



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



WRC-27 and Relevant ICAO Provisions

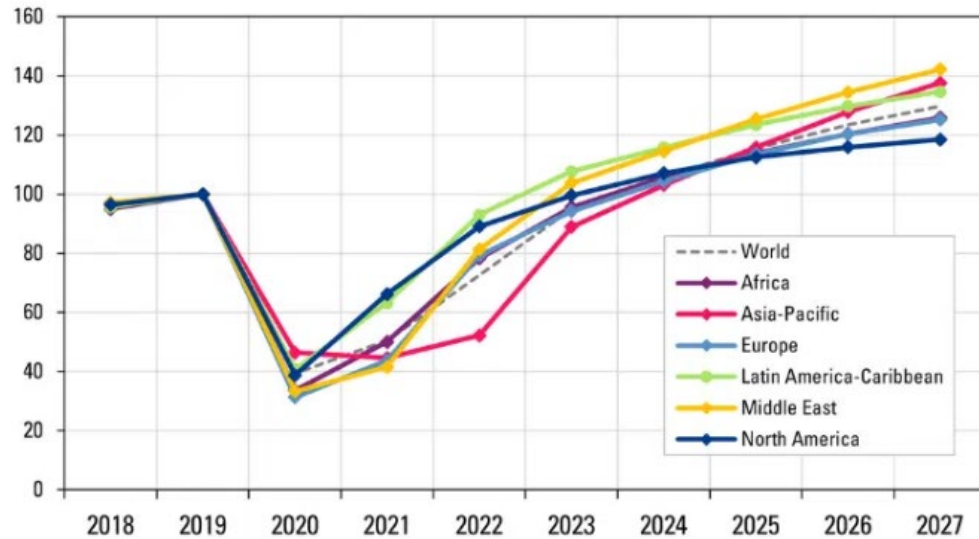
Muna Alnadaf

Technical Officer, Air Navigation Bureau
International Civil Aviation Organization (ICAO)

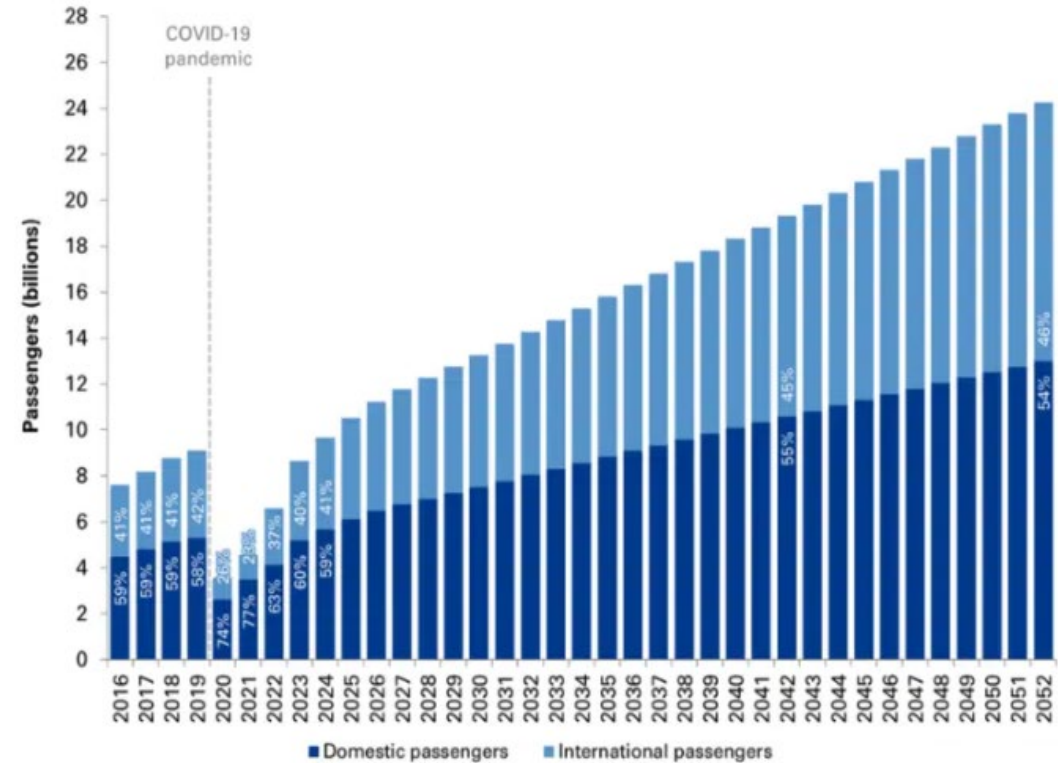
Aeronautical Frequency Spectrum Management

