Starting soon

Integrated Risk Management (IRM) Webinar

INTERNATIONAL CIVIL AVIATION ORGANIZATION

3 September 2026

Starting now

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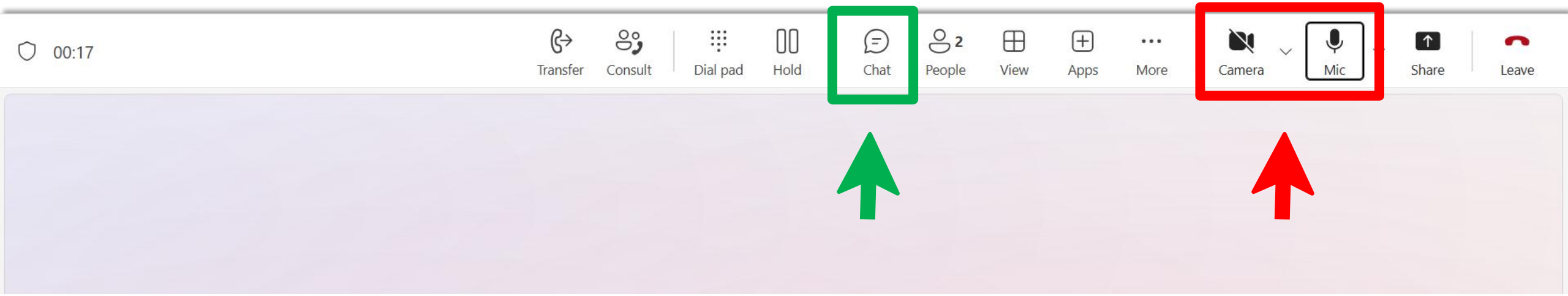

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Presentation Overview

01 **Introduction to IRM**

Mr. Erwin Lassooij, ICAO, Senior Advisor Air Navigation Bureau

02 **Progress on the Guide to IRM**

Mr. Erwin Lassooij, ICAO, Senior Advisor Air Navigation Bureau

03 **IRM in Practice: Examples from Different Perspectives**

Dr. Michael Gerhard, Mr. Adam Borowski, Mr. Aigars Krastins, EASA; Mr. Michel Arnould, EUROCONTROL

04 **Interactive IRM Exercise and Roadmap Feedback**

All participants

05 **Discussion and Questions**

All participants

06 **Closing Remarks and Next Steps**

Mr. Erwin Lassooij, ICAO, Senior Advisor Air Navigation Bureau

Welcome and Housekeeping

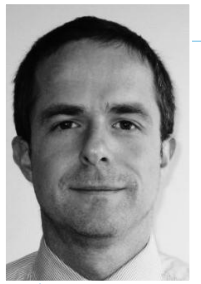
Ms. Connie Hart
Integrated Risk Management and Resilience Consultant at ICAO; Moderator for today's webinar

Mr. Erwin Lassooij
Senior Advisor Air Navigation Bureau, Acting Chief Safety Management Section, and IRM Secretariat Coordinator at ICAO

Dr. Michael Gerhard
Safety Risk Management Section Manager at EASA

Mr. Adam Borkowski
Senior Expert Aviation Security and Intelligence at EASA

Mr. Aigars Krastins
Senior Aviation Safety Risk Manager at EASA



Mr. Michel Arnould
Agency Risk Manager at EUROCONTROL

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Join at slido.com
#1694495

Which ICAO region are you joining from?

What type of organization do you represent?

In which area(s) do you work?

In a few words, what does the term "Integrated Risk Management (IRM)" mean to you?

01. Introduction to IRM

Background – Starting the IRM conversation

01. Introduction to IRM cont'd

Background – How risk management evolved

Reactive: wait for something to happen such as through accident reports

Proactive: not wait for accidents to happen and through safety intelligence where we analyze aviation data to anticipate potential safety and other aviation risks

Integrated Proactiveness: when one domain identifies a risk and develops treatment plans now coordinates with other domains for cross-domain impacts

01. Introduction to IRM cont'd

Practical risk examples

	Conflict Zones	GNSS RFI	Lithium Batteries	Cyber Attack	COVID-19
Economics	X	X	X	X	X
Environment	X				X
Facilitation			X	X	X
Safety	X	X	X	X	X
Security	X	X	X	X	X

The nature and significance of the impacts will vary by event and context

01. Introduction to IRM cont'd

Example: conflict zones (trade-offs across domains)

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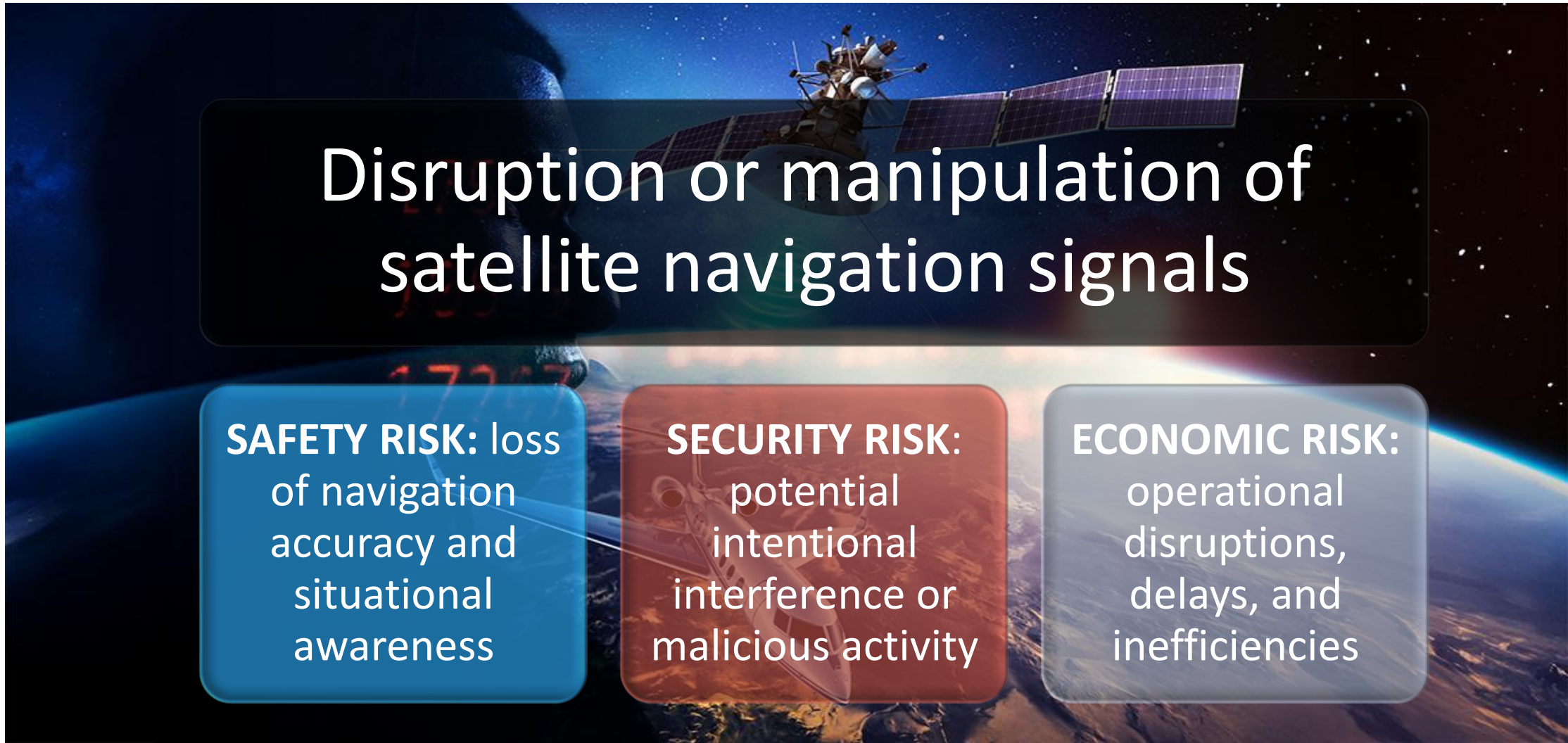
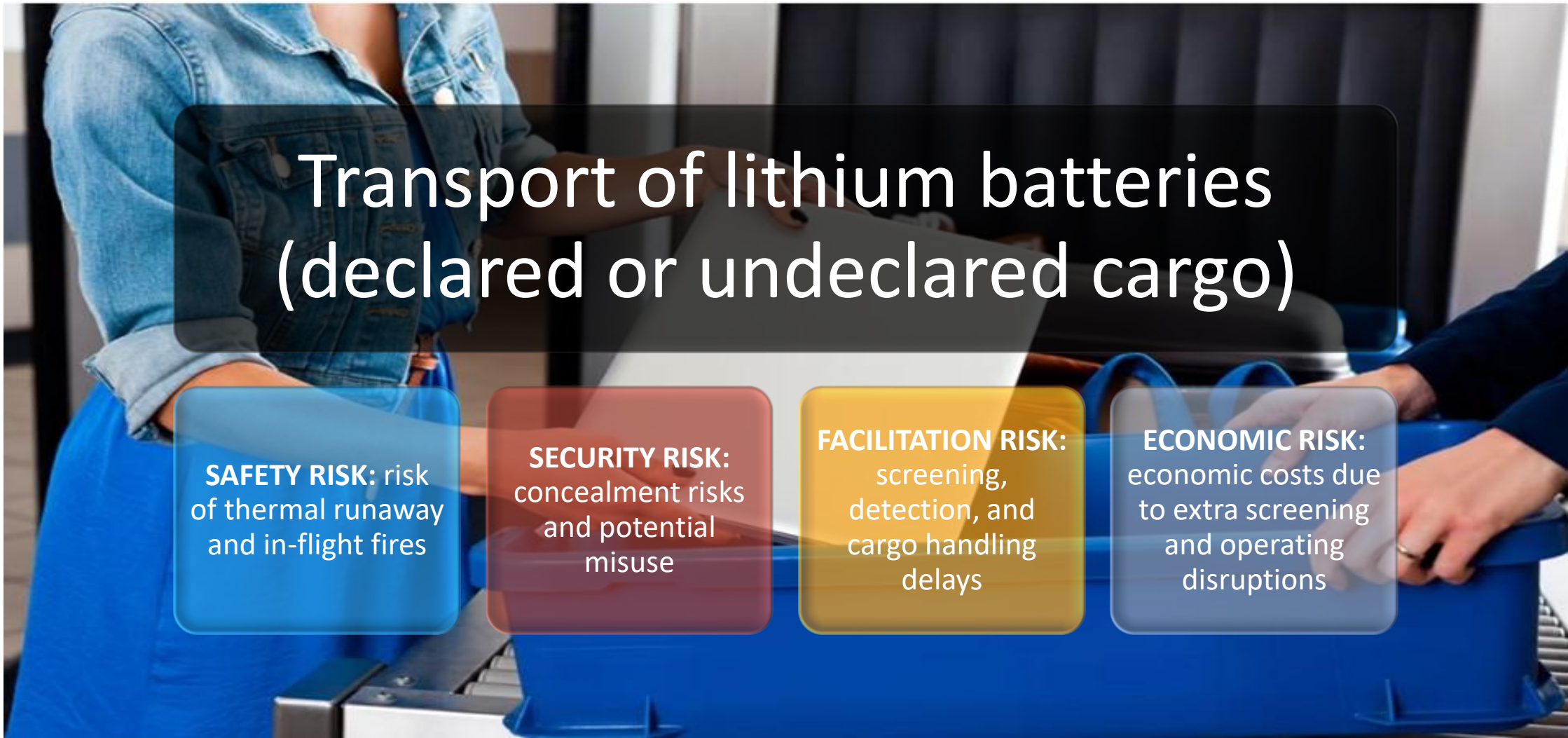
01. Introduction to IRM cont'd

