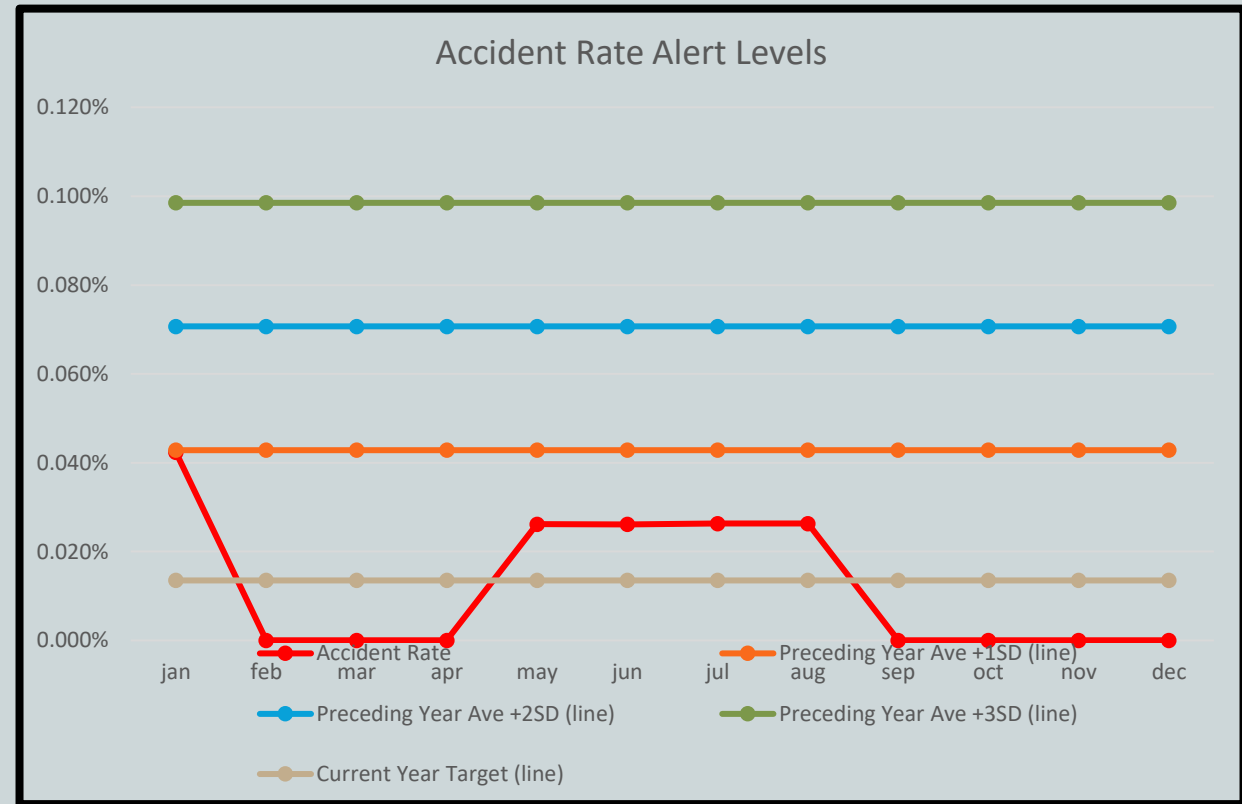
Setting of Targets and Alerts

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A recognized method of setting alerts is the **Standard Deviation (SD) Method**

An alert is triggered for:

- Any event over the third SD
- Two events over the second SD
- Three events over the first SD



Our SMS aims to achieve an:

**ACCEPTABLE LEVEL OF SAFETY PERFORMANCE
(ALoSP)**

And one which is:
AS LOW AS REASONABLY PRACTICABLE (ALARP)

What is an Acceptable Level of Safety Performance (ALoSP)?:

