



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



60th Conference of Directors General of Civil Aviation Asia and Pacific Region

Global Developments in Aviation Safety and Air Navigation

Michele Merkle

Director, Air Navigation Bureau

International Civil Aviation Organization

Presentation Overview

01 Traffic and Safety Trends

02 ICAO Vision 2026-2050

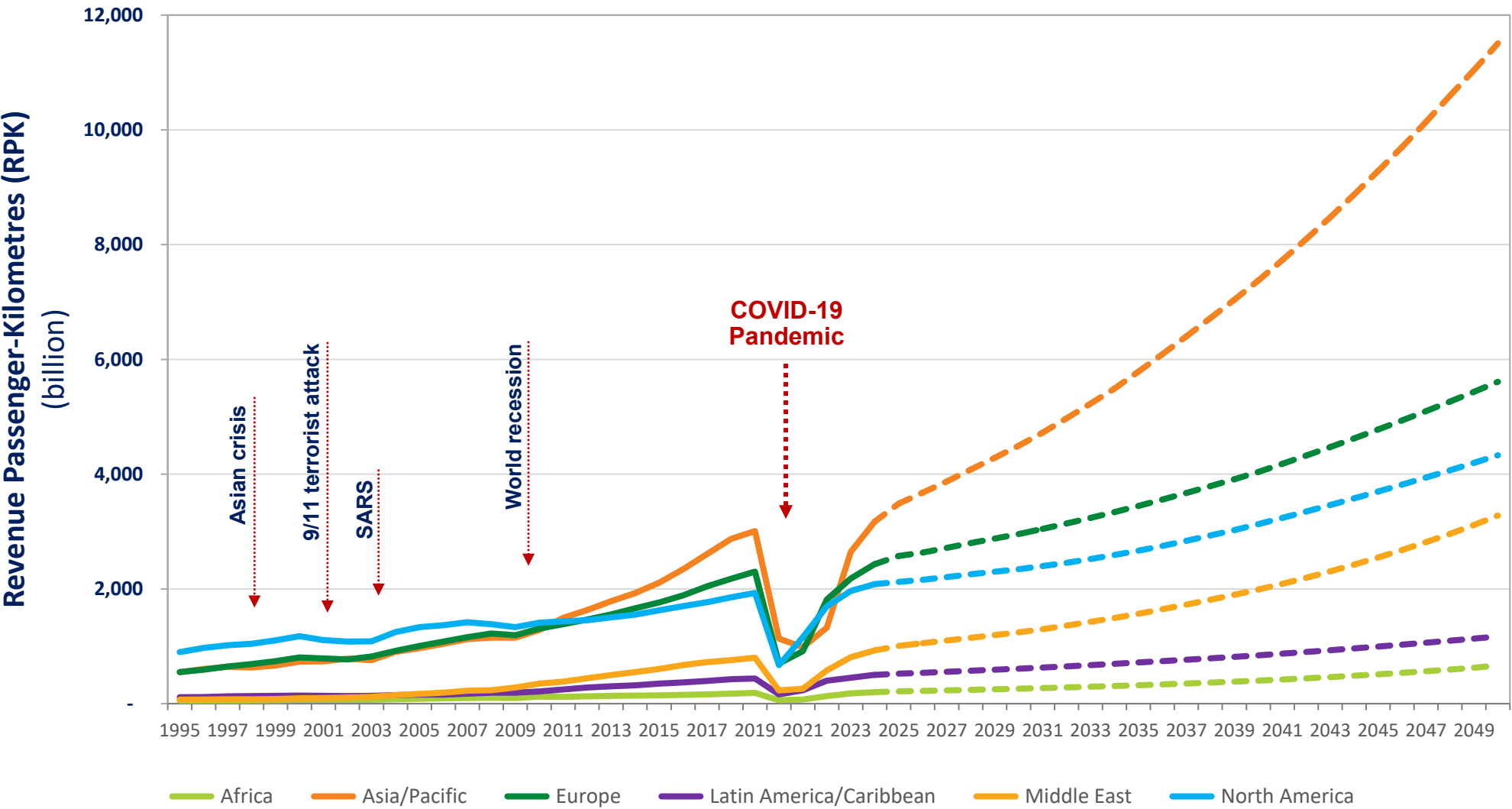
03 AN-Conf/14 Outcomes

04 A42 Overview

05 Upcoming Provisions

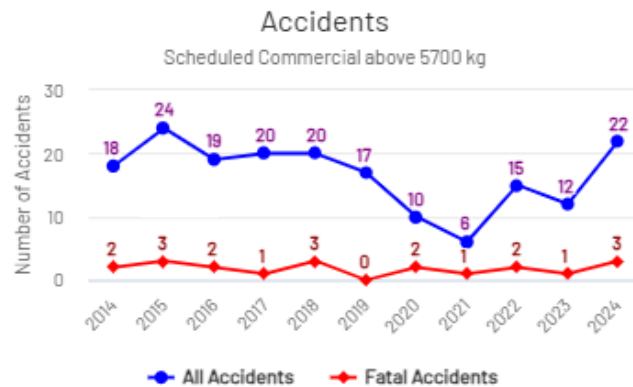
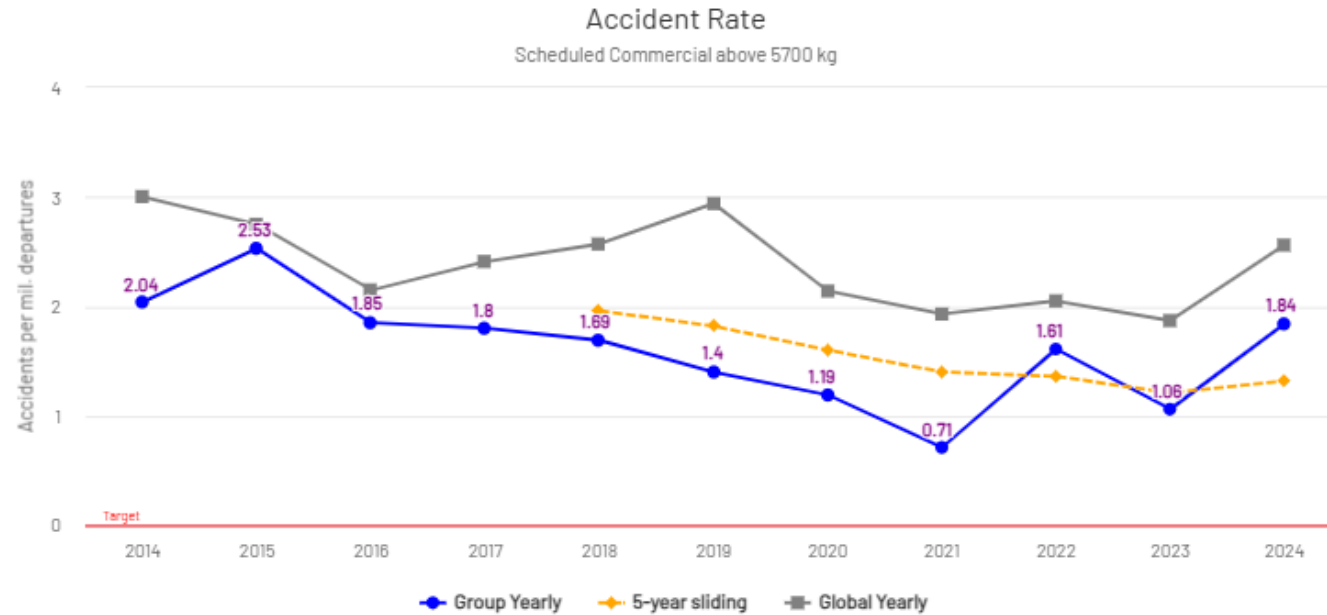
06 Contingency