Example: GNSS interference – RFI/spoofing/jamming (cascading impacts across systems)



01. Introduction to IRM cont'd

Example: lithium batteries (risk transfer across domains)



01. Introduction to IRM cont'd

Example: cyber attacks (system-wide disruption)

01. Introduction to IRM cont'd

Example: COVID-19 (entire system disruption across all domains)

01. Introduction to IRM cont'd

Why IRM matters

Aviation risks are interconnected:

Risks and their consequences can extend across multiple domains

Managing risks in isolation may create new risks:

A treatment in one area may transfer or increase risk elsewhere

Fragmentation limits coordinated decision-making:

Different structures, terminology, and methodologies can make coordination difficult

IRM reduces overall system risks:

IRM supports coordinated decisions that consider cross-domain impacts and potential trade-offs

01. Introduction to IRM cont'd

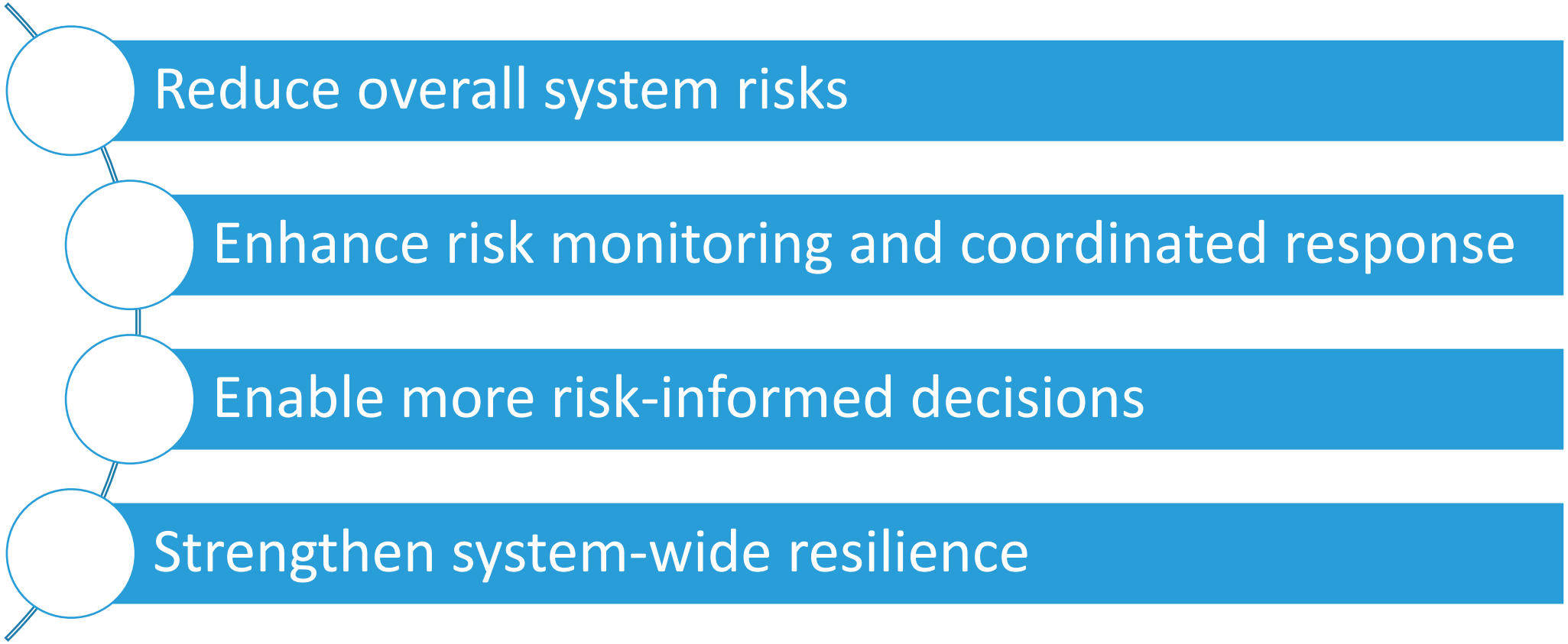
What is IRM?

IRM provides a coordinated approach to:

- identify risks and treatments that may affect multiple aviation domains
- connect existing domain and enterprise risk management arrangements
- involve affected domains in assessing cross-domain impacts
- support coordinated, risk-informed decisions
- preserve existing responsibilities, expertise, and approved methodologies

01. Introduction to IRM cont'd

Benefits of IRM



01. Introduction to IRM cont'd

January to June 2025: establishment of an IRM Study Group (IRM SG), IRM Secretariat Team, and three Working Groups (WGs)

Nominations received from 25 States and International Organizations

- **States**
  - Australia, Brazil, Canada, China, Cuba, France, India, Oman, Portugal, Saudi Arabia, Senegal, Singapore, United Arab Emirates, United Kingdom, United States
- **International Organizations**
  - ACAO, ACI, AFCAC, EASA, Eurocontrol, European Commission, IATA, IBAC, ICCAIA, IFALPA