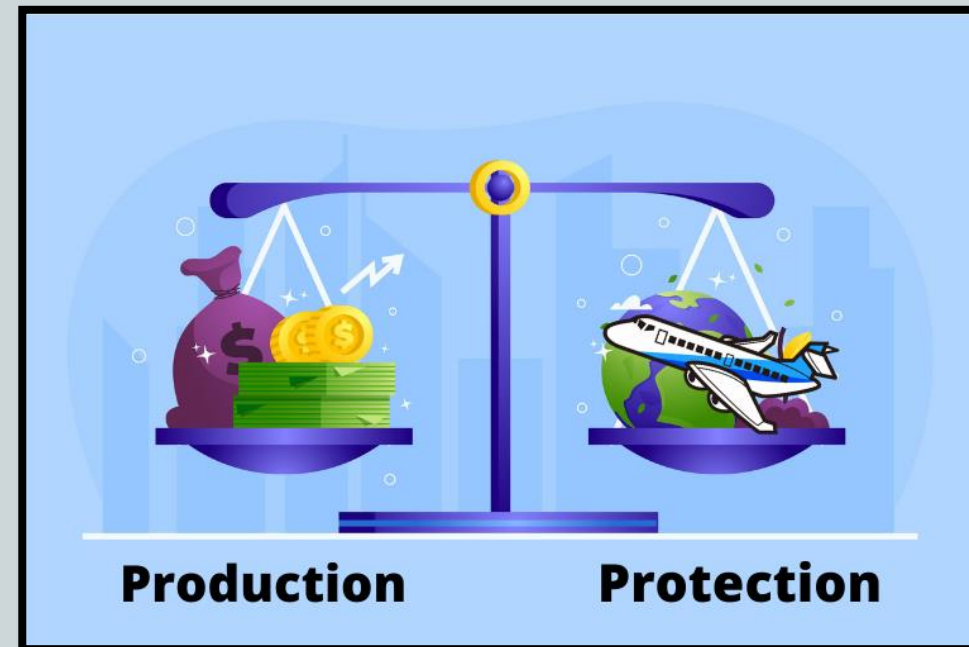
- An **agreed performance** between the service provider & the regulator, one that is ALARP;
- **Clearly defined** in the Service Provider's SPIs & Targets;
- Must be **revised annually & updated periodically** (ideally 3 yearly in line with NASP and GASP)

	RISK INDEX VALUE				
	Extremely Improbable (1)	Improbable (2)	Remote (3)	Occasional(4)	Frequent(5)
Catastrophic (5)	5	10	15	20	25
Hazardous (4)	4	8	12	16	20
Major (3)	3	6	9	12	15
Minor (2)	2	4	6	8	10
Negligible (1)	1	2	3	4	5

ALoSP and ALARP

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- Monitoring & Measurement will provide SMS with a means of establishing an **Acceptable Level of Safety Performance (ALoSP)**.
- The ALoSP shall be **accepted by the regulator**.
- Your **organization's operations** will determine your ALoSP.