Global Traffic: The Pandemic and Recovery



Global Safety Trends

5



ICAO Strategic Plan 2026-2050



ICAO Vision

A safe, secure and sustainable international civil aviation system that connects the world for the benefit of all nations and people.

01

The goal of Zero fatalities in international aviation from accidents and acts of unlawful interference.

02

The aspirational goal of Net-zero carbon emissions by 2050 for international aviation operations.

03

The goal of aviation to serve as an integral part of a thriving, connected, accessible, inclusive, and affordable transport system for people and goods, contributing to socio-economic development, while ensuring no country is left behind.

03 Outcomes

ICAO 80

AN- CONF/14

14th Air Navigation Conference

26 August to 6 September 2024 | Montréal, Canada



Outcomes and follow-up actions

8

Agenda Item 1

ICAO 2023-2025 Business Plan
and long-term strategic
planning

Agenda Item 2

Timely and safe use of new
technologies

Agenda Item 3

Air navigation system
performance improvement

Agenda Item 4

Hyper-connectivity of air
navigation system

- ***Informed the aviation community*** of the work that is already prioritized and underway in the ICAO 2023-2025 Business Plan
- ***Held detailed technical discussions*** on new initiatives, leading to agreement on a set of high-level recommendations in the field of air navigation and safety
- ***Obtained timely direction*** for preparation for the 42nd Session of the ICAO Assembly in 2025

- **22 recommendations were actioned by the ICAO Council and ANC**
- **More information in A42-WP/30 (See Slide 16)**

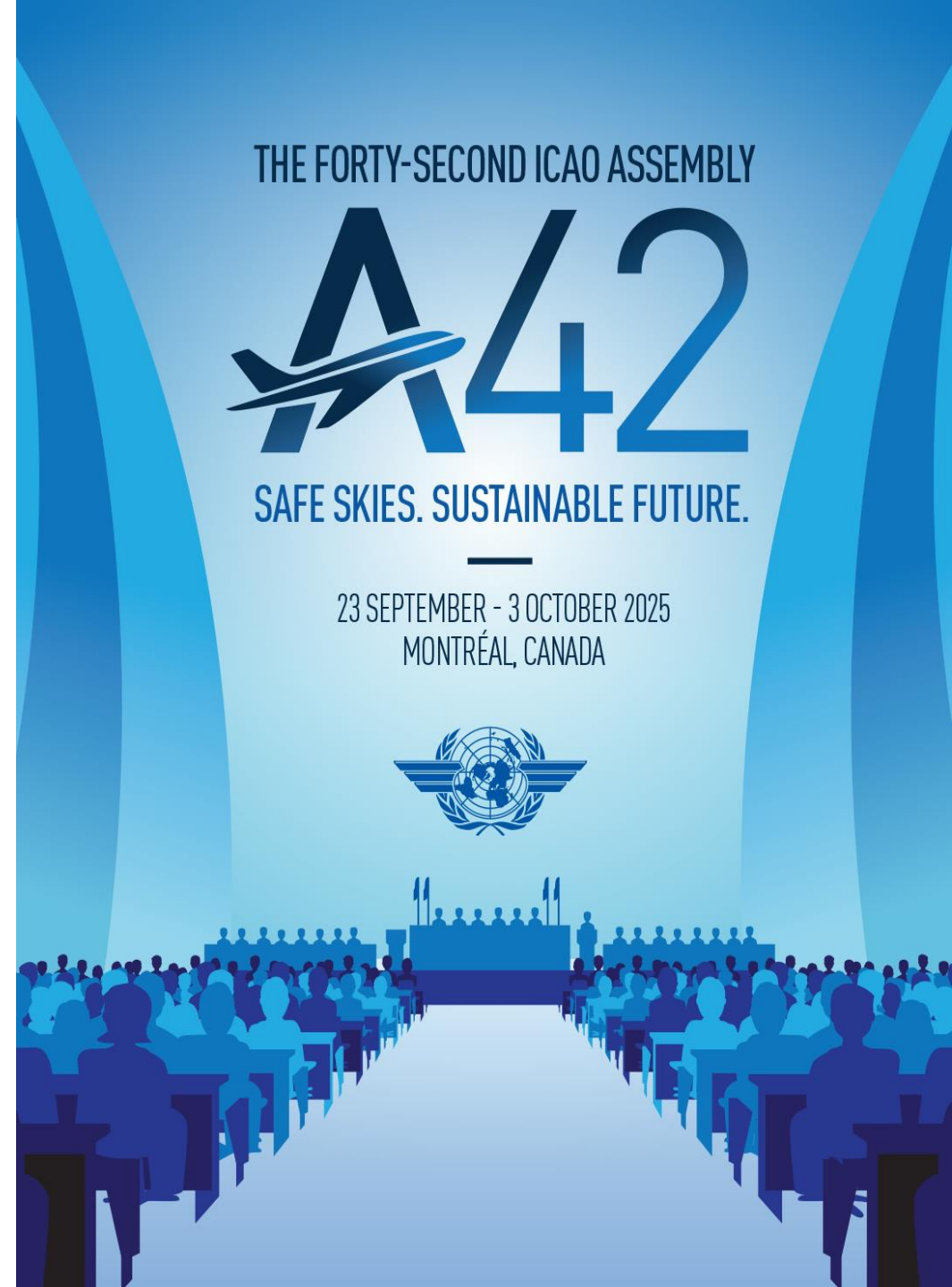
04 Forty-Second ICAO Assembly Overview



Main Role of the Assembly

Article 49 of the Chicago Convention

- Elect States to be represented on the Council
- Approve the Budget for the triennium
- Consider amendments to the Convention
- Review Council Annual Reports and other technical papers
- Review Financial Statements
- Take appropriate action on reports or any matters referred by the Council



State Letter SA 42/1-24/108

First State Letter issued on 13 December 2024

- Actions required:
 1. by **14 August 2025**, transmittal by Member States of any additional items to the Provisional Agenda; and
 2. by **29 August 2025**, submission of original credentials.