WG1: Terminology and Benefits

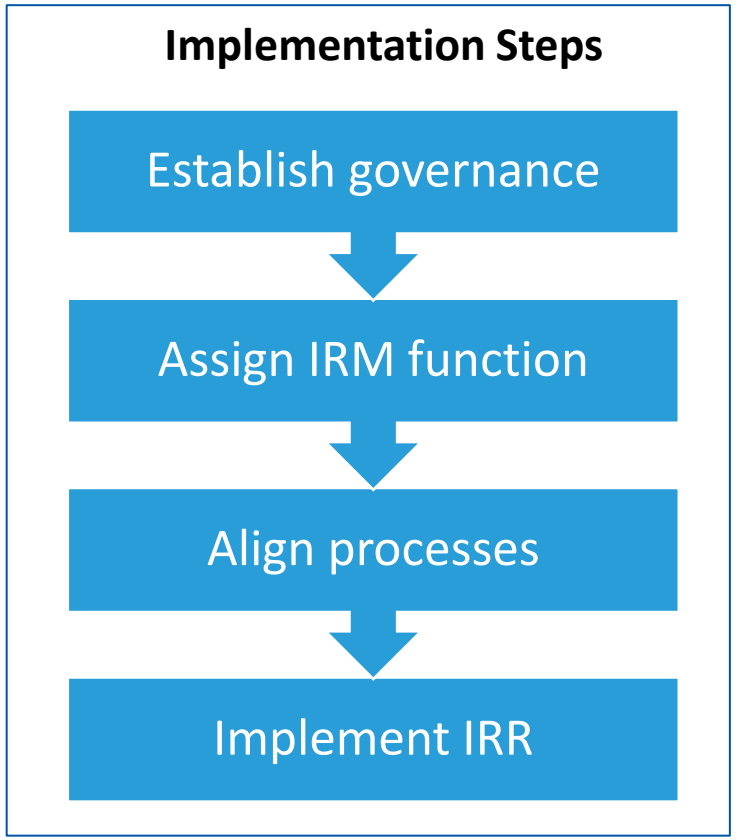
WG2: Risk Management and Resilience

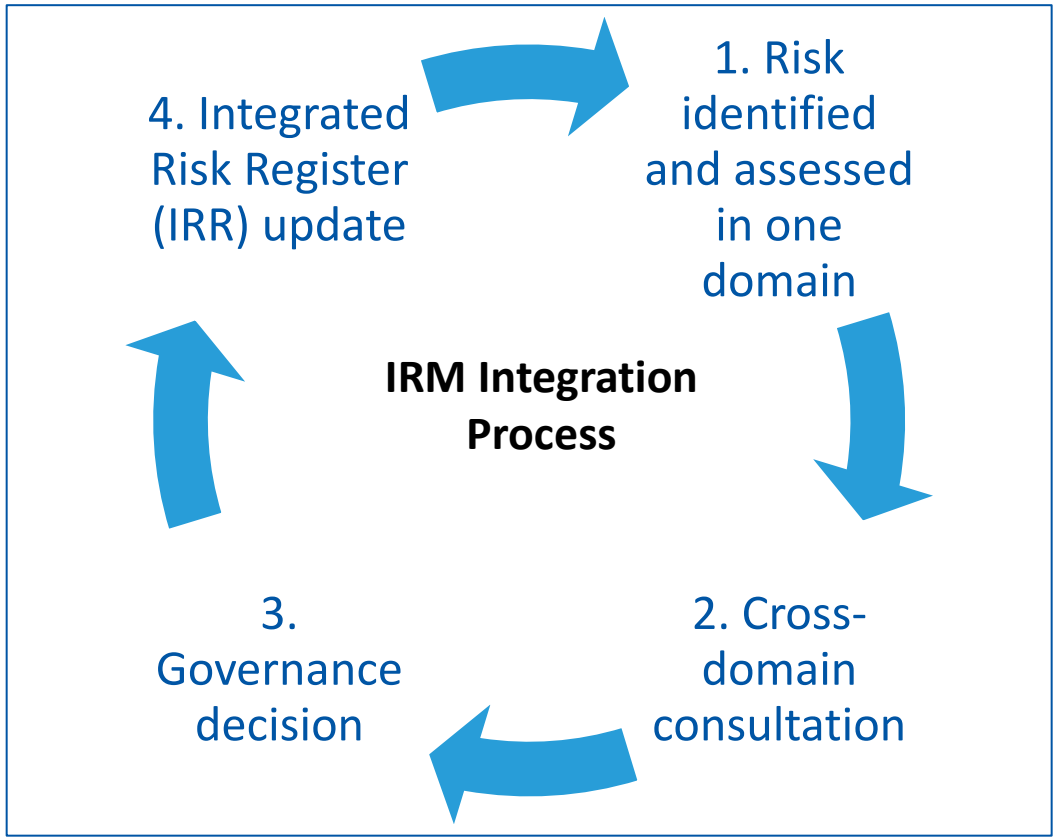
WG3: Sharing and Exchange of Data and Information

IRM Secretariat Team: experts from the Safety, Security, Environment, Facilitation, and Economics domains

01. Introduction to IRM cont'd

The IRM framework





Critical success factors: governance-led, common methodology, IRR, and cross-domain coordination

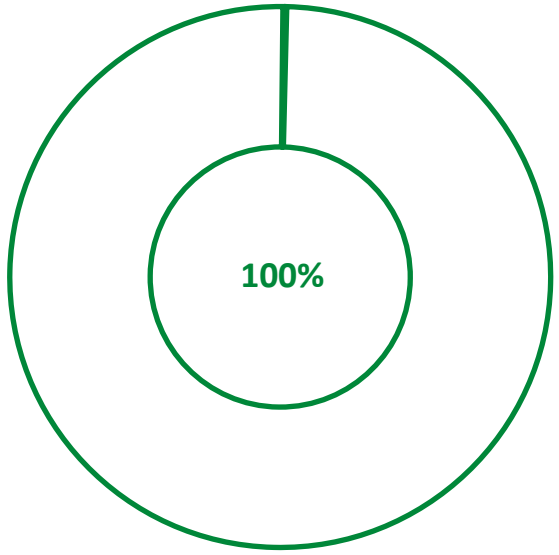
01. Introduction to IRM cont'd

What the Guide is intended to do

- Provide a foundational and practical introduction to IRM
- Connect and strengthen existing risk management arrangements
- Support entities at different levels of risk management maturity
- Enable progressive, scalable, and proportionate implementation
- Preserve existing domain responsibilities, expertise, and methodologies

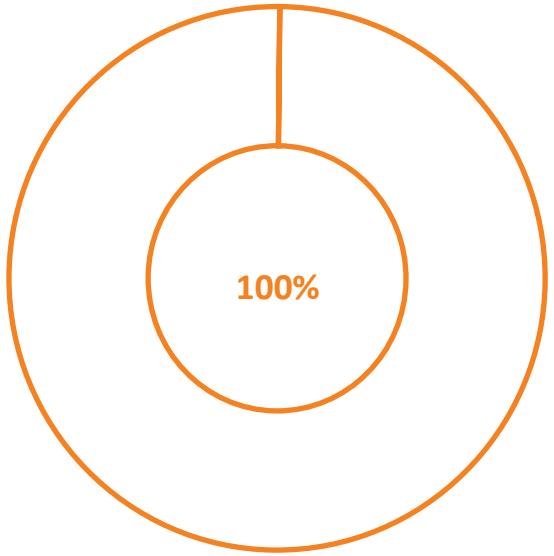
02. Progress on the Guide to IRM

Progress snapshot



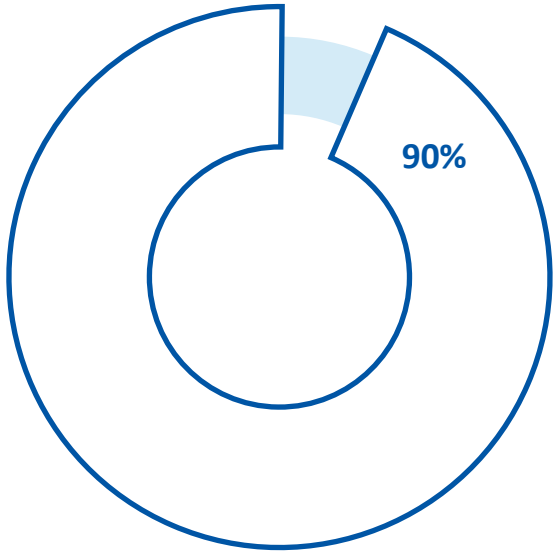
Study Group Governance

Established and completed



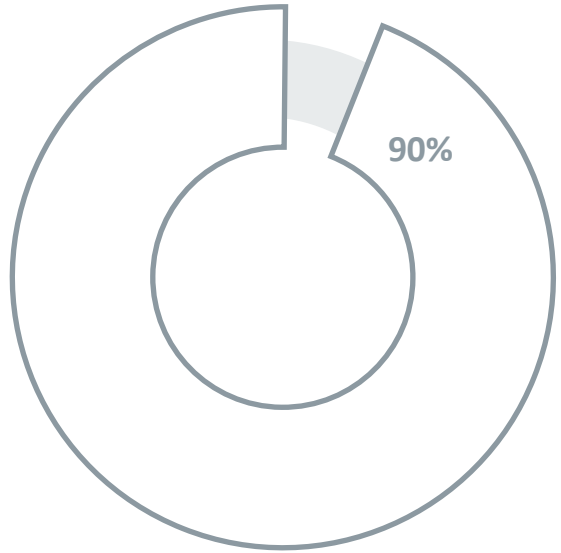
IRM Framework

Developed and completed



Guide to IRM Drafted

Final review underway



Expert Group and Stakeholder Consultation

Comments being consolidated

On track for final review at IRM SG/3 and advanced unedited publication in November 2026

03. IRM in Practice: Examples from Different Perspectives

IRM in Practice: Examples from different Perspectives

EASA & EUROCONTROL

ICAO
Integrated Risk Management (IRM) webinar
03 September 2026

Table of content

EASA
European Union Aviation Safety Agency

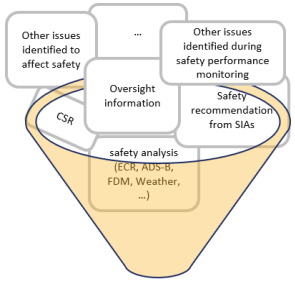
IRM in EASAs Safety Risk Management Practice

