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SAFE SKIES.
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Loss Of Control Inflight - Upset Prevention Recovery Training/TEM

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Loss of Control In-flight (LOC-I) remains one of the most significant contributors to fatal accidents worldwide. LOC-I refers to accidents in which the flight crew was unable to maintain control of the aircraft in flight, resulting in an unrecoverable deviation from the intended flight path.

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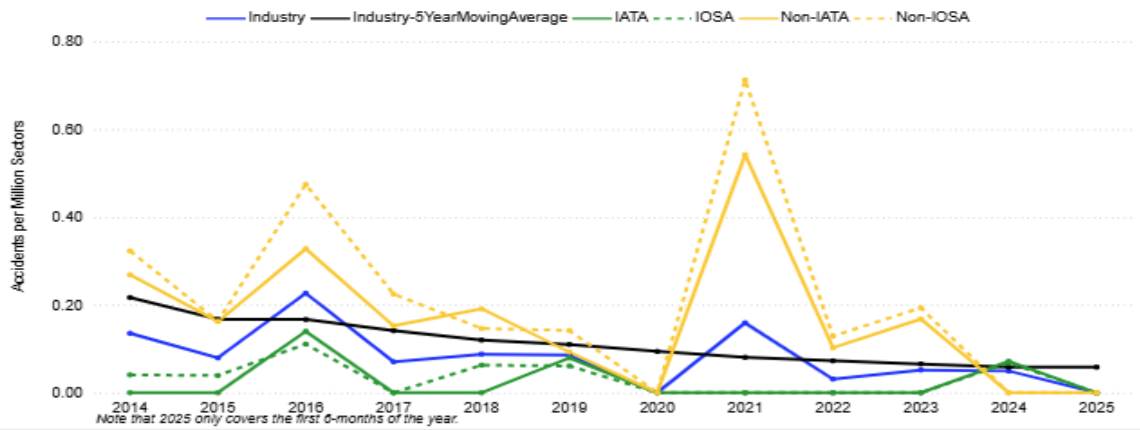
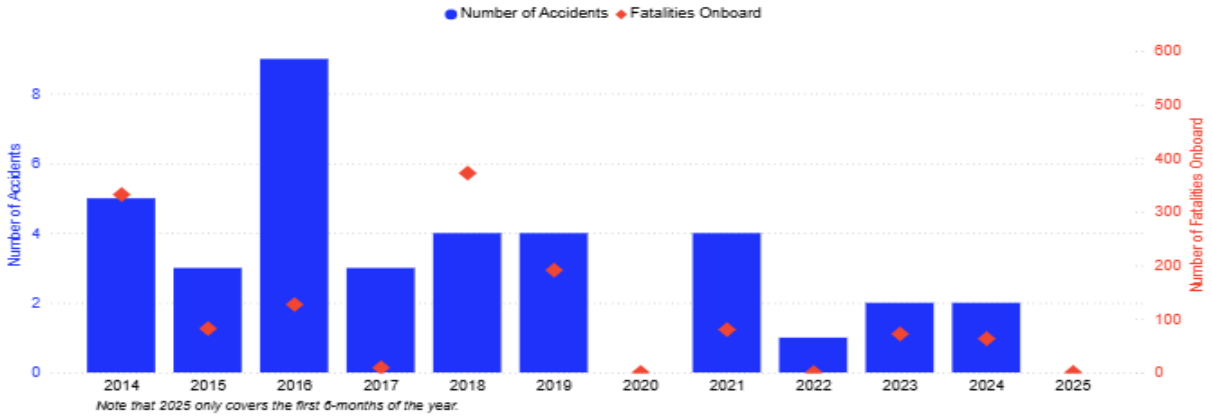
LOC-I Global Accidents From 2014 - 2024

Accidents	Fatal Accidents	Fatalities Onboard	Other Fatalities	Jet	Turboprop	Passenger	Cargo	IATA	IOSA
37	33	1,328	8	15	22	23	13	7	11

Accident Rate (per Million Sectors) by Year * Data source IATA



Accidents and Fatalities Onboard by Year * Data source IATA



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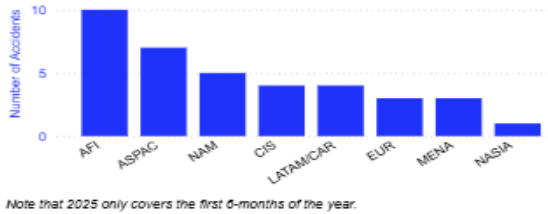
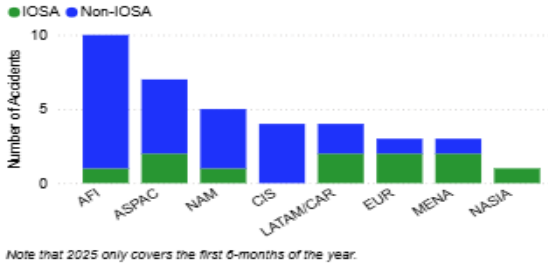
Toggle Region

Accidents by Region of Operator * Data source IATA

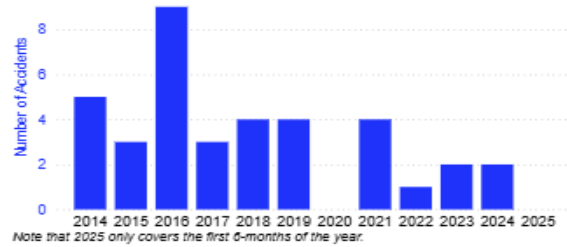


Accidents by Region of Occurrence * Data source IATA

Accidents by Region of Operator * Data source IATA



Accidents by Year * Data source IATA



Accidents by Phase of Flight * Data source IATA

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LOC-I Accidents AFI 2014 - 2024

Accidents	Fatal Accidents	Fatalities Onboard	Other Fatalities	Jet	Turboprop	Passenger	Cargo	IATA	IOSA
10	8	237	7	1	9	5	4	1	1