State Letter SA 25/40

Second State Letter issued on 9 April 2025

- Action required:
 1. note the administrative arrangements;
 2. by **29 July 2025**, Member States to submit documentation (including written statements) for translation; and
 3. by **29 August 2025**, submission of original credentials.

A42 Provisional Agenda

39 items to be addressed by Plenary and five Committees/Commissions:

1. Plenary
2. Executive Committee
- 3. Technical Commission**
4. Economic Commission
5. Legal Commission
6. Administrative Commission



Item 23: Global Aviation Safety and Air Navigation Plans

Item 24: Aviation Safety and Air Navigation Priority Initiatives

Item 25: Other issues to be considered by the Technical Commission

A42 Council Papers



USOAP and USAP

A42-WP/4 EX/1

- Presents a consolidated progress report on the implementation and activities of the USOAP CMA and USAP CMA since the 41st Session of the Assembly.
- Urge States to continue fully engaging in the ICAO audit programmes, while supporting their development.
- Urge States to avoid requesting postponement or cancellations due to the negative impact of such requests.
- Encourages States to continue contributing financial and in-kind resources for the successful operation of ICAO audit programmes, including with the long and short-term secondment of qualified experts.

Evolution of USOAP CMA

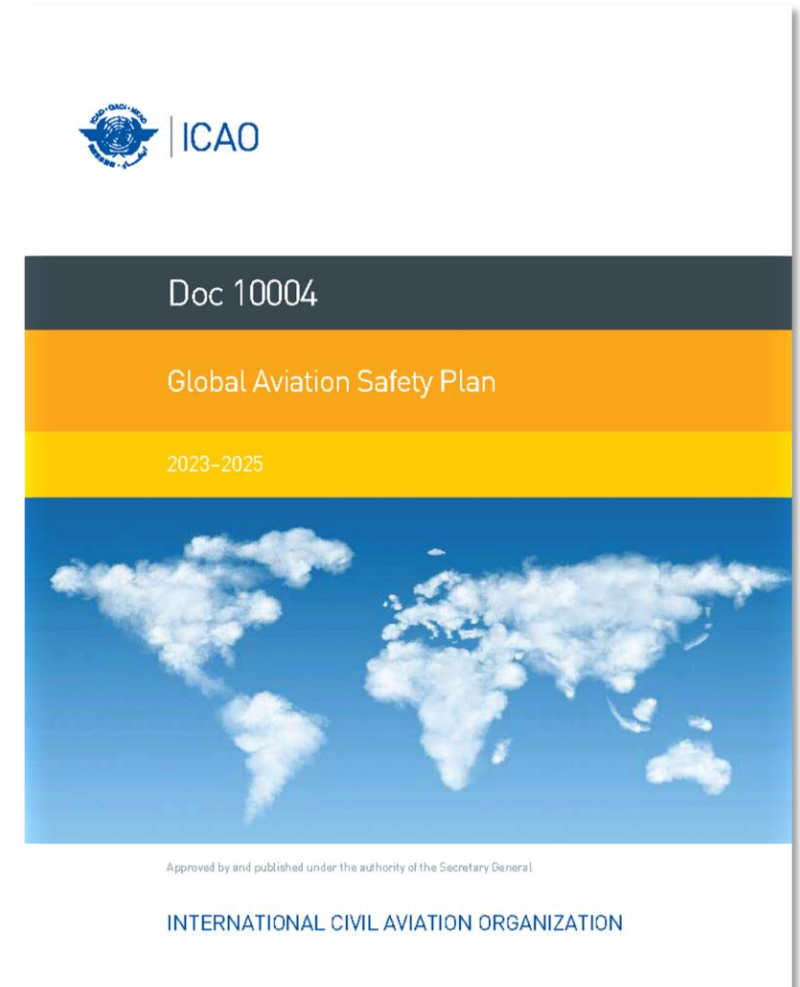
A42-WP/5 EX/2

- Presents the plans to evolve the USOAP CMA in the next triennium as well as new procedures addressing data management in the USOAP OLF.
- Calls for the endorsement of the 3 streams of work that drive the evolution of the USOAP CMA.
- Evolution streams will mainly enhance the use of data and information to progress the CMA concept, will integrate the assessment of SSP implementation into traditional USOAP audits.
- Presents an amended Resolution on the USOAP CMA to supersede Assembly Resolution A40-13

Global Aviation Safety Plan (GASP)

A42-WP/23 TE/1

- **Revised, 2026-2028 edition of GASP to be presented to A42**
 - as part of A42-WP for endorsement
- **Global Ops Safety Risks**
 - 5 G-HRCs remain unchanged
 - new “ORCs” added: ARC, SCF-NP, TURB
 - + focus on contributing factors, such as GNSS RFI
- **Global ORG Challenges**
 - focus on resources to meet national & international obligations
 - AIG & AGA, mainly in CE-4 & CE-8
 - SSP implementation, with focus on SDCPS
- **Majority of GASP goals remain unchanged**
 - new targets added & some previous ones deleted
 - focused on Global Safety Issues to drive RASP & NASP activities



Report on the outcomes of AN-Conf/14

A42-WP/30-TE/4

Overview

- Presents the outcomes of the AN-Conf/14 and follow-up actions taken by ICAO on 22 recommendations.
- Examines the benefits and challenges associated with convening divisional-type meetings ahead of ICAO Assemblies as well as the role of the Technical Commission of the ICAO Assembly.
- Describes the Organization's continued efforts to increase its efficiency and effectiveness.

Action by the Assembly

- note the outcomes of the Fourteenth Air Navigation Conference (AN-Conf/14) ;
- urge States to undertake the AN-Conf/14 recommendations addressed to them; and
- recognize the Organization's continued efforts to increase the efficiency and effectiveness of the Technical Commission of the Assembly.