IRM governance and examples of interconnected risks

Michael GERHARD
Safety Risk Management Section Manager

Safety Risk Management @ EASA

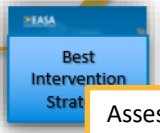
management of systemic safety risks at the level of all 27 EU MS + 4



collection of safety information

monitoring whether risks are mitigated to acceptable level

safety risk register

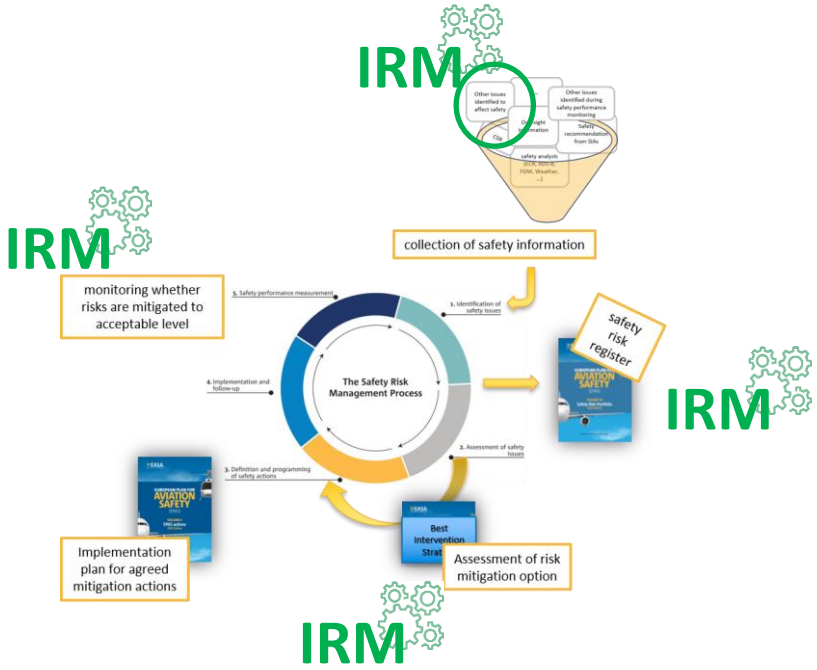


Assessment of risk mitigation option

Implementation plan for agreed mitigation actions

Relevance of IRM in safety risk management

creating awareness - connecting data /information – collaborating - connecting processes – assessing holistically



Collection of safety information

ensure access to any information that could cause a safety deficiency - the source, perspective or domain is irrelevant

Safety risk register

connect safey risks with risks identified in other domains; at least point out the interconnection

Assessment of risk mitigation options

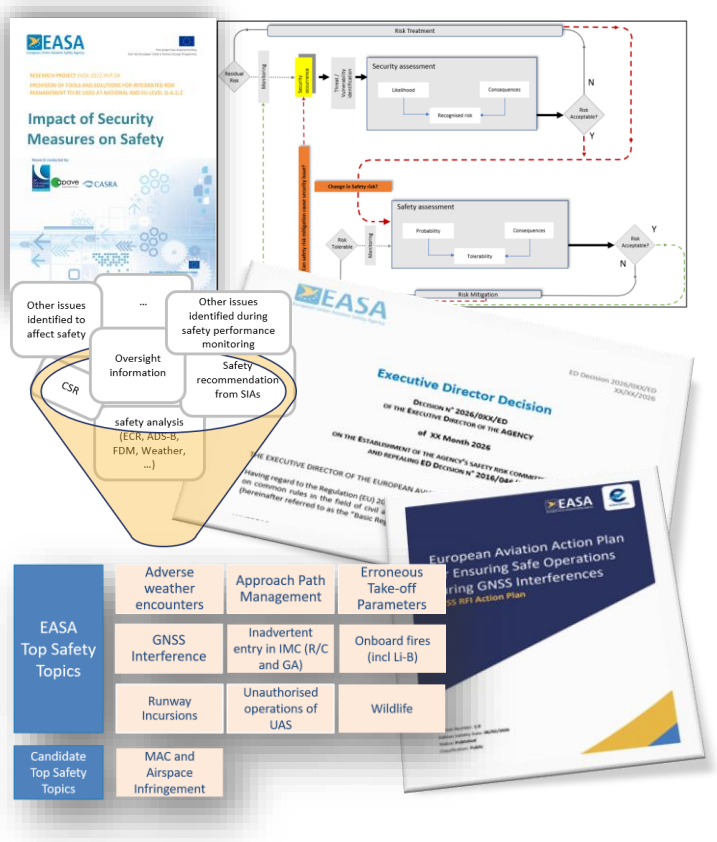
when assessing the possible mitigation actions consider the impacts on other domains / perspectives; the best intervention reflects the entire system

Monitoring 'effectiveness' of actions taken

monitor beyond safety performance: have the actions caused unintended consequences that need to be considered by other domains / perspectives?

How has EASA been gradually increasing its IRM capabilities?

- → **Research** to better understand interdependencies between safety and security
- → SRM **Process Review** in 2025 to
  - → Expand access to relevant (and diverse) data and safety intelligence
  - → Connect risk mitigation committees for a holistic approach and informed decision-making
  - → Identify and manage top safety topics holistically
- → **Collaborate** and form **cross-domain expert groups** to assess high-profile risks and mutually contribute to the other risk management process(es)
- → **Joint action plans** with other organisations
- → Conduct holistic **impact assessments** to determine the best intervention strategy



Examples of IRM in EASAs SRM practice

Risk mitigation in one area (or introduction of innovation / change) may create or exacerbate a risk in another

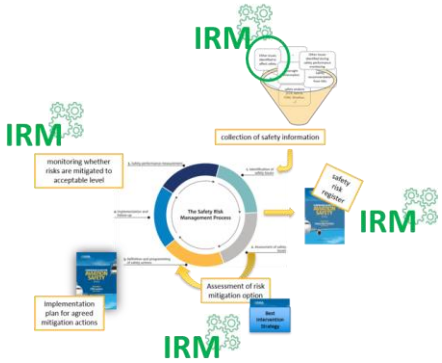
- Lockable cockpit doors
- Ban of laptops in the cabin
- Counter-UAS measures in vicinity of airports
- Introduction of SAF
- …

External risks

- Conflict zones
- (adverse) weather
- Space debris
- …

Multifaceted risks

- Operations of UAS in vicinity of airports
- Cyberattacks
- GNSS interference
- …



Specific awareness

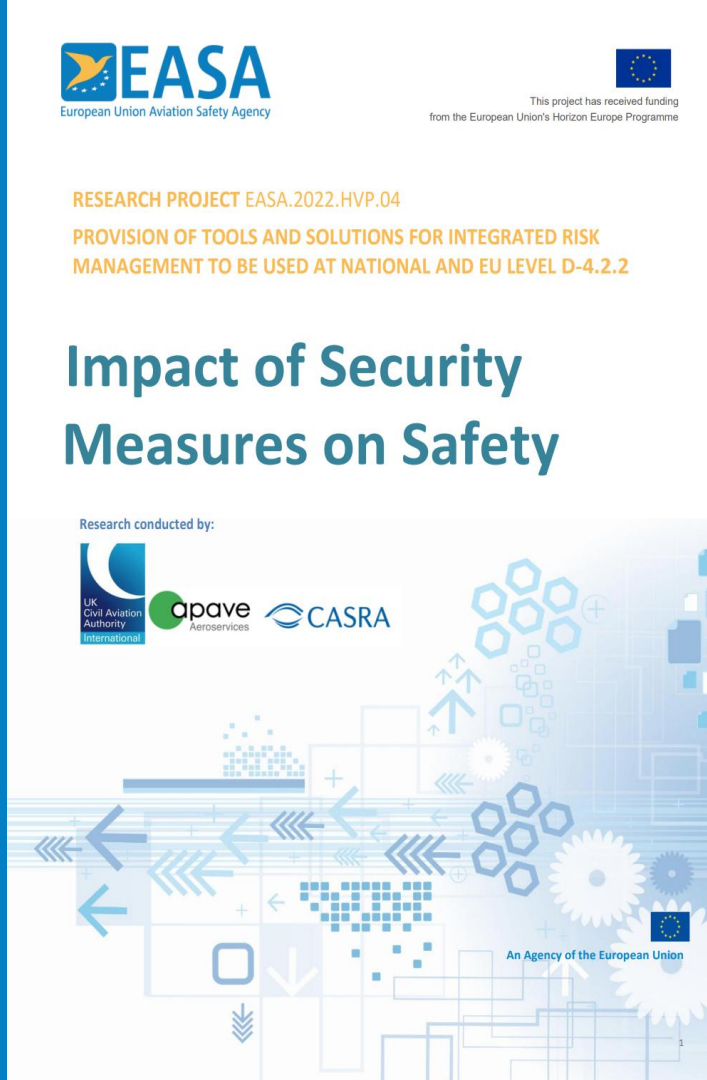
- Temporarily included in the SRP a dedicated COVID-19 portfolio

EASA
European Union Aviation Safety Agency

EASA Research Study - Impact of Security Measures on Safety

Adam BORKOWSKI
Senior Expert - Aviation Security and Intelligence

An Agency of the European Union



Outcomes of the research study

- **Research study**: Impact of Security Measures on Safety
- **Safety and Security:** Different risks - one aviation system