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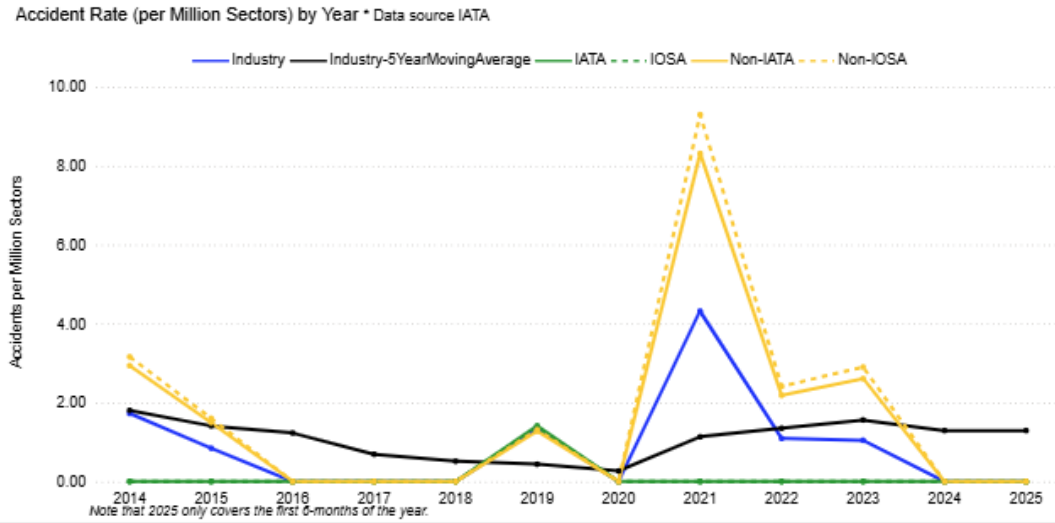
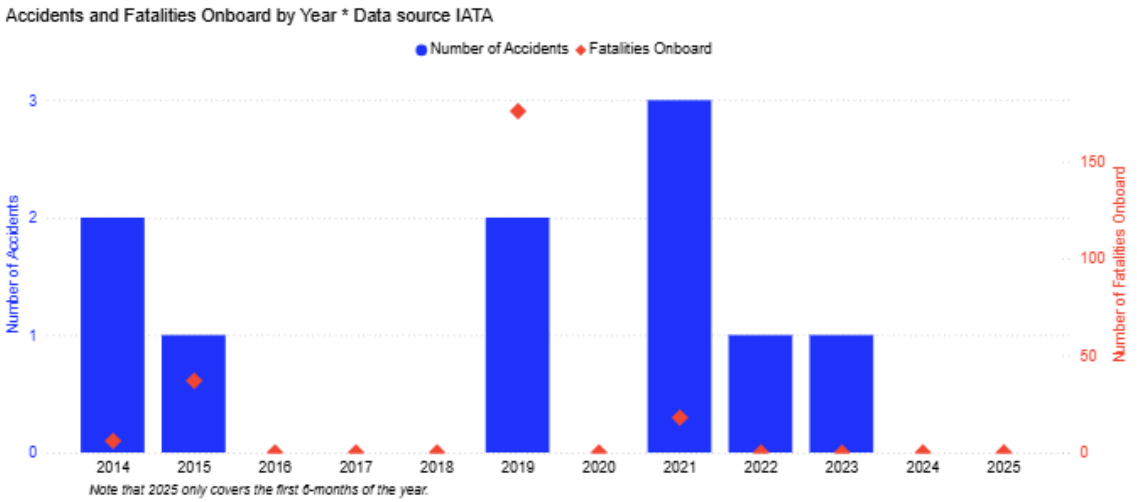
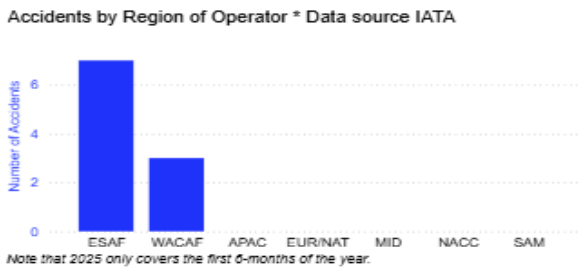
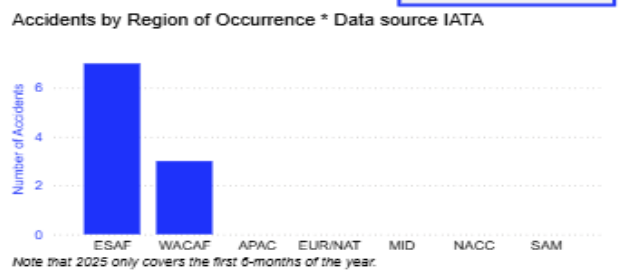
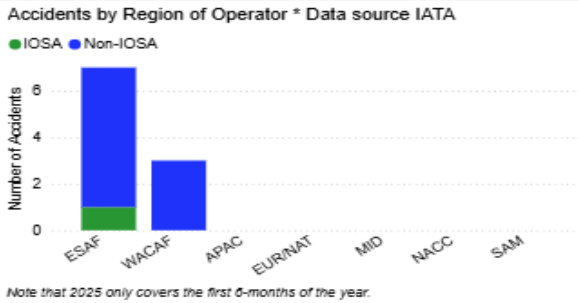
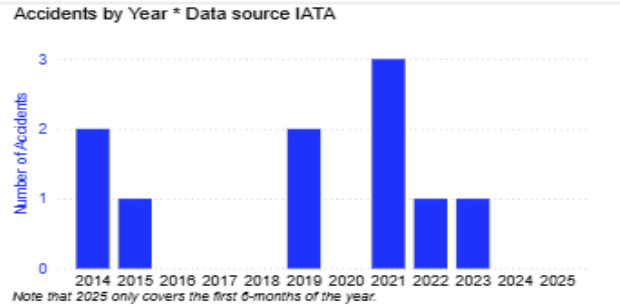