Priority Initiatives

A42-WP/23 TE/3

- Presents an overview of the key initiatives and activities in the areas of aviation safety and air navigation over the next triennium, in line with the ICAO Strategic Plan 2026-2050 and Business Plan 2026-2028
- Identifies the safety trend and highlights the ongoing and future work to address associated risks
- Urges States, together with international organizations, and assisted by the industry where appropriate, to provide support and voluntary contributions (financial or in-kind) to the accomplishment of the key initiatives and activities
- Urges States to consider ICAO's initiatives and activities when planning and executing their own initiatives and activities to further enhance aviation safety and air navigation efficiency

ICAO Policy on Innovation

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A42-WP/29 EX/16

Overview

- Approved: March 17, 2025 by ICAO Council
- Foundation: Assembly Resolution A40-27 on Innovation in Aviation
- Strategic Goal: No Country Left Behind (NCLB) initiative

Aims

- Enhance ICAO's role in assisting Member States to benefit from aviation innovation
- Ensure timely development of global policies and standards for innovations
- Promote innovation environment across all ICAO regions
- Make innovations accessible to all States
- Strengthen stakeholder engagement for rapid innovation development

ICAO POLICY ON INNOVATION

Approved by the Council and
published by its decision



17 March 2025



ICAO

From Policy to Action – Major Achievements

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A42-WP/29 EX/16

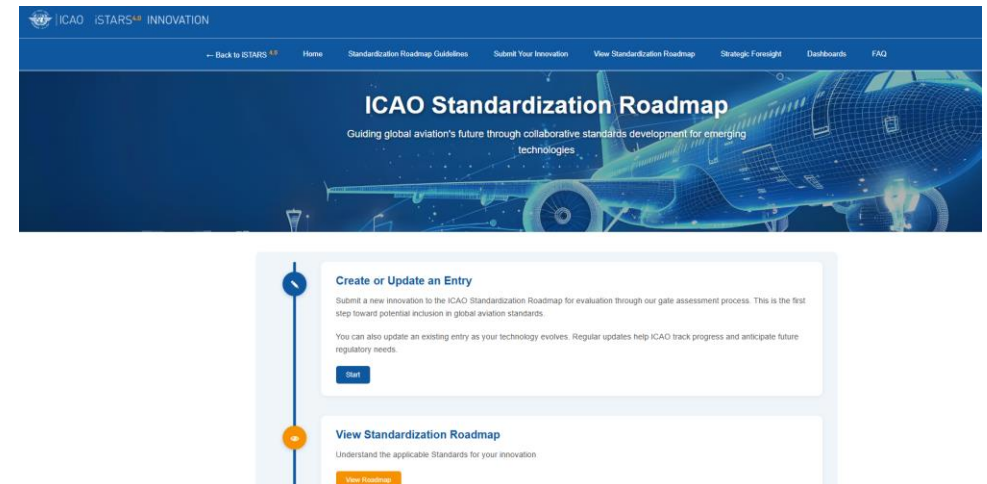
Launched the Innovation Website

- Launched on the iSTARS platform as a central hub to share knowledge, track innovations, and connect stakeholders.
- Will host all key elements outlined in the Innovation Policy's Plan of Action, including the Standardization Roadmap and other supporting tools for implementation.



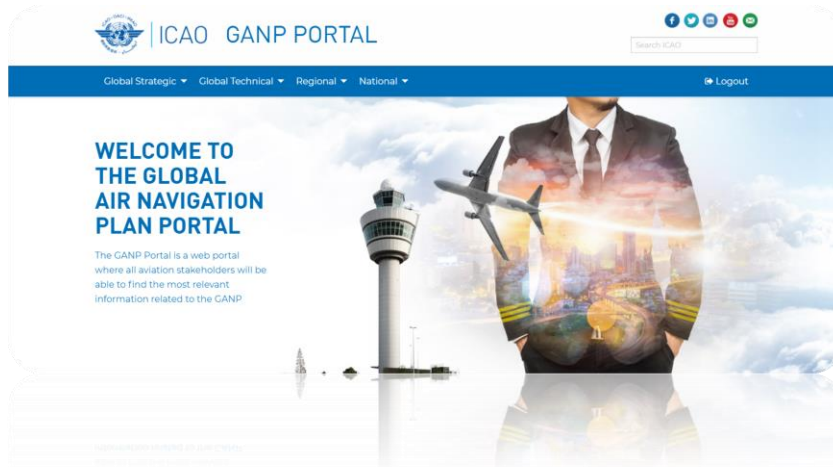
Launched the Standardization Roadmap

- Implemented to support regulatory readiness by mapping innovation maturity to the ICAO standard-setting process.
- Provides a clear timeline to help States and stakeholders anticipate upcoming SARPs and guidance. Enhances transparency and predictability for Member States and industry planning efforts.



Global Air Navigation Plan (GANP)

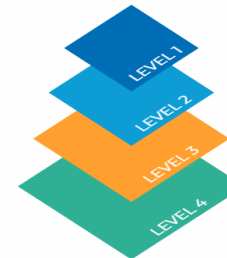
A42-WP/31 TE/5



MULTILAYER STRUCTURE OF THE GANP

Click a level to navigate

GLOBAL STRATEGIC
GLOBAL TECHNICAL
REGIONAL
NATIONAL



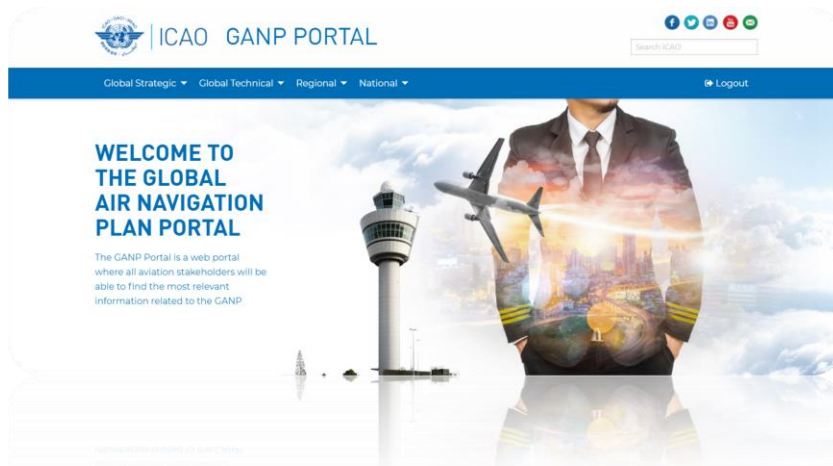
• Deliverable 1 – Update of the GANP Strategy

- A41 priority areas and ICAO Strategic Plan
 - Recovery and sustainability of air transport
 - Reduction of CO₂ emissions
 - Resilience of the aviation system
 - Maintaining safety
- Two new challenges and opportunities
- Updated performance ambitions in environment and resilience

- A new approach to integrate the new entrants
 - Focused on required air navigation services
- Common understanding to automation and artificial intelligence
 - United Nations principles for using artificial intelligence
- Update to the conceptual roadmap

Global Air Navigation Plan (GANP)

A42-WP/31 TE/5



MULTILAYER STRUCTURE OF THE GANP

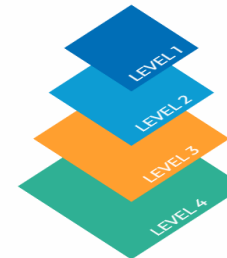
Click a level to navigate

GLOBAL STRATEGIC

GLOBAL TECHNICAL

REGIONAL

NATIONAL



GLOBAL TECHNICAL
×

Supports technical managers in planning the implementation of basic air navigation services and new operational improvements in a cost-effective manner.