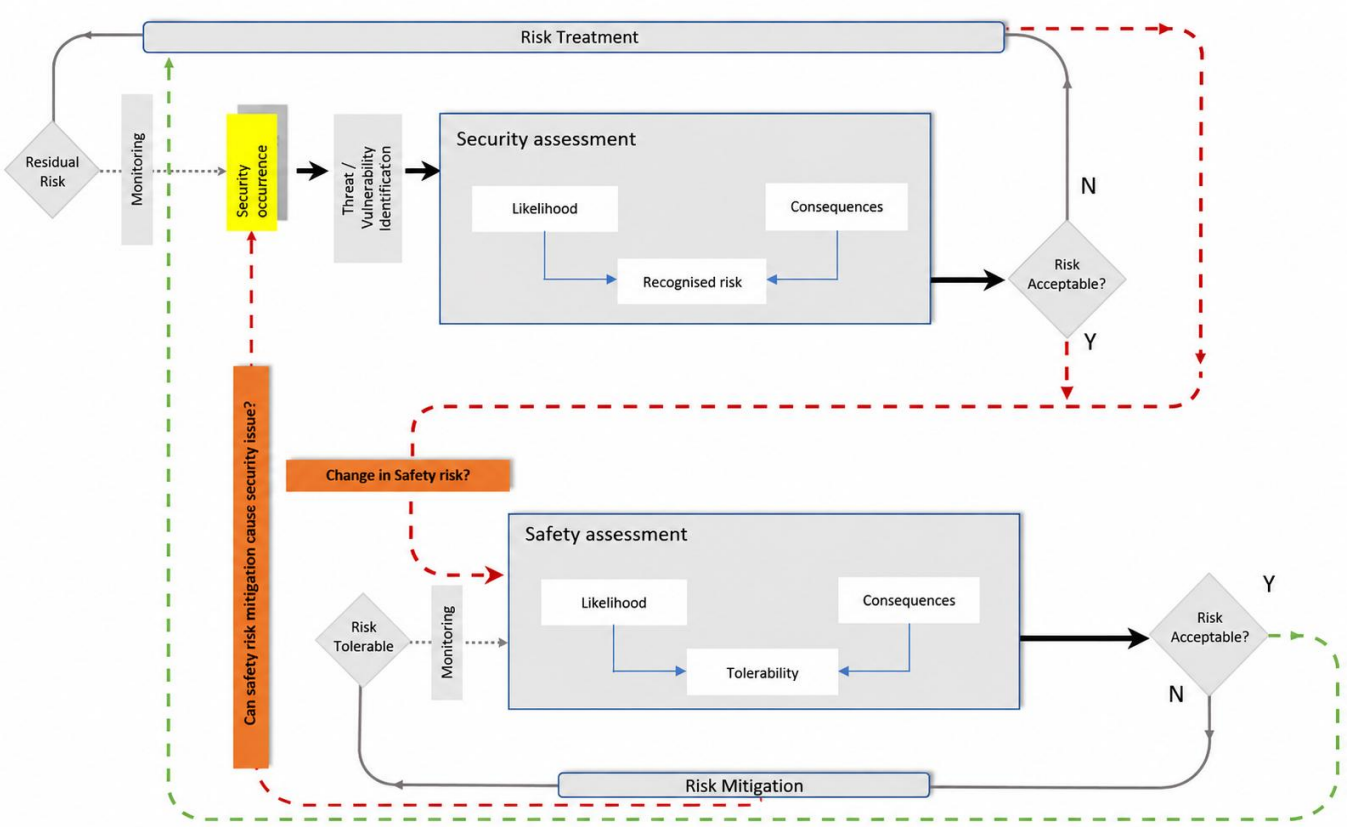
What the research found:

- Different terminology and risk matrices
- Barriers to intelligence and information sharing
- Different organisational approaches and maturity levels
- Strong support for better safety - security alignment
- Need for guidance and sharing of good practices

What the research recommends:

- Assess the current level of integration
- Encourage integrated management systems
- Develop knowledge and capability
- Use interconnected tools to create a **common risk picture and support coordinated decision-making**

Integrated Management: linking safety and security



Key principle:
Safety and security risks remain assessed through their respective processes, while the impacts of risk treatment and mitigation are systematically assessed across both domains.

Integrated management ≠ one methodology and single governance for all domains

EASA
European Union Aviation Safety Agency

IRM in Practice: Conflict Zones

Adam BORKOWSKI
Senior Expert - Aviation Security and Intelligence

An Agency of the European Union

Conflict Zones: Integrated risk management

Source: ICAO Doc 10084

EASA application of IRM for CZ RA

- Likelihood of an aircraft being targeted
  - Intentionally (threats)
  - Unintentionally (hazards)
- Airspace management capability
  - Aeronautical information quality
  - Time and accuracy of measures
  - Civil - military coordination

Conflict-zone risk management integrates security threat assessment with aviation safety risk assessment and operational mitigations.

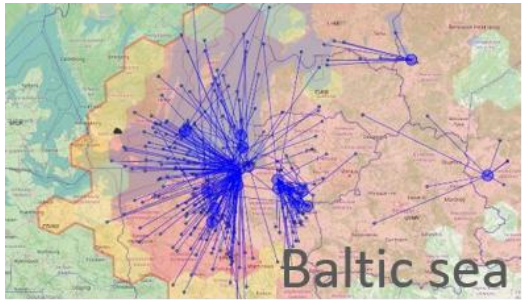
EASA
European Union Aviation Safety Agency

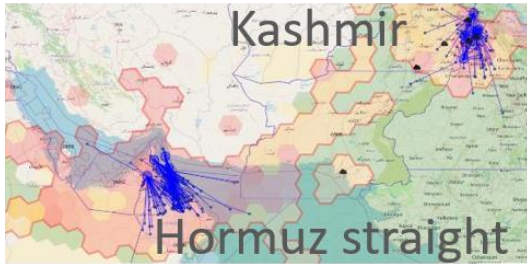
IRM in Practice: European Approach to Monitoring and Responding to GNSS Interference

Aigars KRASTINS
Senior aviation safety risk manager

The safety issue and the Top Safety Topic

- The safety issue ‘Impact of GNSS interference on civil aviation operations’ (SI-0034), was identified since long in the EU Safety Risk Portfolio
- It has increased after the Russian Federation invasion of Ukraine, Middle East, and other conflict zones.
- The priority/risk is **high** per safety issue priority index (SIPI).
- It is a Top Safety Topic in the EU Safety risk management.

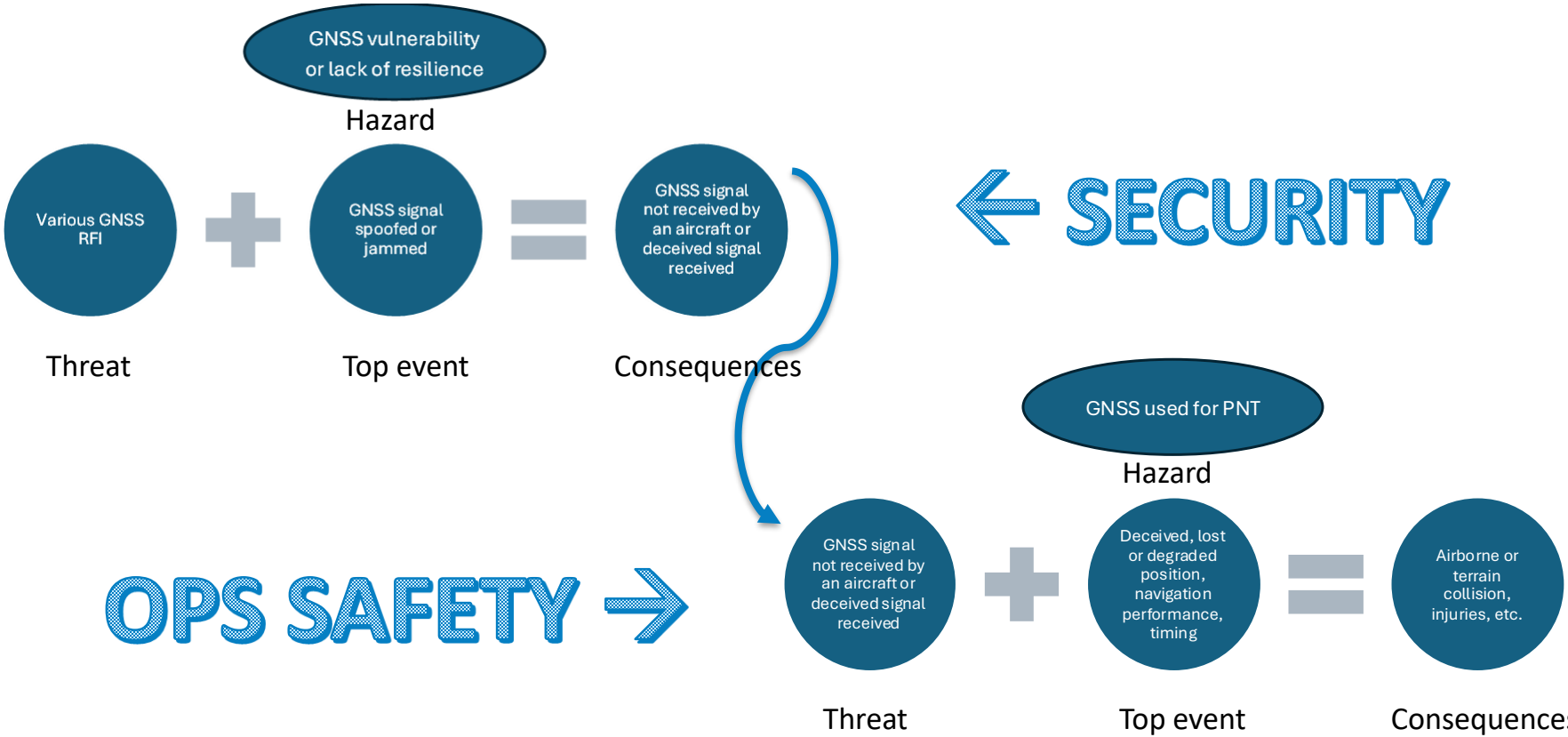




GNSS Interference: safety or security issue?