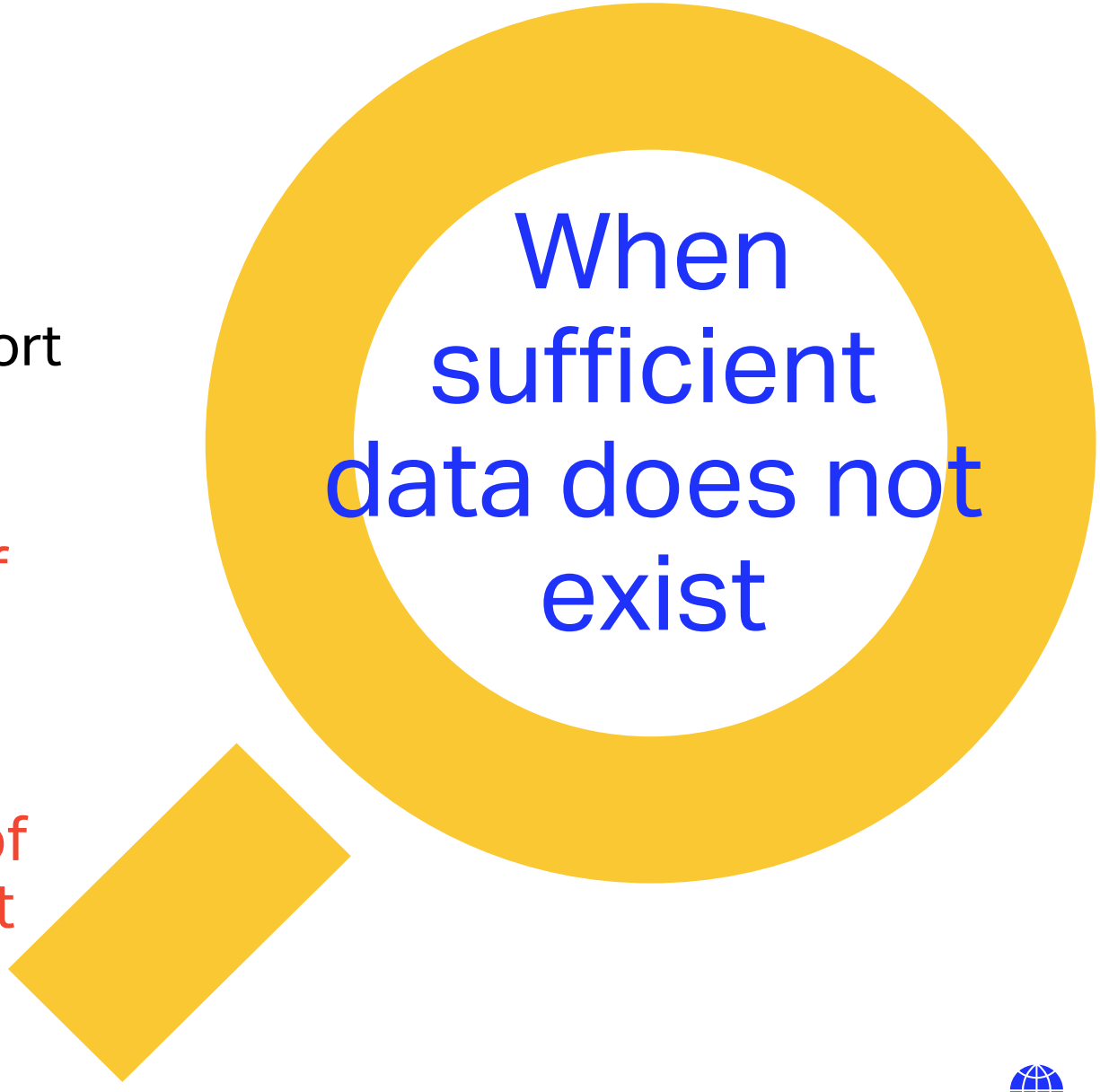






- Insufficient data detracts from accurate safety analysis!
  - Need to encourage better data provision
  - Need to IMPROVE accident report completion timelines

- AFI region has a VERY low rate of meeting Annex 13 accident investigation report completion timelines. AFI region remains the region with the highest number of investigations with no final report shared.