ASBUs & PF
AN-SPA
BBBs

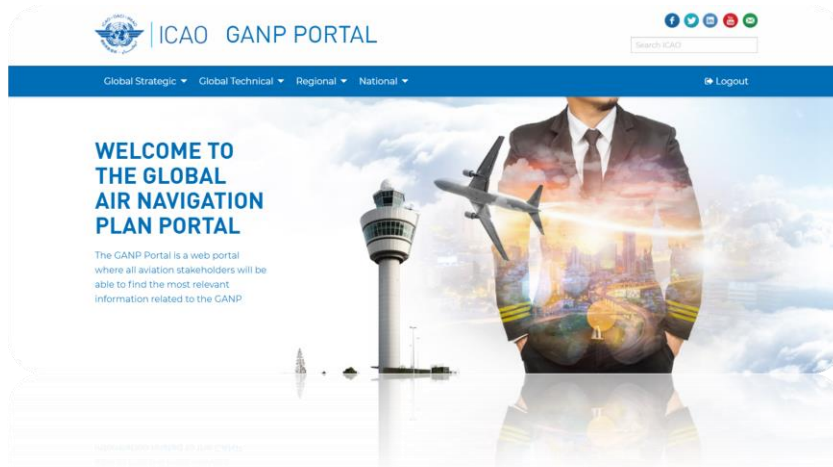
- **Deliverable 2 - Update to the Aviation System Block Upgrade framework**
 - Integrate new concepts (new entrants, use of AI/ML)
- **Deliverable 3 - Mapping between the strategic and technical levels**
- **Deliverable 4 – Simplified guidance on the application of a performance-based approach**

- **Deliverable 5 - Update of the GANP performance framework**

- Resilience focus area
- Environment KPA
 - Focus areas: CO2 emissions, LAQ and noise
 - Reflect all ICAO initiatives but focused on operational measures/improvements

Global Air Navigation Plan (GANP)

A42-WP/31 TE/5



MULTILAYER STRUCTURE OF THE GANP

Click a level to navigate

GLOBAL STRATEGIC
GLOBAL TECHNICAL
REGIONAL
NATIONAL



REGIONAL

Addresses regional and sub-regional needs aligned with the global objectives.

AFI ANP APAC ANP
EUR ANP MID ANP
NAM ANP NAT ANP
CARSAM ANP

NATIONAL

Development by States, in coordination with relevant stakeholders, of air navigation plans aligned with regional and global plans.

NANP TEMPLATE
CBA CHECKLIST

Regional and National Levels

- eANP tool
 - Support the management of the ANPs
 - Under development
- National template and associated guidance
 - Support the States on national planning
 - Under development

OUTLOOK FOR THE NINTH EDITION OF THE GANP

- Problem statement
 - Challenges faced by the aviation community
- Context
 - Ongoing developments
- Proposed focus
 - Improve

Regional Cooperation

A42-WP/32 TE/6

- Presents ICAO's efforts to assist States, RSOOs and RAIOS in addressing challenges, explores the benefits of regional cooperation and includes key actions required to enhance their effectiveness
- Urges States that are members of RSOOs and RAIOS to establish sustainable funding mechanisms, appropriate legal frameworks and adequate organizational structures to strengthen RSOOs and RAIOS and actively use the services
- Urges States to:
 - 1) support ICAO in the development and implementation of the RRAP, RSOO and RAIOS Cooperative Platforms, associated workshops, documentation and guidance material, as well as implementation support activities;
 - 2) further enhance the effectiveness and efficiency of RSOOs and RAIOS and to avoid duplication of efforts; and
 - 3) contribute to ICAO's Safety Fund (SAFE) to enable ICAO to provide safety-related\implementation support to address the needs of States, as well as regional cooperation initiatives;
- Presents an amended resolution on regional cooperation to supersede Assembly Resolution A40-6

Radio Frequency Spectrum Matters

A42-WP/33 TE/7

ITU World Radiocommunication Conferences (WRCs):

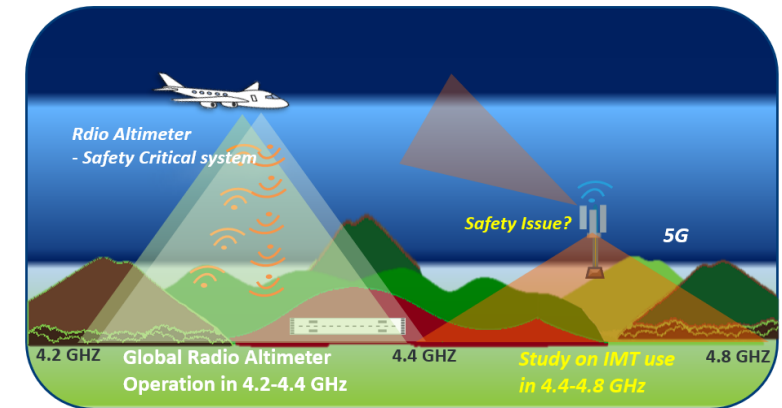
- Held every four years. All spectrum users compete for access to the finite resource of Spectrum available
- Next WRC is in 2027. Items on the Agenda for WRC-27 may negatively affect aviation access to critical Spectrum
- Preparatory studies are underway in ITU. States and Regional Telecommunication Organizations (APT-APG in APAC) are developing their positions.
- Active support from States is the only means to ensure positive results from WRC-27 for civil aviation
- Aviation is underrepresented in the WRC-27 preparatory studies

The recent State Letter E 3/5-25/65 attaches the approved ICAO Position for ITU WRC-27

WRC-27

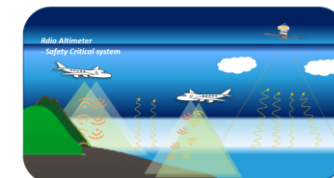
WRC-27 Agenda Item 1.7:

Study on IMT Use in the frequency bands 4400-4800 MHz



WRC-27

WRC-27 Agenda Item 1.19: Primary allocations to the EESS passive in the bands 4200-4400