World wide consistent growth of air traffic

Medium-term passenger traffic forecast by regions
(indexed, 2019 = 100)



Long-term international and domestic passenger traffic (2016–2052)



Between 2023 and 2052, global passenger traffic is expected to reach close to 25 billion, approximately 2.5 times the 2024 projection

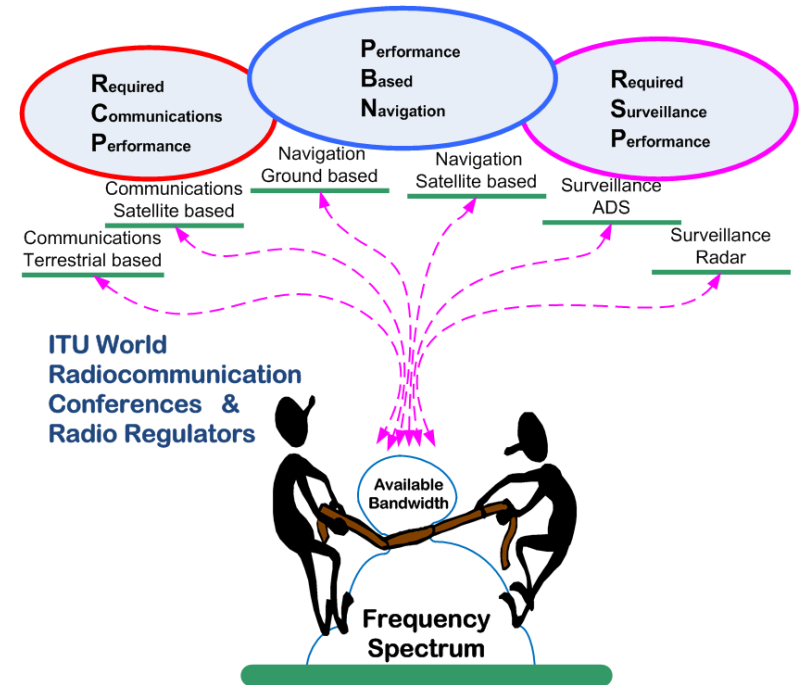
Source: ACI World Airport Traffic Forecasts (WATF) 2023-2052

Aviation Safety Depends on CNS and Spectrum

- About 100.000 flights take off and land every day without any incidents around the world
- Aviation maintains its exceptional safety through a globally coordinated approach **supported by CNS systems — all of which rely on access to protected radio-frequency spectrum**