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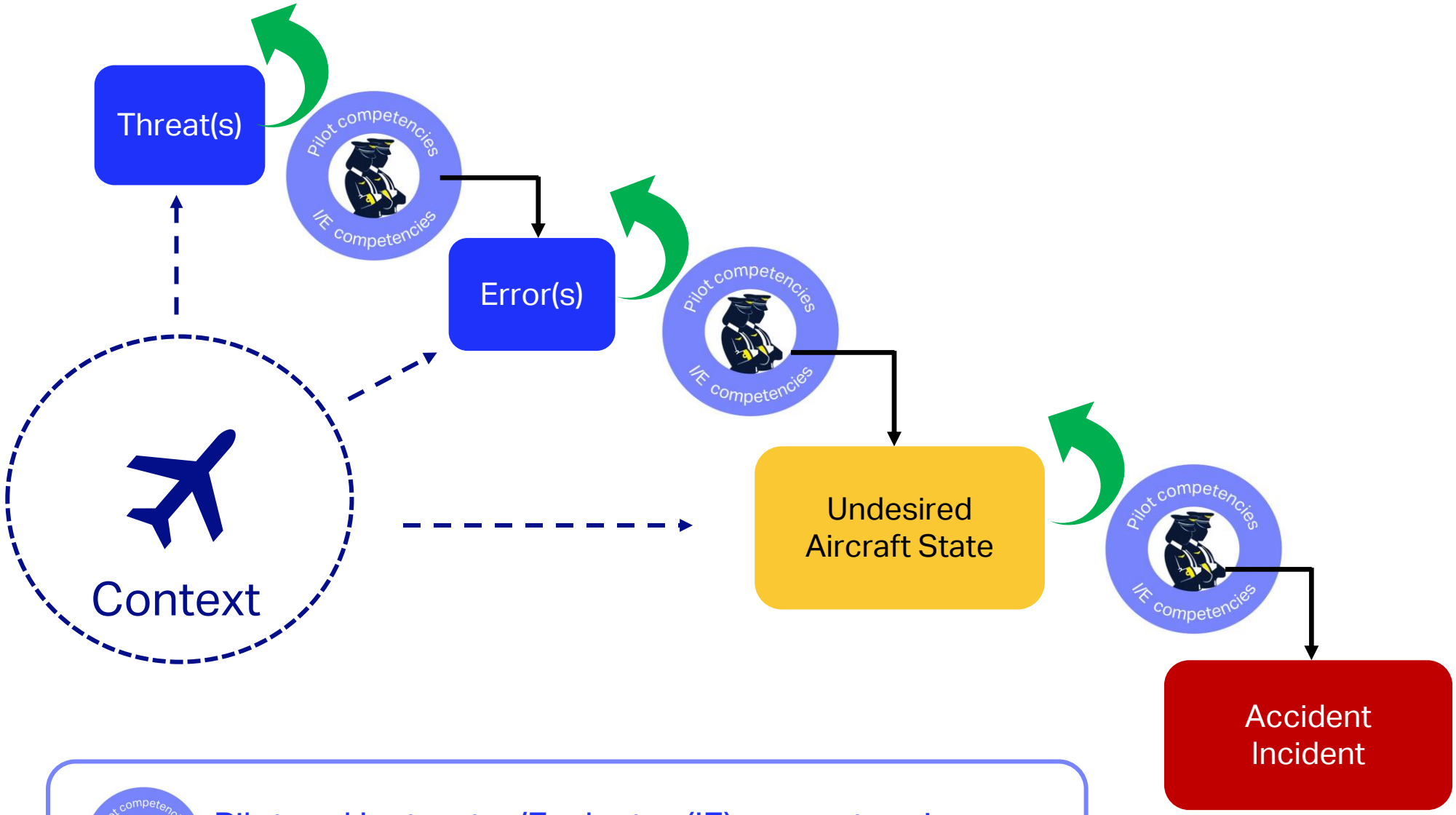
Threat and Error Management Model



Pilot and Instructor/Evaluator (IE) competencies are the individual and team counter measures

Definition - Threats

An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.

Mismanaged threat: A threat that is linked to or induces a flight crew error.

There are two types of threats:

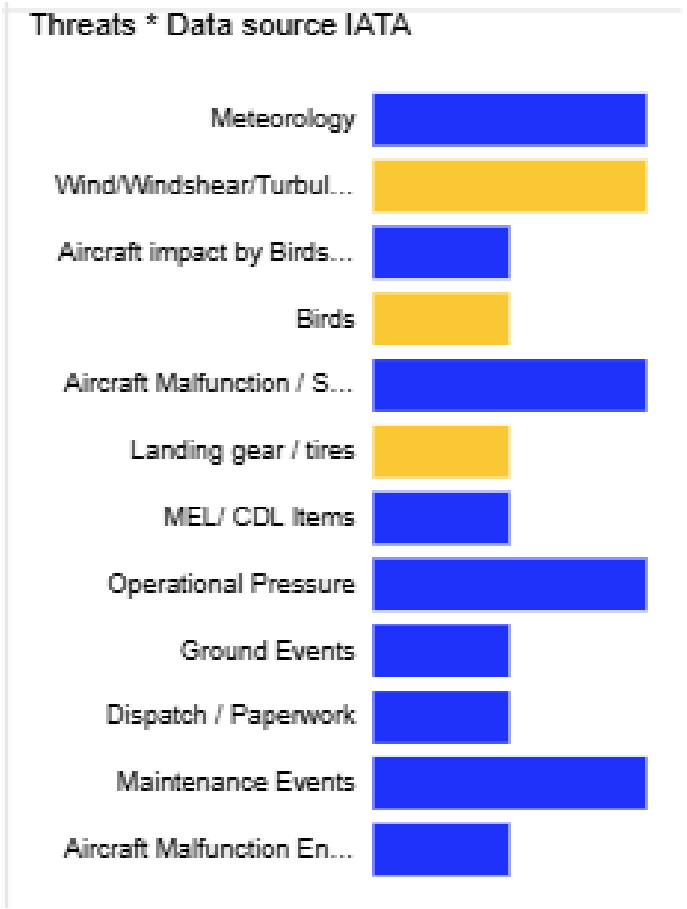
- Environmental Threats – (e.g., methodology, lack of visual reference, birds and foreign objects, etc…)
- Airline Threats – such as aircraft malfunction, flight controls, MEL Items, etc…)

LOC-I Threats

Accident Data: 2014-HY2025

The top contributing factors:

- Operational Pressure
- Maintenance Events
- Meteorology
- Aircraft Malfunction



Top Threats related to AFI Operators

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Definition - Flight Crew Errors

An observed flight crew deviation from organizational expectations or crew intentions.

Mismanaged error: An error that is linked to or induces additional error or an undesired aircraft state.