- Intentional action
- Most likely, the effect of Electronic Warfare (EW)
- Civil aviation not the primary target
- Interferences encountered in or close to Conflict Zones

Integrated risk management approach



Collaborative cross-domain risk management

Governance & Strategic direction

implementation of mitigation actions

EASA Safety Committee & Safety Risk Committee

GNSSI Top Safety Topic team - coordination

EASA/ECTRL Action plan

EASA GNSS Task Force cross-domain expertise

Coordination & monitoring through reported occurrences and ADS-B data

EASA Safety Information Bulletin 2022-02 R4

Best intervention strategy
- Safety issue assessment
- Impact Assessment of proposed mitigation actions

Sharing of information across domains

- → GNSSI is an example where risk management across domains ensures the protection of information necessary in one domain, whilst providing the information / intelligence necessary to assess risks in another domain
- → While fully respecting information sensitivity, the sharing of security information relevant to flight safety helps to ensure risks are managed comprehensively and effectively

Conclusions

→ Integrated management of the GNSSI risk – from both security and OPS safety sides – allow a proper risk understanding and mitigation to ensure safe flights for the benefit of passengers

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Integrated Risk Management

An example of risk integration across 2 risk registers

Michel Arnould

Agency Risk Officer

03/09/2026

CONSORTIUM COORDINATOR sesar DEPLOYMENT MANAGER

FOUNDING MEMBER sesar JOINT UNDERTAKING

NETWORK MANAGER

1. The Network Manager

- Role entrusted to EUROCONTROL by the European Commission
- Mission: Maximise the safe and efficient use of European airspace capacity
- The Network Manager Operations Centre (NMOC) coordinates traffic flows across Europe and supports around 30,000 flights per day.
- Main functions:
  - Air Traffic Flow and Capacity Management (ATFCM)
  - Design and utilisation of airspace structures
  - Scarce resources (radio frequency)
  - Infrastructure management, deployment and monitoring
  - Airspace and Aeronautical Data Management
  - Network Operations Planning
  - Crisis management through the European Aviation Crisis Coordination Cell (EACCC)
  - …

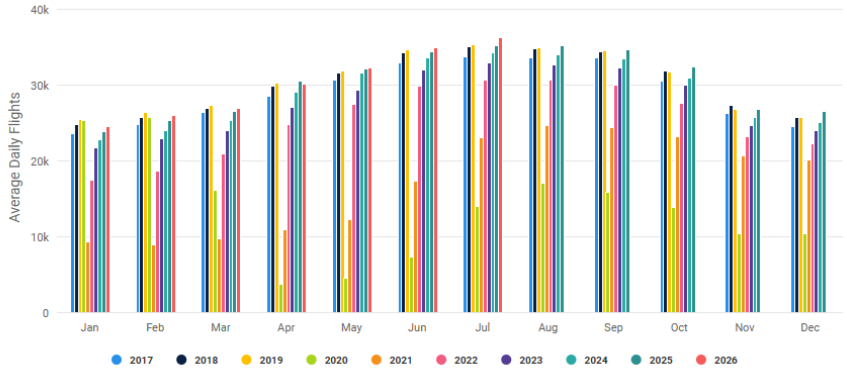
Traffic

1,120,818

flights in July 2026 (ECAC area)

↑ 2.8 %

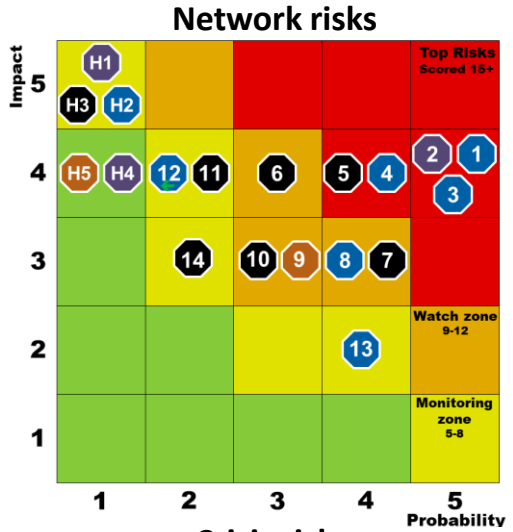
traffic compared to July 2025 (ECAC area)

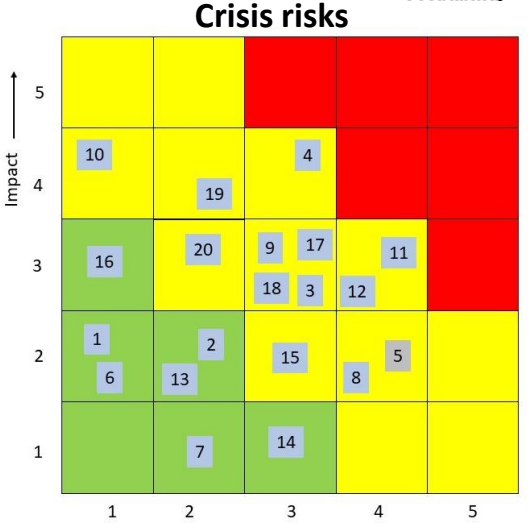


2. Context

- Eurocontrol is maintaining two risk registers that cover the European Aviation Network:
  - The European Aviation **Network risks**
    - Definition and monitoring of actions European level. Main user: oversight function (Network Management Board)
    - Example: need to better coordinate adverse weather ➔ definition of X-Border Weather (XBW) procedure to reduce the impact of the events
  - The European Aviation Crisis Coordination Cell (EACCC) risk register, used to document **Crisis risks**
    - Monitoring of the risks that may trigger a crisis
    - Example: should we increase the probability of a volcanic ash crisis further to the latest Etna eruption?

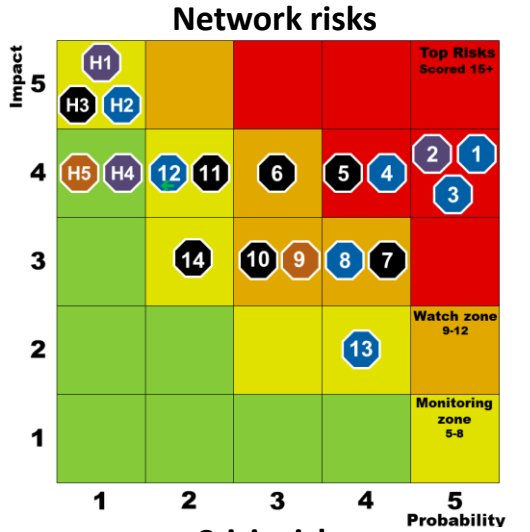
➔ **Different purposes: risk mgt vs crisis mgt**