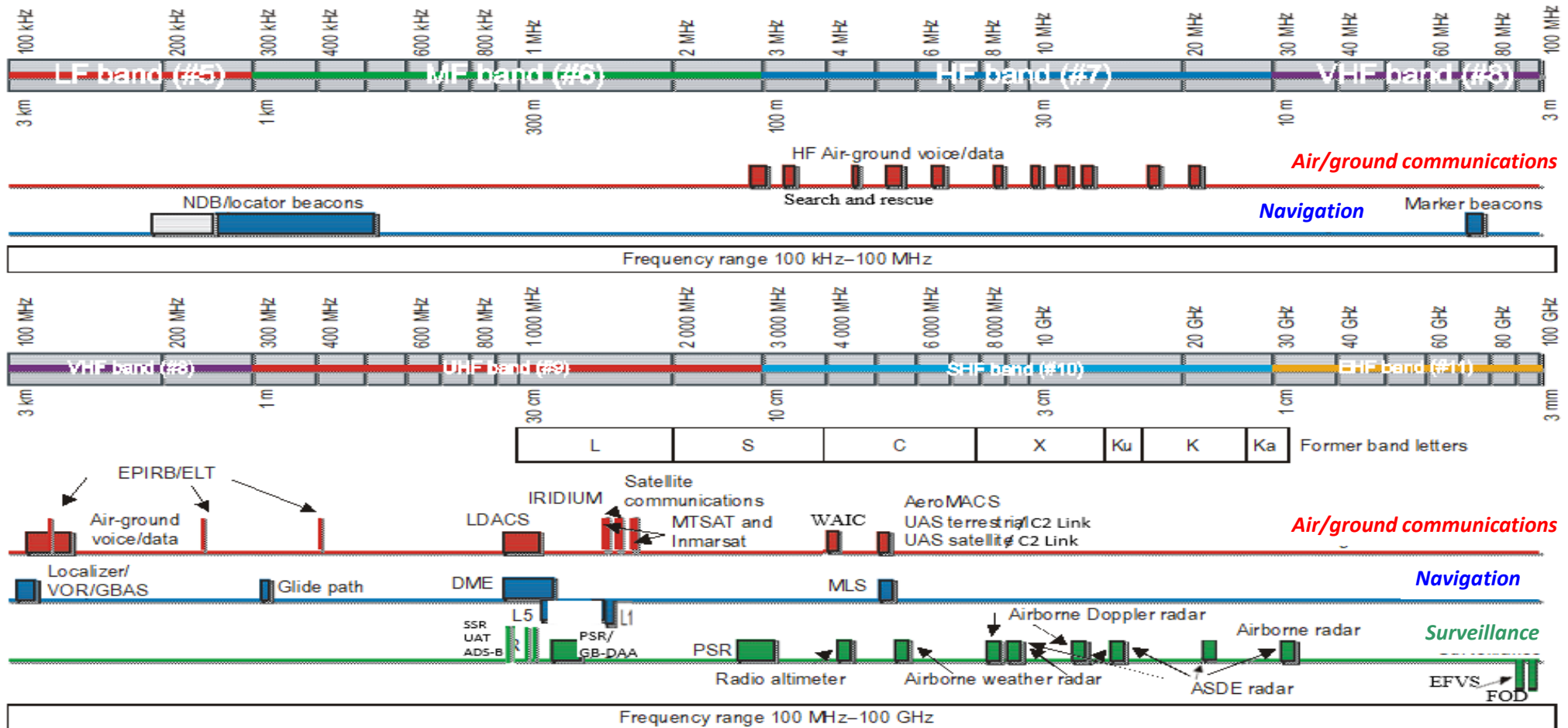


Modern Aircraft: Fully Dependent on Safety Spectrum



Aeronautical Frequency Spectrum Management

Over 1 GHz of frequency spectrum in global allocations to aeronautical safety services



Notes:

1. Drawing not to scale.
2. Not all regional or sub-regional allocations are shown.
3. Band identification (e.g. VHF) and band # per Radio Regulations.
4. The satellite communication bands used by MTSAT and Inmarsat are not allocated to the aeronautical mobile satellite (R) service.

Aeronautical Frequency Spectrum Management



The highest level of Spectrum Management takes place at the ITU World Radiocommunication Conferences (WRC), held every four years



Maintenance of the International provisions for Spectrum Management, contained in the ITU Radio Regulations (RR)



This includes maintenance of the Table of Frequency Allocations



A consequence of this process is that aeronautical frequency managers need to develop, and lobby for an aviation position on frequency spectrum use



Aeronautical Frequency Spectrum Management



- National position is developed and coordinated by the National Frequency Spectrum authority
- Aviation is but one of many users that lobby for attention



- National telecommunications authorities co-ordinate their position through regional organizations
- Aviation representatives may not be allowed to speak up as the National Frequency Spectrum Authority has only “one official position”
- ICAO is allowed to participate



- National telecommunications authorities co-ordinate their position through the ITU-R Study Groups
- National delegation has only “one official position”
- States look to ICAO for guidance on aviation matters