LOC-I Flight Crew Errors
Accident Data: 2013-HY2024

Top Flight Crew Errors related to AFI Operators

The top contributing factors are:

- Documentation
  - Incorrect Weight & Balance/ Fuel Information (30% of total LOC-I accidents)
  - Systems/Radios/Instruments: incorrect packs, altimeter, fuel switch settings, or radio frequency dialed

- Noncompliance to Standard Operating Procedures (20% of total LOC-I accidents)

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Definition - Undesired Aircraft State (UAS)

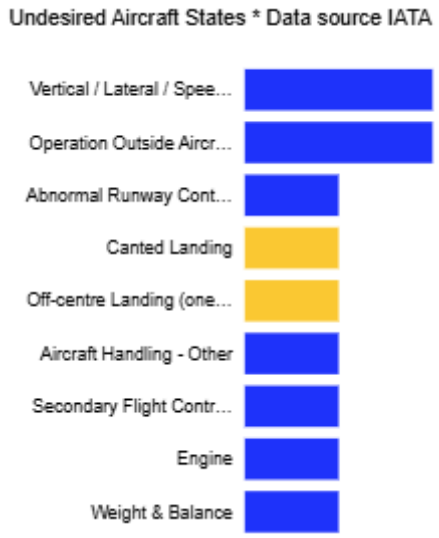
Flight-crew-induced aircraft state that clearly reduces safety margins; a safety-compromising situation that results from ineffective error management

An UAS is recoverable

Undesired Aircraft State (UAS)
Accident Data: 2014-HY2025

The top contributing factors:

- Vertical/Lateral/Speed Deviation
- Operation Outside Aircraft Limitations



Top UAS related to AFI Operators

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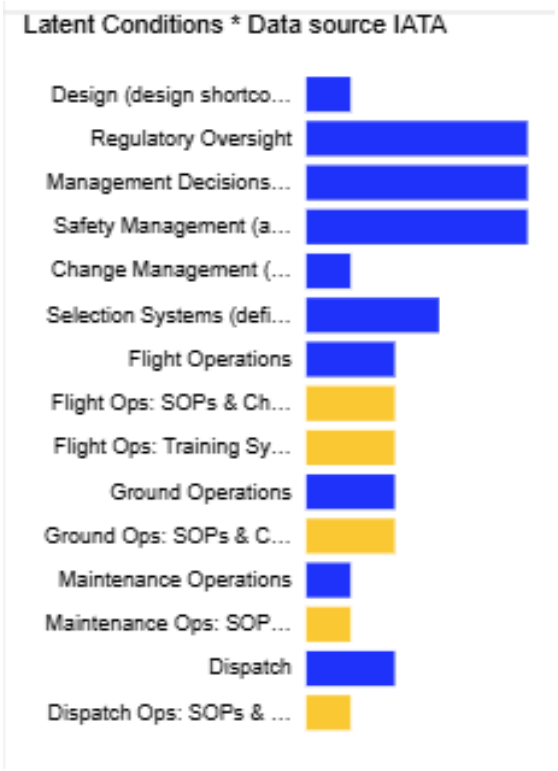
Definition - Latent Condition

Conditions present in the system before the accident and triggered by various possible factors

LOC-I Latent Condition
Accident Data: 2014-HY2025

The top contributing factors:

- Absent or deficient Safety Management
- Deficient regulatory oversight by the state or lack thereof
- Inadequate Management decision, including cost cutting, stringent fuel policy, etc…
- Deficient or absent selection standards



Top Latent Conditions related to AFI Operators

Definition – Flight Crew Countermeasures

Countermeasures that the flight crew can take. Countermeasures from other areas, such as ATC, ground operations personnel and maintenance staff, are not considered at this time.

From a competency-based training and assessment perspective, the competencies of the approved adapted competency model provide individual and team countermeasures to threats and errors and undesired aircraft states. CRM skills are embedded in the approved adapted competency model. Therefore, the CRM training supports the development of the competencies as countermeasures in the TEM concept.
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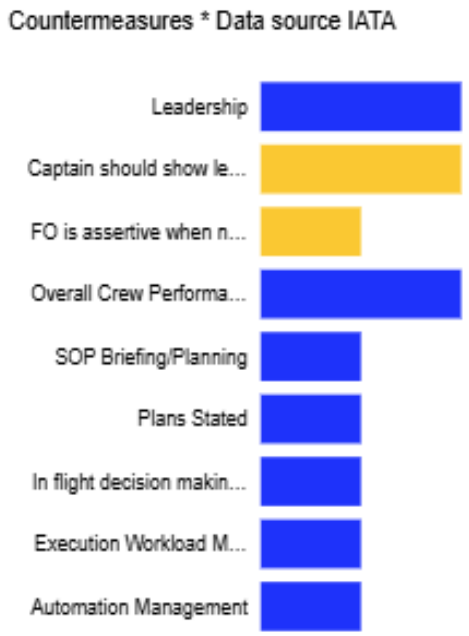
LOC-I Countermeasures

Accident Data: 2014-HY2025

Countermeasures related to AFI Operators

The top contributing factors:

- Leadership
  - Captain should show leadership and coordinate flight deck activities
- Overall Crew Performance where crew members should perform well as risk managers



Threat and Error Management (TEM)