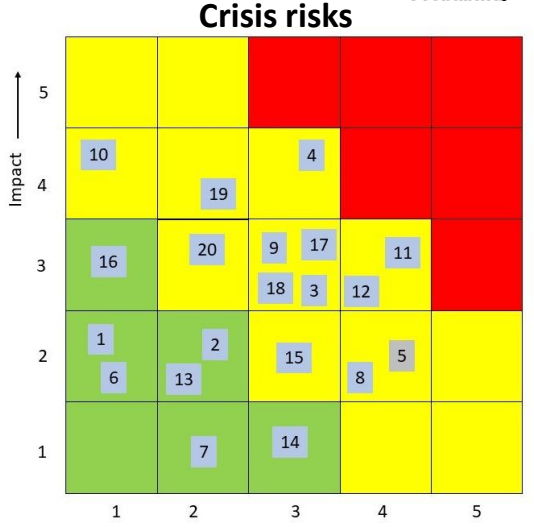




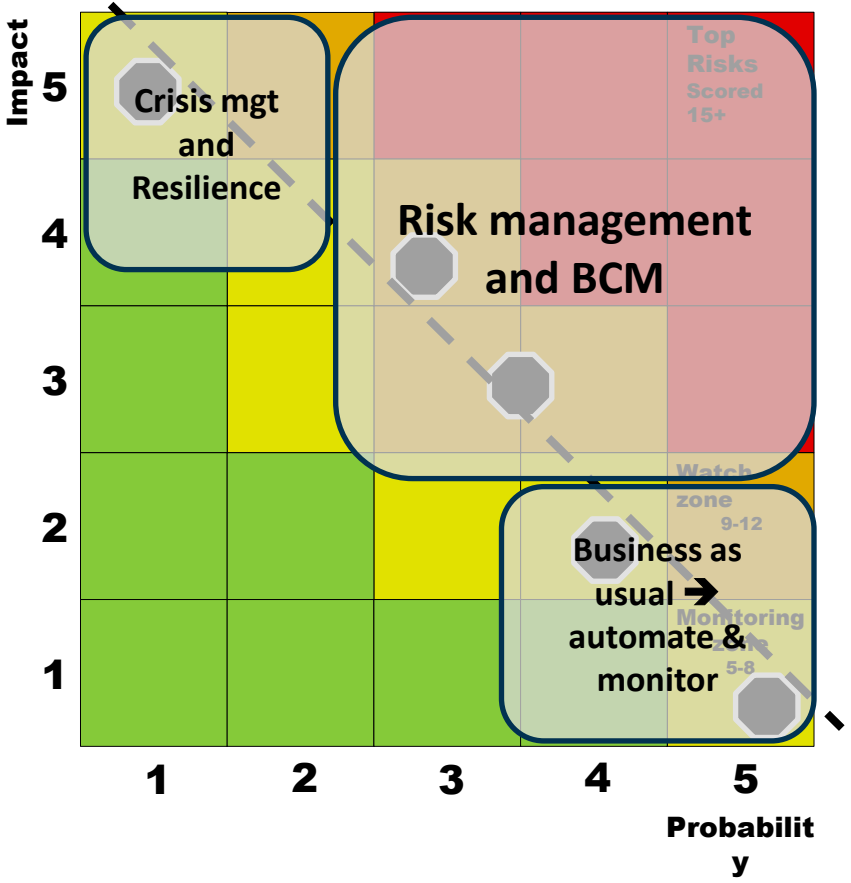
3. Problem statement

- How do we integrate those 2 risks registers?
- We want to:
  - Keep both risk registers, because they serve different purposes and have different audiences
  - All crisis risks should be in the network risks, but not the opposite
  - Understand the differences, and adapt the methodologies if deemed appropriate
  - Not align, but be able to justify the differences in methodology by the different purposes
  - Have an agreed process to integrate changes from one register to the other





4. Scenario analysis and scope of risk vs crisis mgt



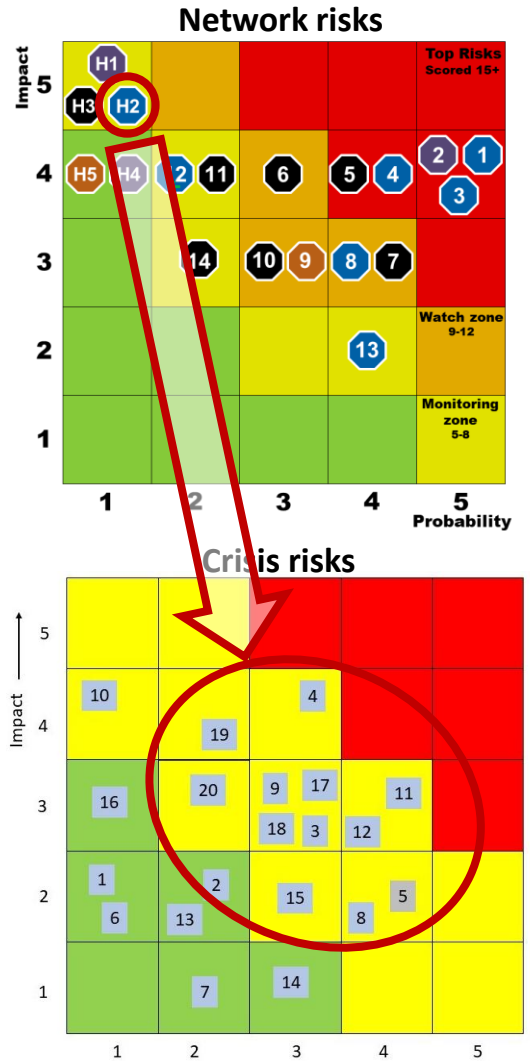
- Let's take a risk of earthquake:
  - Several scenarios
  - Low ➔ high intensity and scale,
  - Very high ➔ very low probability
- From a risk mgt viewpoint:
  - HILL (High Impact, Low Likelihood) scenario
  - Covered by crisis mgt and resilience
- From a crisis mgt viewpoint,
  - Scenarios that would impact several countries

  ➔ medium probability and likelihood

- This applies to all "disasters"

4. Scenario analysis and scope of risk vs crisis mgt

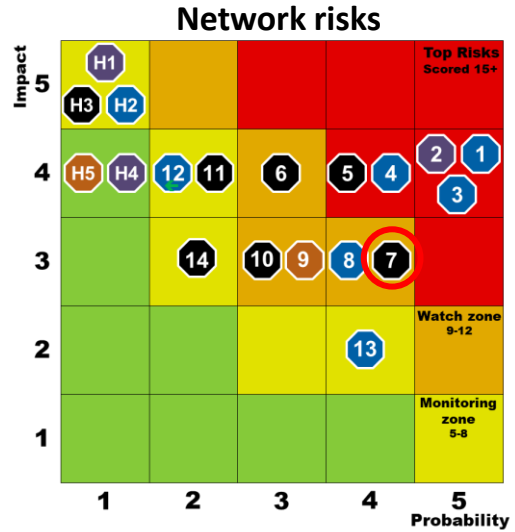
- Different granularity and different scores
  - Network risk H2 Disaster / pandemic covers more than 10 crisis risks:
    - Natural disasters: Volcano eruption, solar flare, earthquake, meteorite, flood,…
    - Man-made disasters: nuclear incident, large-scale power outage, space debris, chemical incident, war / civil unrest…
    - Pandemic
  - How did we approach these differences?
    - We recognised that different purposes justify the different scenarios
    - We aggregated the crisis risks into a single network risk (and it solves some confidentiality issues)

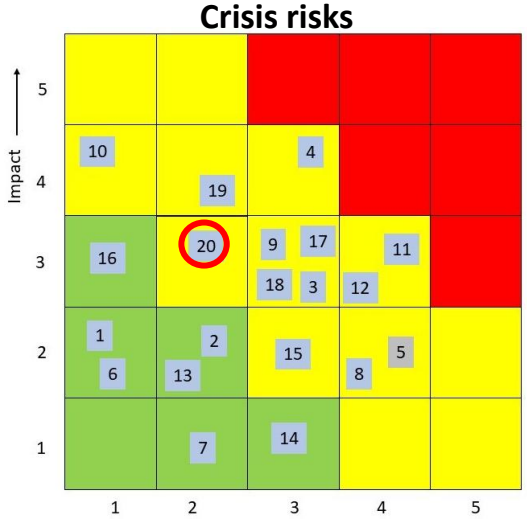


4. Scenario analysis and scope of risk vs crisis mgt

- Another example: GNSS interference (GNSS RFI):
  - Different scores:
    - In Network risks Prb4 Imp3 ➔ 12
    - In crisis risks Prb2 Imp3 ➔ 6
  - Why?
    - Because GNSS RFI is an issue that <u>needs</u> to be addressed by the network (and is being addressed), even if the impact is local
    - But it's not likely to create a network-wide crisis

➔ The rating scales used reflect the purpose of the risk registers

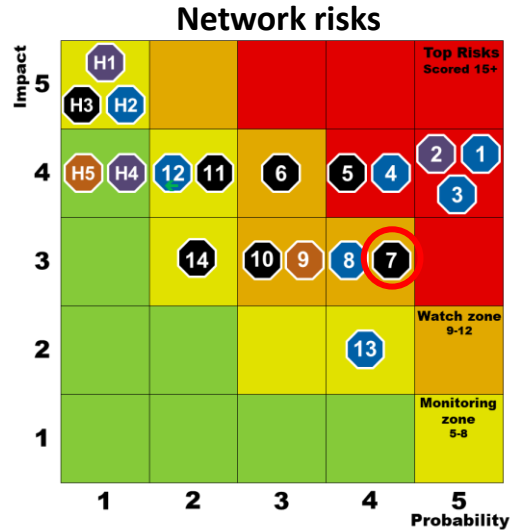


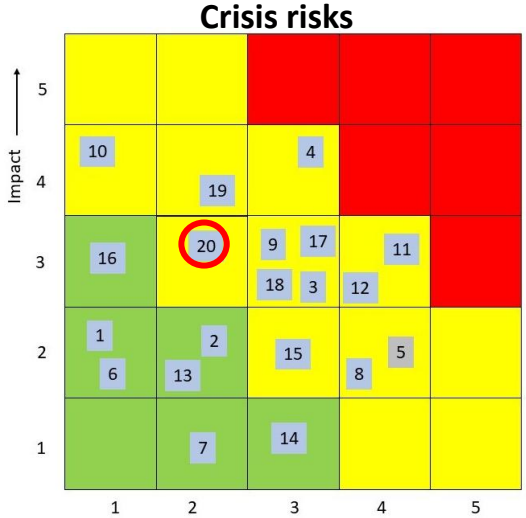


4. Scenario analysis and scope of risk vs crisis mgt

- Done:
  - Understood the purpose of the functions:
    - ➔ Different risk scenarios
    - ➔ Different levels of granularity

- Next steps:
  - Make sure the methodologies cover:
    - Scenario analysis
    - Aggregation
    - Scoring
  - Have a closer look at terminologies used





THANK YOU

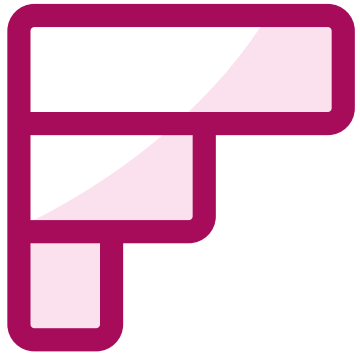
04. Interactive IRM exercise and roadmap feedback

Apply the Guide’s concepts to a cross-domain decision

Scenario: coordinated response to a cyber disruption	A malicious cyber incident degrades airport passenger-processing and flight information systems during peak operations.
	Cybersecurity proposes immediately disconnecting shared interfaces to contain the incident.
	The action may affect check-in, passenger flow, operational information, dispatch, screening, safety and continuity.
	Your task is to identify who must participate and how to reach a coordinated, time-bound decision.