National level

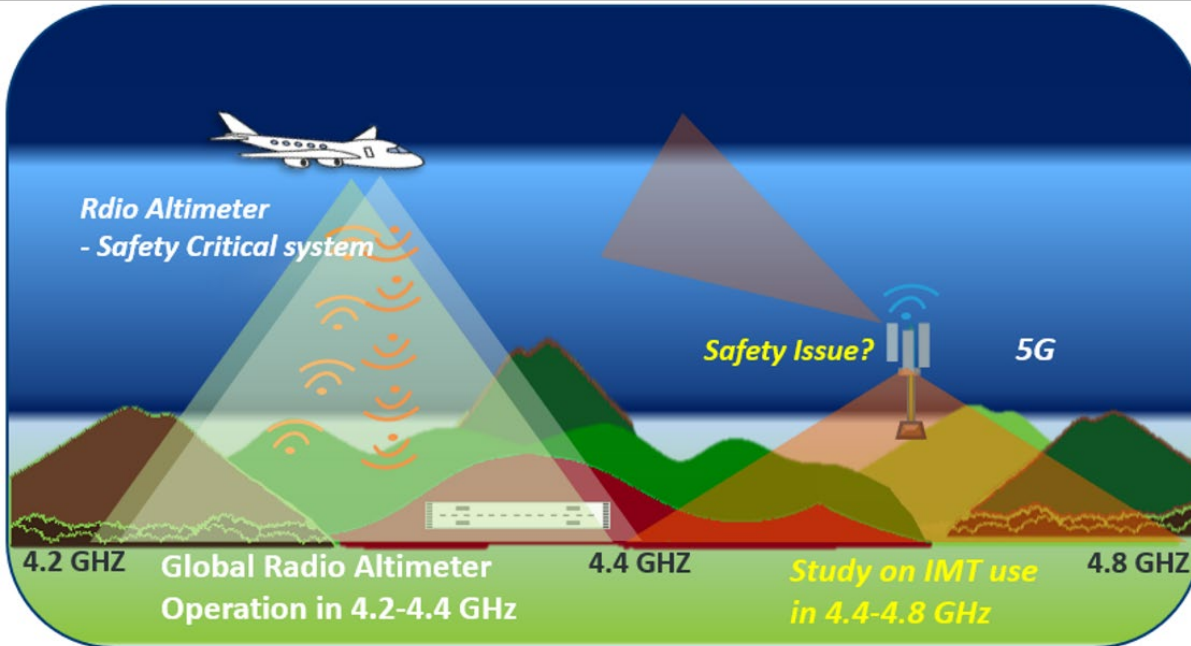
Regional Level

International level

WRC-27 Agenda Item 1.7—and More —Affect Aviation Safety

Many WRC agenda items could affect aeronautical safety services! *Further collaboration is needed!*

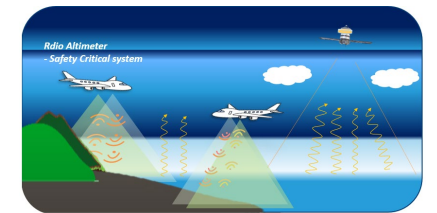
WRC-27 Agenda Item 1.7: Study on IMT Use in the frequency bands 4400-4800



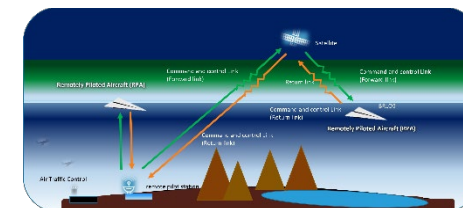
AI 1.17: Space Weather Sensors



AI 1.19: Primary allocations to the EESS passive in the frequency bands 4200-4400



AI 9.1: Urgent action by Study groups in prep for the next WRC beyond-line-of-sight C2-link for RPAS