Accidents	Fatal Accidents	Fatalities Onboard	Other Fatalities	Jet	Turboprop	Passenger	Cargo	IATA	IOSA
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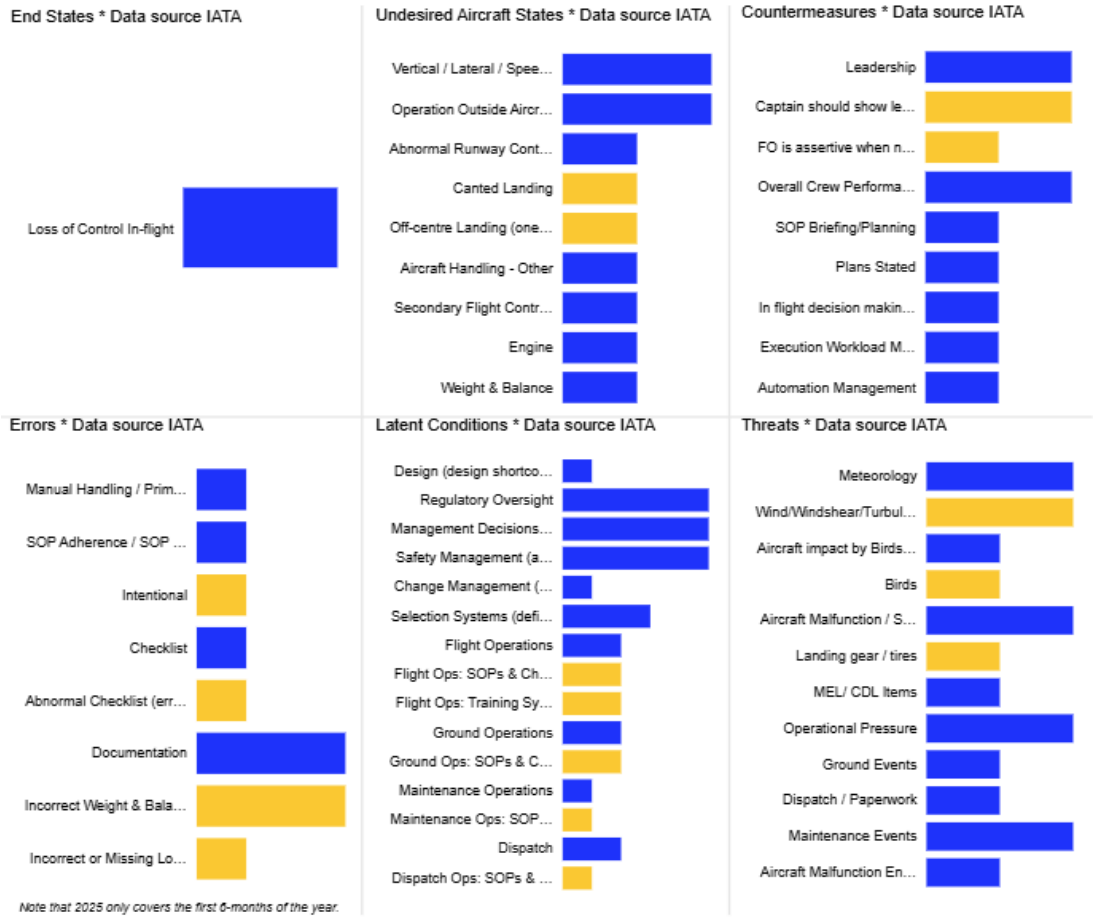
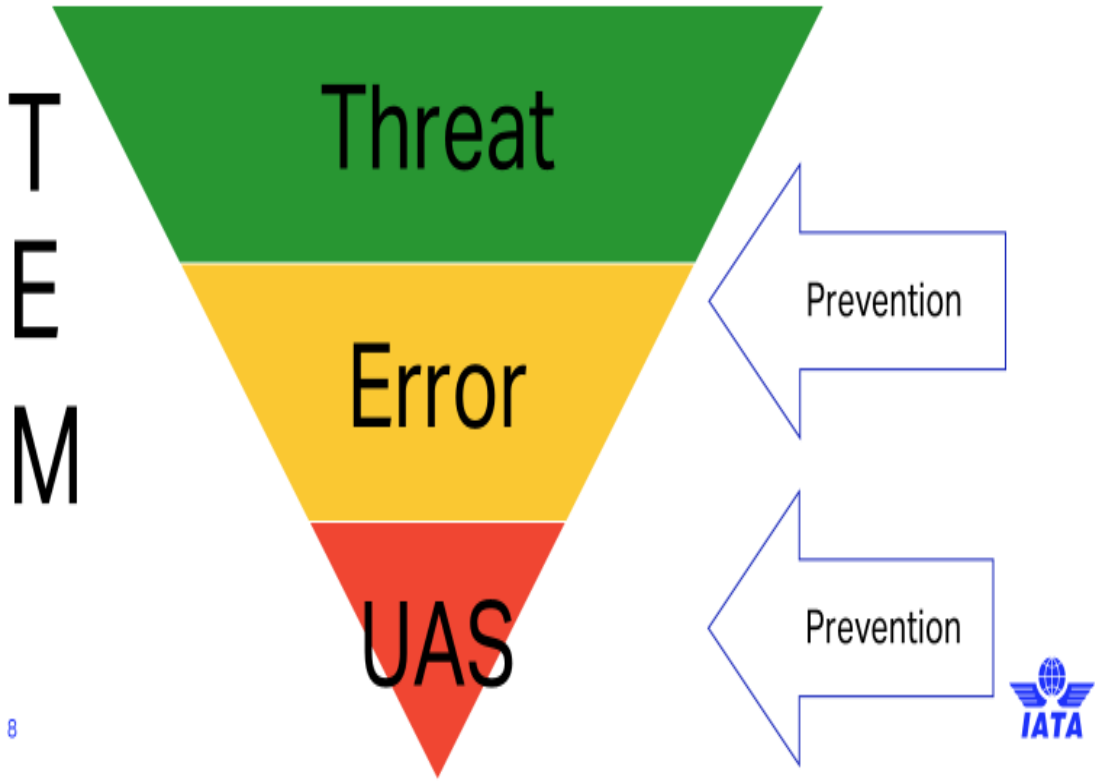
Main categories **Subcategories**



Note that 2025 only covers the first 6-months of the year.



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Breaking the Accident Chain

Pilots should:

- Have the knowledge of the contributing factors that could lead to UAS
- Apply the TEM principles during all the phases of the flight
- Continuously and systematically perform a TEM assessment of the operational context of the flight.

Note The TEM assessment may conduct a specific briefing, and The TEM assessment is a pre-requisite to all technical briefings

- Emphasize the briefing on pre-flight and, in certain phases, impending night or Instrument Meteorological Conditions (IMC) entries that complicate situational awareness and recovery.

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Breaking the Accident Chain

- Exercise all their competencies to mitigate the threats, to detect and correct their errors and to recognize and recover from any UAS.