Note: a treatment in one area may create or transfer risk elsewhere

Who needs to participate in this event? Select all domains and functions that should be involved. You may select multiple answers.

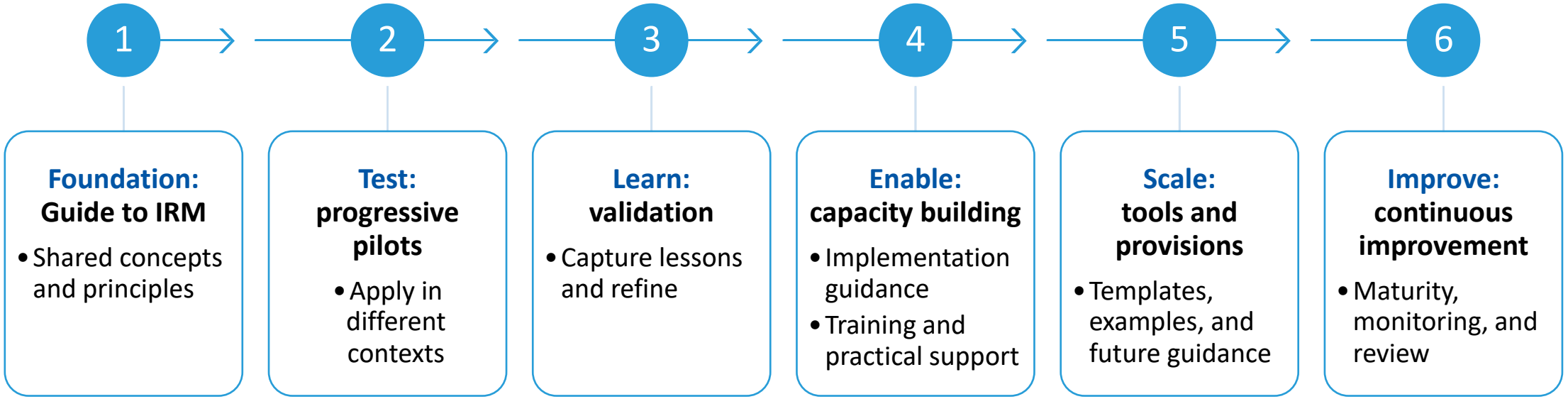


What should be addressed first? Rank the coordination activities.

Which response best reflects IRM? Select one answer.

04. Interactive IRM exercise and roadmap feedback cont'd

IRM roadmap – from guidance to implementation



The Guide to IRM is the foundation – not the end point

04. Interactive IRM exercise and roadmap feedback cont'd

Parallel workstreams between IRM and Safety Management

Related workstream: strengthen SSP/domain foundations

- Identify implementation barriers
- Develop pragmatic guidance
- Adapt training and capacity support
- Establish realistic targets
- Monitor implementation and recurring challenges
- Adjust support using evidence

IRM implementation workstream: progressive IRM implementation

- Publish and promote the Guide to IRM
- Design and conduct IRM pilots
- Validate minimum viable IRM
- Develop practical implementation support
- Enable proportionate expansion
- Monitor, learn, and refine

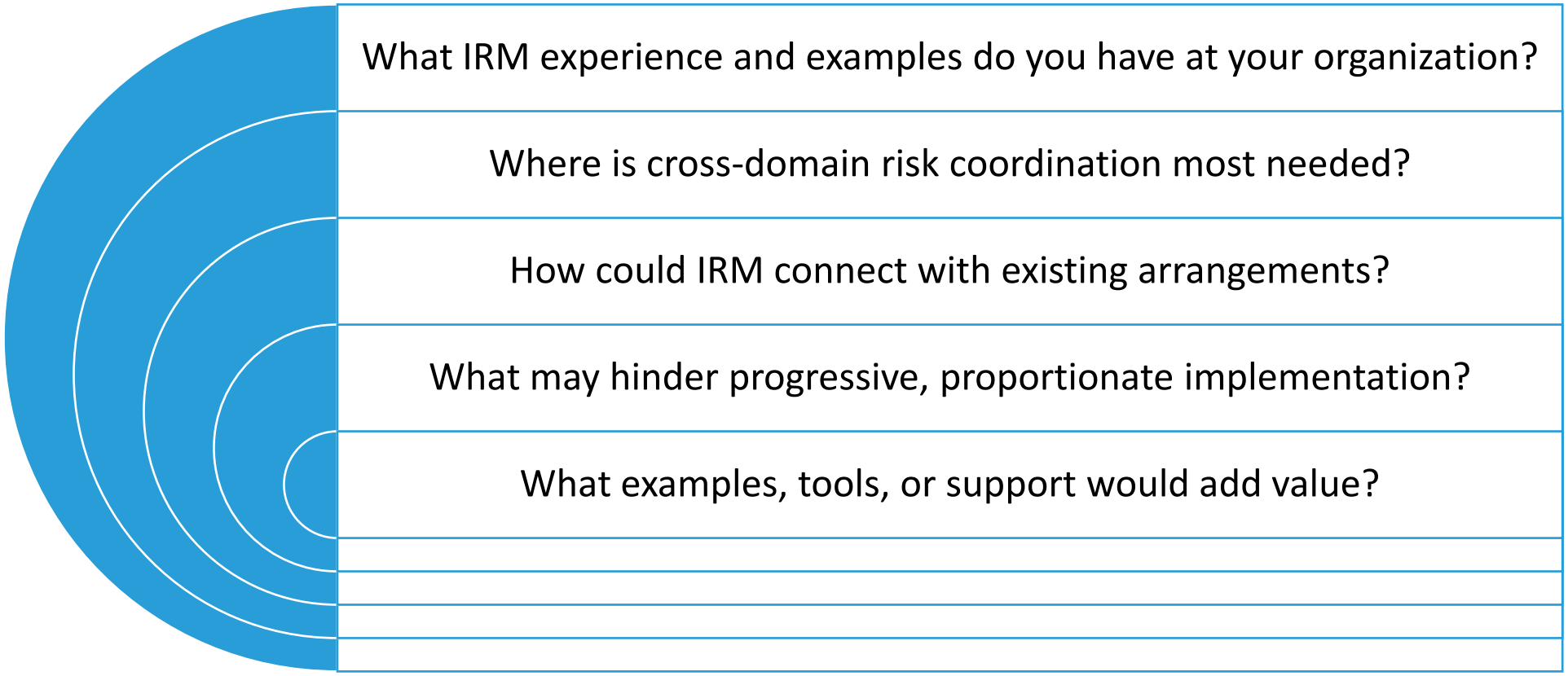
Neither workstream is a prerequisite for progress in the other

Supported by enabling workstreams for ICAO and Regional Office coordination; terminology and information alignment; AI and IRM; practical knowledge; and maturity and performance

What should be ICAO's priority next? Select one or multiple implementation support priorities.

05. Discussion and Questions

Share your experiences, challenges, and opportunities

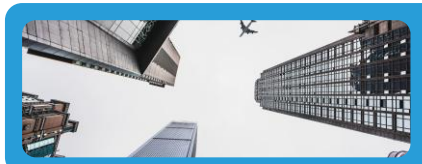


What does IRM mean to you now? After today's webinar, answer again in a few words.

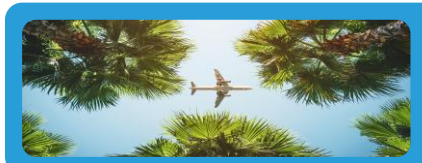
06. Closing Remarks and Next Steps

From guidance to implementation

Aviation risks are interconnected



The Guide provides a shared foundation for coordinated decision-making



Today’s feedback will inform final review and future implementation support

IRM is not about managing risk - it is about managing risk better together

06. Closing Remarks and Next Steps cont'd

Immediate milestones

8-10 Sep:
Final review Guide to IRM at IRM SG/3

22 Sep:
IRM briefing to the Council

14 Sep-30 Oct:
Secretariat preparation for publication

26 Nov and beyond:
Planned advanced unedited publication; validation and implementation support

Questions and comments on IRM:
safetymanagement@icao.int

Thank You

ICAO