Management and Defence of Aviation Frequency Spectrum

1

ICAO Frequency Spectrum **Strategy & Policy**

2

ICAO **Position** for WRC & Relevant State Letters

3

Assembly Resolution A42-7

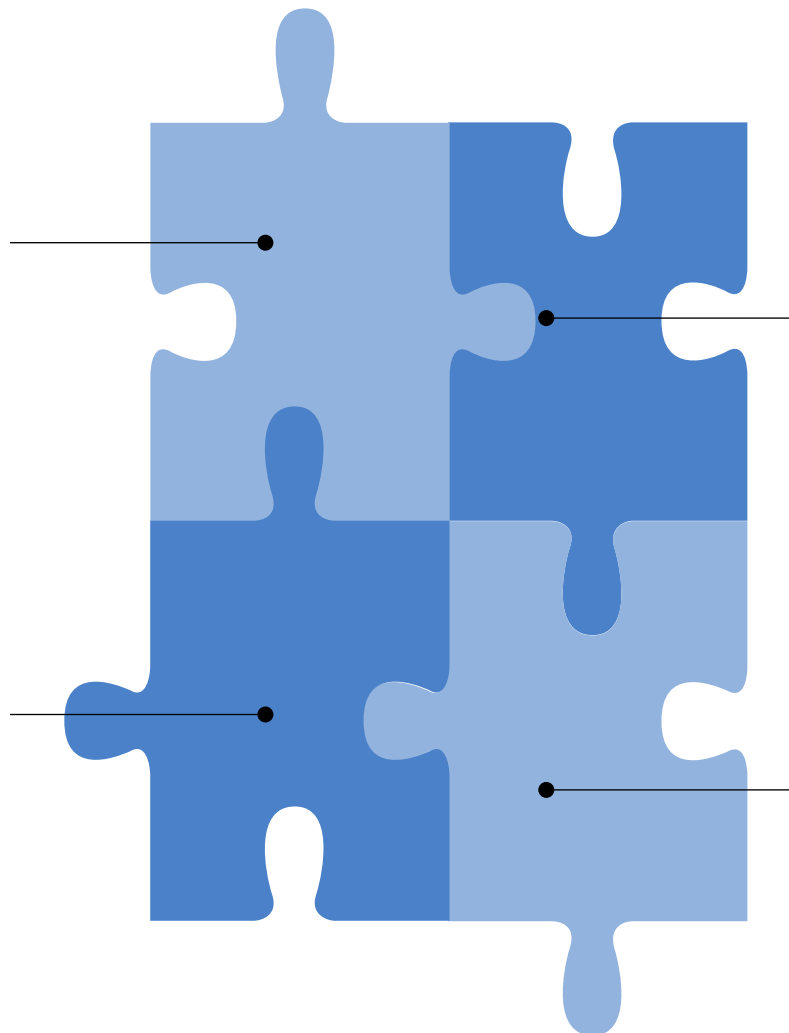
1

ICAO Frequency Spectrum Strategy

High level vision on existing and future spectrum requirements in support of the evolving CNS systems and infrastructure requirements

ICAO Frequency Policy Statements

Statements of official policy on each and every frequency band used by aeronautical systems for the provision of CNS



ICAO Position for WRC

ICAO Position on the specific agenda items of the upcoming ITU WRC to ensure that aeronautical requirements and safety concerns are met

Strategy for establishing and promoting the ICAO WRC Position

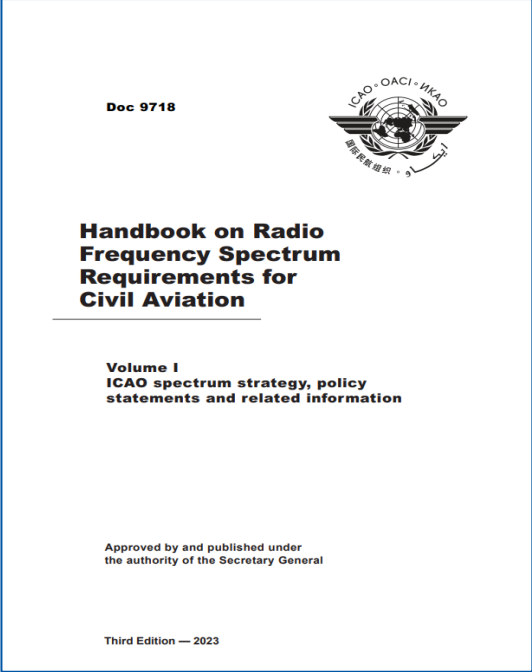
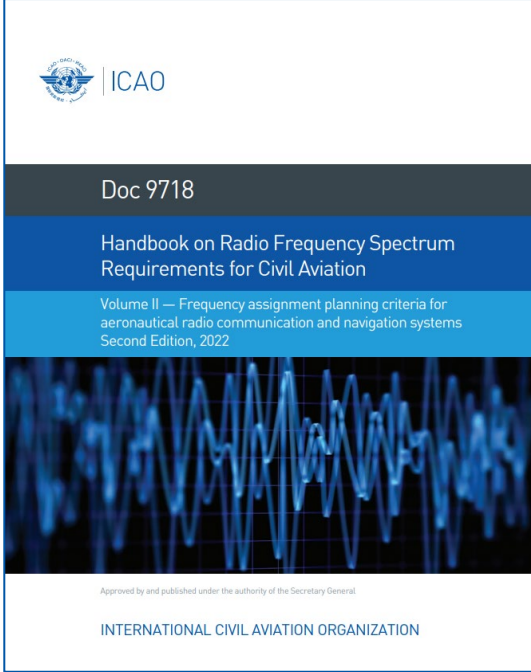
(including **Assembly Resolution A42-7**)