ICAO Pilot competencies	
• Application of Procedures and Compliance with Regulations [PRO] • Aeroplane Flight Path Management, automation [FPA] • Aeroplane Flight Path Management, manual control [FPM]	• Communication [COM] • Situation Awareness and Management of Information [SAW] • Leadership and Teamwork [LTW] • Workload Management [WLM] • Problem Solving and Decision Making [PSD]

Breaking the Accident Chain

Operators should enhance flight crew training by:

- Implementing Competency-based Training and Assessment (CBTA) to include Evidence Based Training program
- Ensuring Upset Prevention and Recovery Training (UPRT) programs compliance with latest ICAO standards and industry best practices
- Ensuring sufficient time is dedicated to manual flying and management of different level of automation
- Conducting training on energy management in a variety of scenarios and flight phases
- Developing Crew Resource Management skills

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Breaking the Accident Chain

Operators should establish an airline policy that cover the following

- **TEM concept** including,
  - Definitions the concept and definition of Threats, Errors and Undesired Aircraft State
  - Role of pilot competencies as countermeasures
  - Applicability of TEM in operations, (all flight phase, briefing, debriefing etc.)
- **Automation and manual flying**, where pilots
  - Decide level of automation according to operational context (risk assessment)
  - Maintain competence by using all level of automation including manual flying
  - Are ready to change level of automation at all time, if necessary
  - Have clear visibility on operator limitation that could apply
- **Monitoring,** including
  - Definition of monitoring
  - Definition of the PF and PM roles
  - Definition of Area of Vulnerability (AOV) including PF and PM duties depending on AOVs

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Breaking the Accident Chain

- Operators should provide to flight crew effective SOPs integrating TEM principles
- Improve safety management, with risk assessment and the application of SOPs
- Positive Safety Culture: operators should develop an engagement strategy to promote the development of a positive safety culture
  - Learning and improving from events is an important part of a positive safety culture
  - Apply non-punitive culture

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Breaking the Accident Chain

For States

- States together with investigation bodies should improve investigation and accident/incident reporting with the main objective of accident prevention.
- The lack of data is a serious impediment to improvement.

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To Summarize…

1. Operators should complete a risk assessment for Loss of Control, tailoring this generic risk assessment to their own operation, and regularly review it.

2. Operators should provide flight simulation training device (FSTD) training to pilots for managing various meteorological conditions including adverse weather

3. As part of the evidence-based training (EBT) and competency-based training and assessment (CBTA), operators are recommended to use and monitor FOQA/FDM data analysis and other data sources to create realistic training scenarios, taking into account the FSTD fidelity, the pilots feedback, and the human performance aspects.

4. Operators should provide pilots with training on the different weather radar types available within a given aircraft fleet and for this to be representative of the radar installed on the specific aircraft.

5. Operators should provide pilots with the theoretical knowledge of the advanced weather radar functions and its limitations.

6. Operators should provide pilots with scenario-based simulator training representing the airline's operational and environmental context complexity.

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7. . Operators should ensure that flight monitoring management/flight operational quality assurance (FDM/FOQA) programs integrate human performance elements such as the two pilot's competencies in flight path management - manual control (FPM) flight path management - automation (FPA), while maintaining a positive safety culture.

8. Operators shall ensure that full flight simulator (FFSs) are qualified against the relevant Upset Recovery and Prevention Training (UPRT) elements in accordance with the latest certification specifications in order to avoid negative transfer of training.

9. Operators should ensure dispatchers provide contingency routes for dynamic rerouting, i.e plan multiple routes, around areas of known convective activity including fuel figures associated to the potential rerouting

10. Operators should advocate for ATC to provide operators in advance with multiple departure and arrival routings in case of weather developments, traffic patterns, or congestion to ensure the dispatchers include them in flight pre-planning.

11. Operators should describe in their operation manual a TEM based decision making process to be applied by the pilots in operations.

12. Operators should consider OEM recommendations for the use of FFS motion for UPRT exercises.

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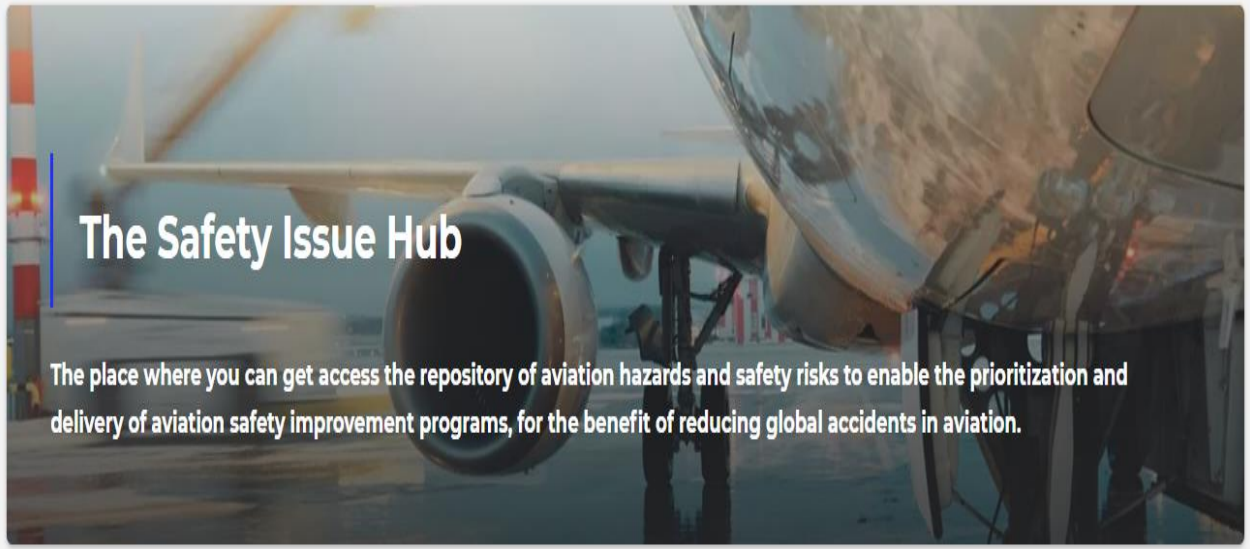