WRC-27

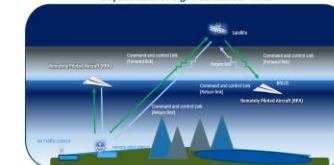
WRC-27 Agenda Item 1.17: Space Weather Sensors



WRC-27

WRC-27 Agenda Item 6:

Urgent action by Study groups in prep for the next WRC beyond-line-of-sight C2-link for RPAS

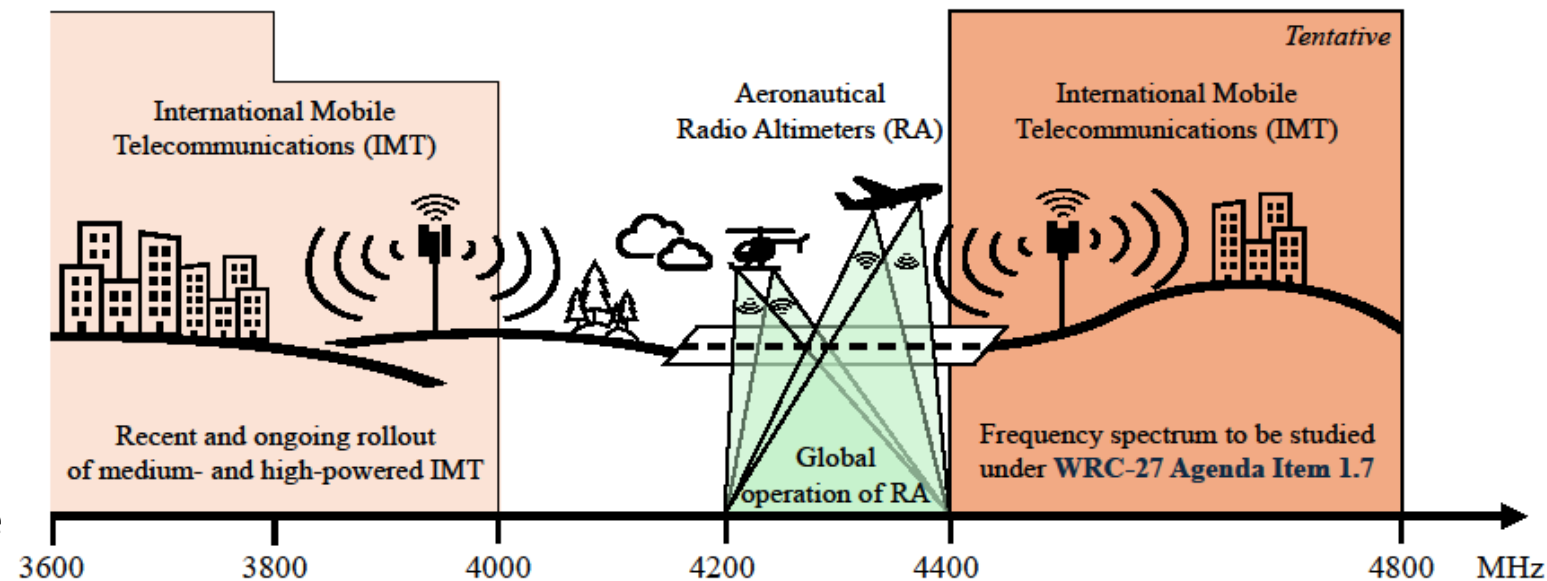


Radio Frequency Spectrum Matters

A42-WP/33 TE/7

WRC-27 Agenda Item 1.7

- Looks to identify the frequency band immediately above the Radio Altimeter band to International Mobile Telecommunications.
- Radio Altimeters are a critical safety system.
- In the current ITU preparatory studies (ITU-R WP 5B and WP 5D) due account is not being taken of the safety critical role of the radio altimeters.



Should Aviation Authorities fail to step up and actively provide expert representation and advice in the ITU World Radiocommunication Conference preparatory process, this may result in unsustainable loss of critical functions necessary for maintaining the current level of safety in aviation

Global Navigation Satellite System Radio Frequency Interference (GNSS RFI)

A42-WP/34 TE/8



Loss of Control in-Flight (LOC-I)



Controlled flight into terrain (CFIT)



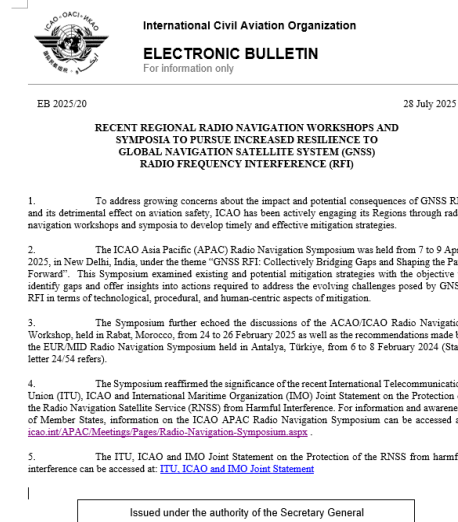
Mid-air Collision (MAC)

Global Navigation Satellite System Radio Frequency Interference (GNSS RFI)

Implementation Package (iPack) for the mitigation of the impact of GNSS RFI

The iPack will:

- help States effectively manage GNSS RFI occurrences while ensuring uninterrupted, safe and efficient air navigation services.
- provide tailored solutions to address each State's unique challenges and needs. Through a combination of preventive and reactive measures, the iPack aims to minimize the likelihood and impact of GNSS RFI, ultimately strengthening the resilience of air navigation services.
- be ready for implementation in Q4 2025.



EB 2025/20

ICAO APAC Radio NAV Symposium examined existing and potential mitigation strategies with the objective to identify gaps and offer insights into actions required to address the evolving challenges posed by GNSS RFI in terms of technological, procedural, and human-centric aspects of mitigation.