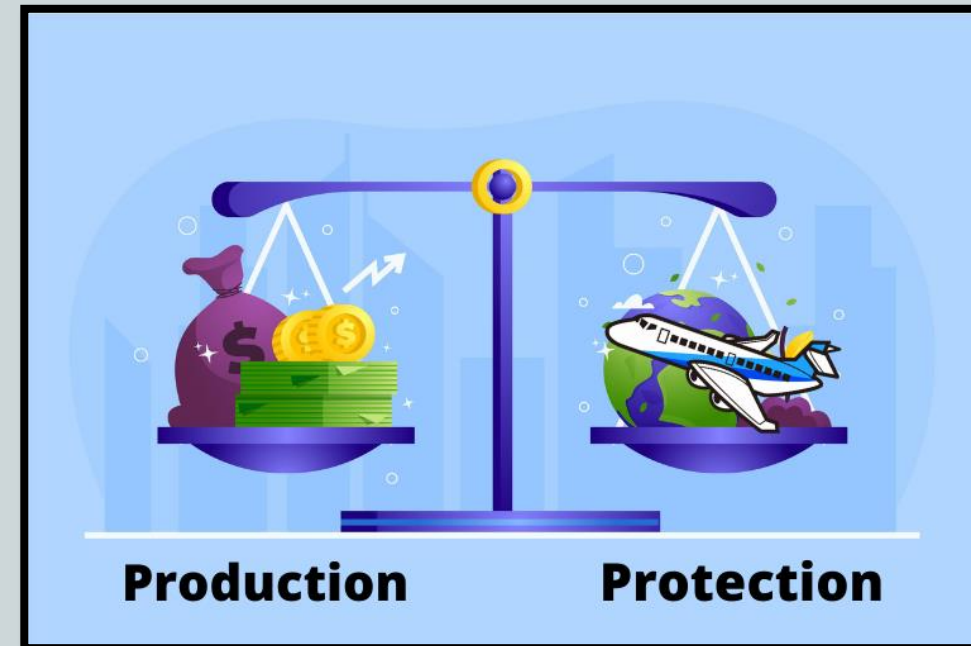


ALoSP and ALARP

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What is As Low As Reasonably Practicable (ALARP)?:

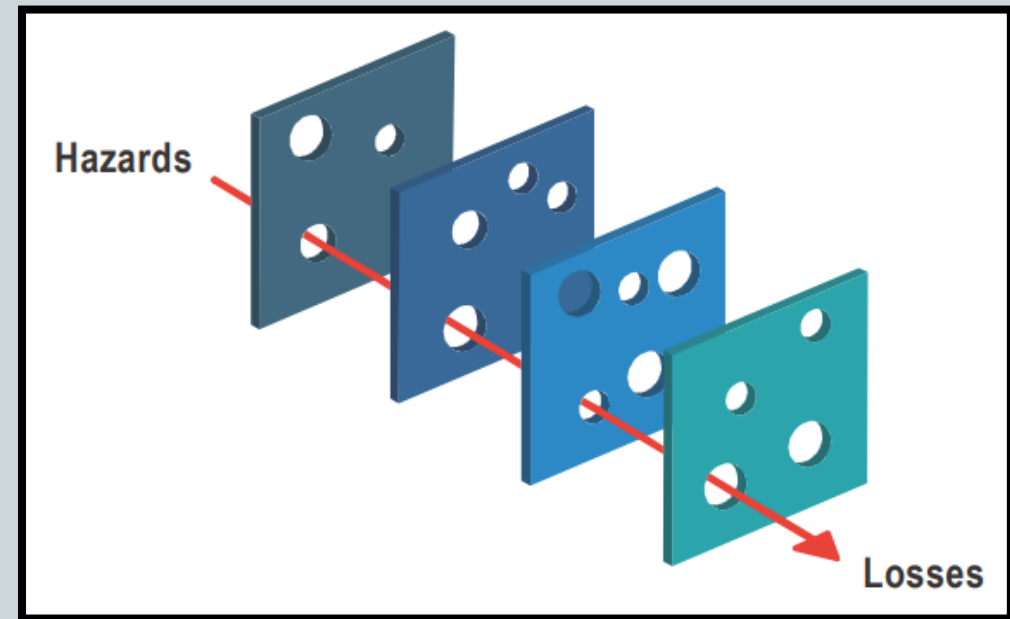
- A level of performance below which strikes a **balance between production & protection**;
- There is **no significant benefit from further mitigations** or where the **cost of** applying mitigation significantly **outweighs the benefit**;
- **We cannot operate without risk**, so there is a point below which further mitigation is unjustified, and this is ALARP



SPIs and Hazards

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- SMS aims to **trap hazards &** thereafter **manage risks** through the **Safety Data Collection and Processing System (SDCPS)**
- The **SDCPS collects & analyses data** for trend analysis, risk mitigation, and monitoring of SPIs and SPTs.
- With **robust SPIs & SPTs** you will be able to trap and mitigate hazards