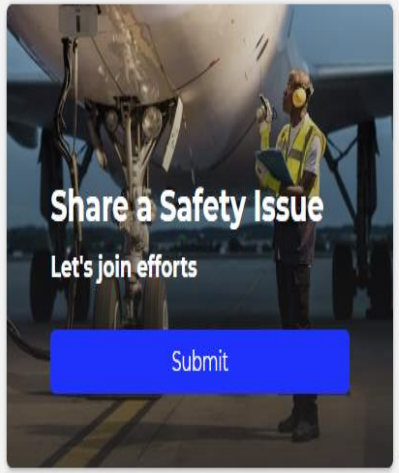

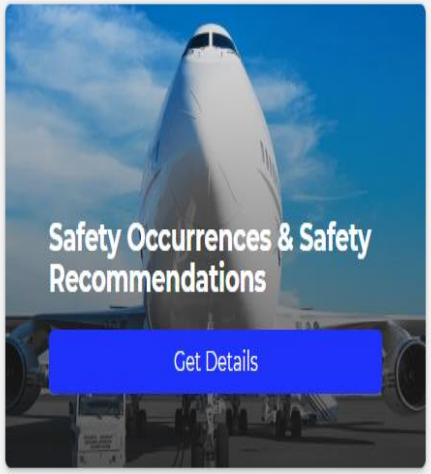

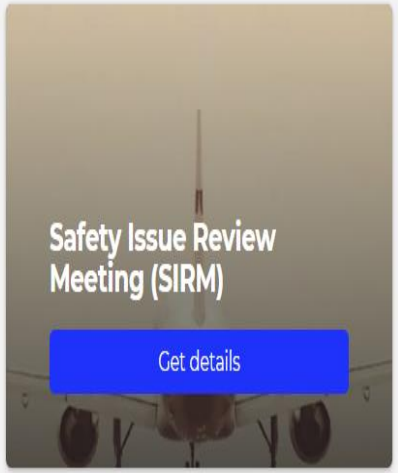

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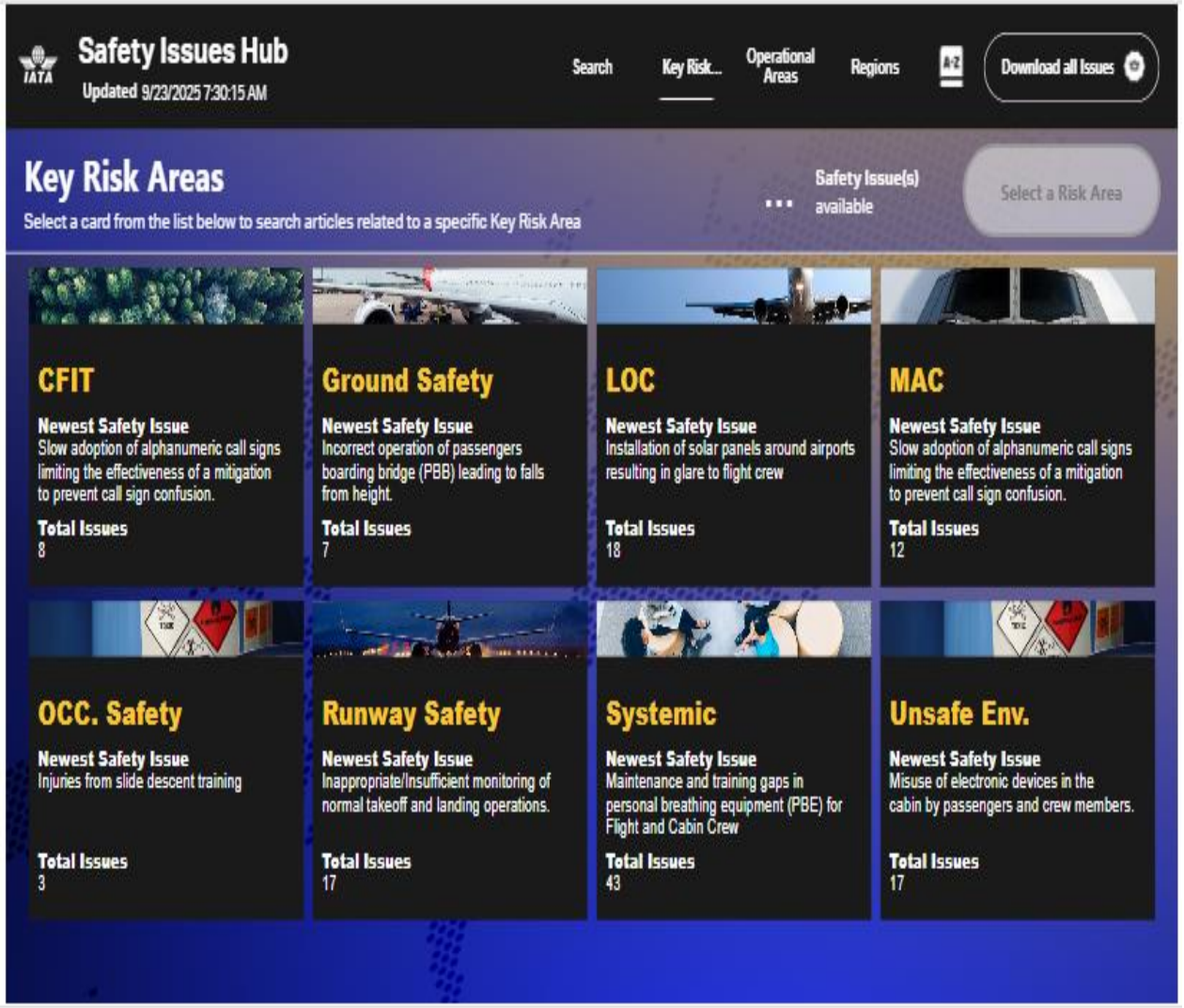

[18 LOC Safety Issues Identified]

[Further Guidance Available Here]