Electronic Bulletin (EB2025/20) was published on 28 July 2025, includes link to the Symposium's webpage, for information and awareness of Member States

05

Upcoming ICAO Provisions

Technical Area	SARPs and PANS	Description	Expected Applicability Date
FF-ICE	Annex 1, 2, 6.1, 6.2, 6.3, 10.2, 11, PANS-AIM, PANS-ATM, PANS-OPS Vol III, PANS-ABC	Initial implementation of the flight and flow information for a collaborative environment (FF-ICE) services	28 November 2024
SWIM	Annex 3, 10.2, 10.3, 15, PANS-AIM, PANS-IM (New)	System-wide information management (SWIM) and information security.	28 November 2024
SAR	Annex 11, 12	Implementation of the Global Aeronautical Distress and Safety System (GADSS) concept. Drift measurement, responsiveness of search and rescue (SAR) points of contact, methods for allowing other States to assist in SAR operations, safety of SAR personnel at accident sites, conduct of exercises, and procedures to be followed when intercepting a distress transmission.	28 November 2024
Helicopter PBN operations	PANS-AIM, PANS-OPS Vol II	Instrument flight procedures (IFP) for helicopter PBN operations	28 November 2024
hang gliding and paragliding activities	PANS-ABC	The NOTAM code for hang gliding and paragliding activities.	28 November 2024
Charting	Annex 4, PANS-AIM, PANS-OPS Vol I and II	Charting navigation specifications and accuracies, assurance for flight procedure design and maintenance of criteria	28 November 2024
Aircraft with folding wing tips	Annex 4, PANS-AIM	Aeronautical information related to areas where it is safe to operate aeroplanes with wing tips extended.	28 November 2024
FDAP	Annex 6.1	Updated provisions concerning flight data analysis programmes (FDAP)	28 November 2024
Aerodrome	PANS-Aerodrome	Amendments related to pavement rating	28 November 2024
Aerodrome	Annex 14.1,	aerodrome design, visual aids and apron management service	27 November 2025
MET	Annex 3, 6.1, 6.2, 6.3, 10.2, 11, PANS-MET (New)	Restructured Annex 3, space weather information services, quantitative volcanic ash information and the international airways volcano watch (IAVW), the ICAO meteorological information exchange model (IWXXM), the world area forecast system (WAFS), and improved definition of meteorological authority and introduction of a new definition of meteorological service provider	27 November 2025

Technical Area	SARPs and PANS	Description	Expected Applicability Date
Navigation Systems	Annex 10.1	Advanced receiver autonomous integrity monitoring (ARAIM), global positioning system (GPS), Galileo system, the satellite-based augmentation system (SBAS), the ground-based augmentation system (GBAS), distance-measuring equipment (DME) and frequency assignment planning for instrument landing system (ILS), VHF omnidirectional radio range (VOR), DME and GBAS	27 November 2025
COM	Annex 10.2	Aeronautical telecommunication network (ATN)/Internet Protocol Suite (IPS) requirements regarding mobility across multiple media, naming and addressing, IPS security, quality of service (QoS), system management and overall transitional aspects	27 November 2025
Radio Frequency	Annex 10.5	Wireless avionic intra-communications (WAIC), as well as frequency utilization for instrument landing system (ILS), VHF omnidirectional radio range (VOR), distance measuring equipment (DME) and ground-based augmentation system (GBAS)	27 November 2025
AIG	Annex 13	Investigations involving unmanned aircraft (UA); the release of investigative information; Global Aeronautical Distress and Safety System (GADSS) data and information; the publication of Final Reports; and the consultation period of Final Reports	26 November 2026
Data Link	Annex 2, Annex 10, Volume II, Annex 11 and PANS-ATM	Update relevant provisions supporting the air-ground data link operations to ensure they remain current and consistent with the improved guidance contained in the GOLD Manual (Doc 10037)	26 November 2026
Surveillance	Annex 10.4	Performance of surveillance systems in light of operational experience and emerging technologies	26 November 2026
RPAS	Annex 1, 2, 6.4, 8	Introduction of provisions for international RPAS operations in controlled airspace and at aerodromes. New Annex 6 Part IV on International Operations Remotely Piloted Aircraft Systems	26 November 2026
Aerodrome	Annex 14.2	Certification and an SMS for heliports	26 November 2026
Aerodrome	Annex 14.1, 14.2, 6.1, 6.2, 6.3, 9, PANS-AERO, PANS-AIM	Related ground handling	25 November 2027
MET	Annex 3, 15 and PANS-MET	<ul style="list-style-type: none">• Volcanic activity report and quantitative volcanic ash concentration information• Exchange of meteorological information in IWXXM and the introduction of SWIM service• Introduction of next-generation World Area Forecast System information• RPAS and via ADS-B-3 aerodrome observation/forecast information services and air reports• Space weather information service• Requirements for a regional space weather centre	25 November 2027
Dangerous Goods	Annex 18	Clarification of States’ responsibilities with respect to the safe transport of dangerous goods, including dangerous goods risks introduced by entities in the cargo supply chain.	23 November 2028

Technical Area	SARPs and PANS	Description	Expected Applicability Date
IFP	Annex 11, PANS-OPS Vol. I, II, PANS-AIM	Optimized SBAS instrument Criteria, path terminators, merging of ILS and GLS criteria and maintenance of existing criteria.	23 November 2028
FLTOPS	Annex 1, 2, 6.1, 6.2, 6.3, 6.4, 7, 8, 11, 15, 19, PANS-ATM	Operator emergency response plan, ramp inspections, electronic certificates and documents, additional/technical crewmember, runway overrun awareness and alerting system (ROAAS) and minor amendments	23 November 2028
RPASP-ATM	Annexes 2, 10.2, 10.4, 10.6 , 11, 12, PANS-ATM, PANS-OPS. I and III, PANS-AIM	detect and avoid (DAA), C2 Link and air traffic management (ATM), RLP, and C2CSP concepts.	23 November 2028
AIM	Annex 15 and PANS-AIM	<ul style="list-style-type: none"> Concerning trigger NOTAM validity period as well as other minor amendments 	23 November 2028
AIG	Annex 13, Annexes 6.1, 6.2, 6.3	<ul style="list-style-type: none"> Clarify the intent of the provisions of Annex 13 on para 5.11 for completing the Annex 13 investigation with a publicly available Final Report for accidents involving acts of unlawful interference Removing the condition associated with the word “available” from Annex 13, 5.4.3, to eliminate the risk of misinterpretation. Simplify and standardize ADREP reporting. Conflict of interest scenarios 	23 November 2028
Wake Turbulence	PANS-ATM	Wake turbulence separation minima for aircraft taking off from the intermediate part of the runway; optimized separation for dependent parallel approaches and pair-wise separation.	23 November 2028
CTC	Annex 4, PANS-ATM, PANS-OPS Vol III	Clarifies the responsibilities for the provision of terrain and obstacle clearance and temperature correction under various circumstances.	23 November 2028
ACAS III	Annex 10.4 (ACAS III)	Airborne collision avoidance system (ACAS) III	23 November 2028
SATCOM	Annex 10.III and 10.V, in coordination with FSMP	Update of the SATCOM SARPS to include more stringent performance requirements	23 November 2028
Aerodrome	Annex 14.1	Obstacle limitation surfaces	21 November 2030
ATFM	Annex 11, PANS-ATM	Requirements to support global implementation of air traffic flow management (ATFM) and capacity determination.	21 November 2030