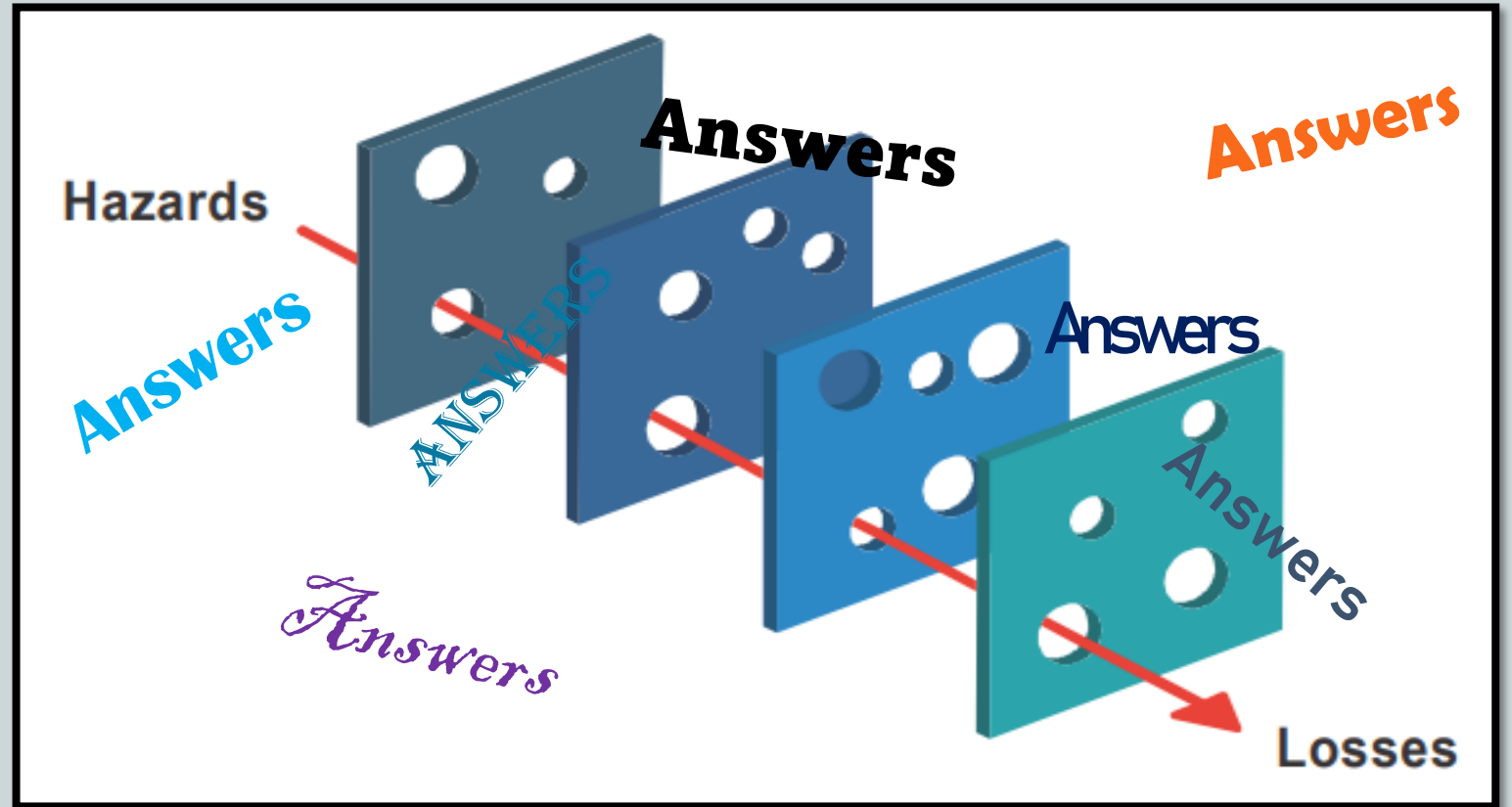


In Conclusion ...

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- **SPIs and SPTs drive your SMS performance**
- **SPIs and SPTs are an essential component of safety assurance**
- **You need to develop your own SPIs and SPTs based on data from your SMS, these are specific to your operational system**
- **SPIs and SPTs shall be accepted by the regulator**
- **SMS and SSP apply to everyone – your contribution counts!**

- Questions?



Thank-you Everyone!

- FROM THE NCAA:
- WE THANK ALL THE PARTICIPANTS AND ALL THE PRESENTERS FOR THEIR TIME AND COMMITMENT TO SAFETY BY MAKING THIS WORKSHOP HAPPEN.