Safety Management

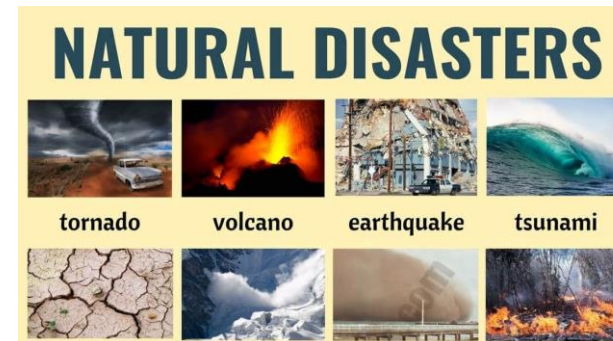
Update on Annex 19 and Guidance

- **Annex 19 Amendment 2**
 - Adopted by Council: 23 June 2025
 - Applicability date: 26 November 2026
 - includes enhanced provisions for the State safety programme (SSP), Safety Management System (SMS) and the development of safety intelligence,
+ the extension of SMS applicability for RPAS operators and heliports
- **New Safety Intelligence Manual (Doc 10159)**
 - Safety data collection and processing system (SDCPS), safety reporting, data analysis, governance, sharing & exchange
 - Advance unedited version available on ICAO-NET and ICAO eLibrary
- **5th Edition of Safety Management Manual (Doc 9859)**
 - SSP & SMS, safety culture, Safety Risk Management, Safety Assurance
 - Advance unedited version expected Q4 2025



06 Crisis preparedness and response

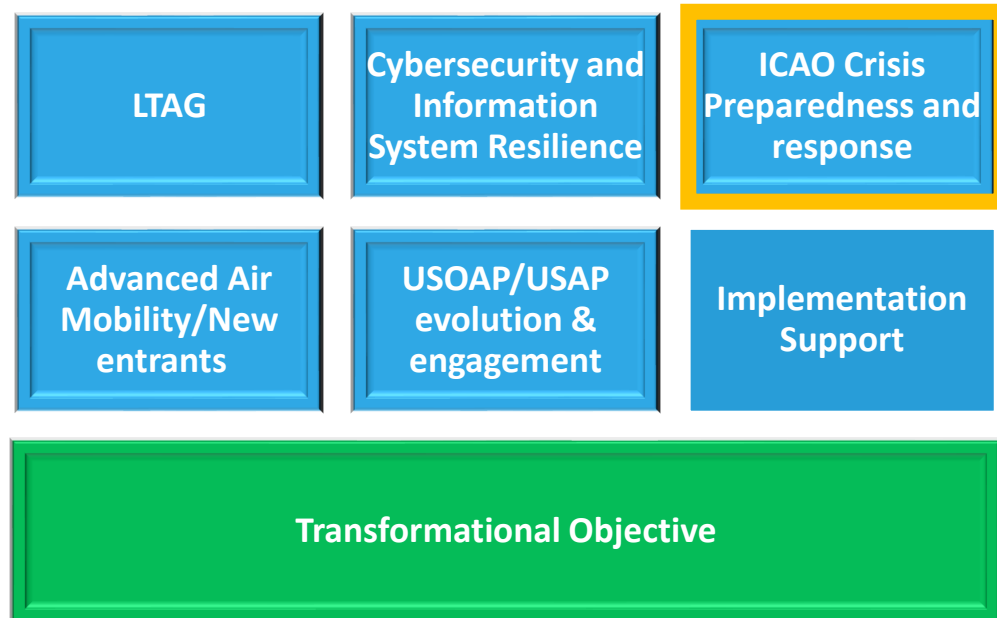
A crisis/contingency event can happen anywhere and disrupt flight operations



In the ICAO Business Plan

Current Triennium 2023-2025

Priority Focus Areas approved by the ICAO Council



Next Triennium (2026-2028)

One of the Programmes under One Strategic Goal



**AVIATION DELIVERS
SEAMLESS,
ACCESSIBLE, AND
RELIABLE MOBILITY
FOR ALL**

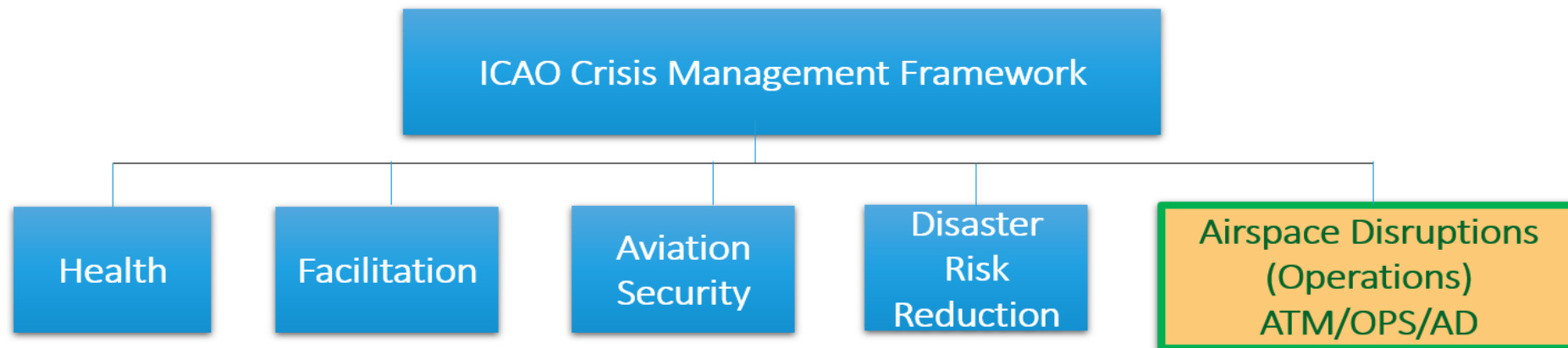
Crisis Preparedness and Response

This programme envisages to create a comprehensive and adaptable crisis response programme within ICAO to help States meet obligations under the Chicago Convention and other sectors, improving crisis response capabilities for ATM disruptions, health emergencies, and humanitarian crisis

Purpose

- ✓ **Address the current crisis response challenges**, in such areas as governance, coordination and communication.
- ✓ **Improve response capabilities by States** in the face of various crises (e.g., pandemics, natural disasters) causing disruption, or potential disruption, of airport, air traffic and other related support services.
- ✓ **Improve preparedness of ICAO and the aviation-related entities** to respond to these diverse crises in a timely, efficient, coordinated and effective manner.

Initial proposed structure



Thank You