2

3

ICAO Doc 9718

Handbook on Radio Frequency Spectrum Requirements for Civil Aviation

Vol. I - ICAO Spectrum Strategy and Policy	Vol. II - Frequency Assignment Planning
 <p style="text-align: right;">3rd edition (2023)</p>	 <p style="text-align: right;">2nd edition (2022)</p>
<p>Handbook on Radio Frequency Spectrum Requirements for Civil Aviation - Volume I — ICAO spectrum strategy, policy statements and related information (Doc 9718-1) ICAO Store</p>	<p>Handbook on Radio Frequency Spectrum Requirements for Civil Aviation - Volume II — Frequency assignment planning criteria for aeronautical radio communication and navigation systems (Doc 9718-2) ICAO Store</p>

The 4th edition of Volume I (unedited version) will shortly be available on:

- the FSMP public website: <https://www.icao.int/FSMP/documents>
- the ICAO eLibrary: <https://elibrary.icao.int/home>

Handbook on Radio Frequency Spectrum Requirements for Civil Aviation Volume I - Spectrum Strategy and Policies

Overall ICAO Spectrum Policy (approved by Council)



1

- ICAO Spectrum Strategy

- Long term spectrum use of current and future radio systems

- ICAO Spectrum Policy Statements

- Specific actions to assist in meeting the Strategic Objectives

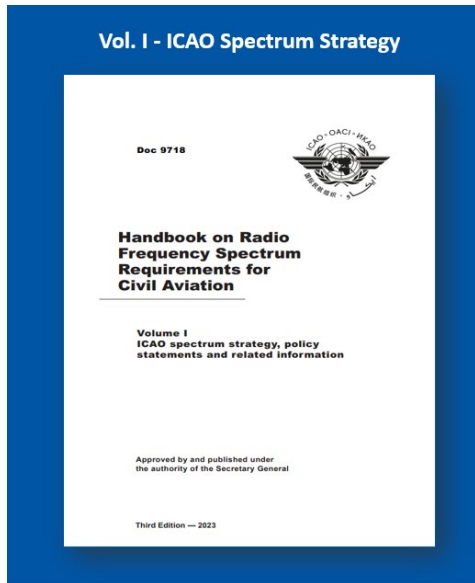
2

Attachment F : ICAO Position for future WRC's

- Medium and long term availability of spectrum for aviation

3

Attachment E: Assembly Resolution A42-7

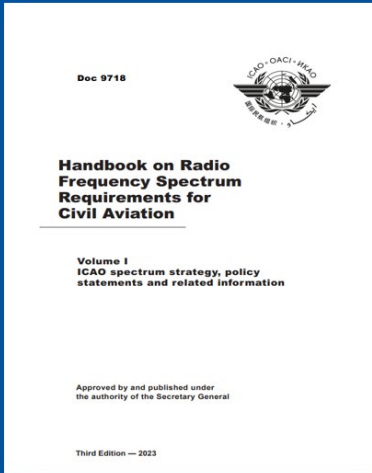


Doc 9718 Volume I

Spectrum Strategy and Policies

Background material in the Handbook, (Volume I) (1)

- **Role of ICAO**
 - In ITU-R (Study Groups) and in Regional Telecommunication Organizations
 - At ITU World Radiocommunication Conferences
 - In frequency coordination and registration (also ITU)
- **Role of the ITU and Regional Telecommunication Organizations**
 - Develop technical material (ITU-R Study Groups)
 - Amend Radio Regulations (at WRCs)



Doc 9718 Volume I

Spectrum Strategy and Policies

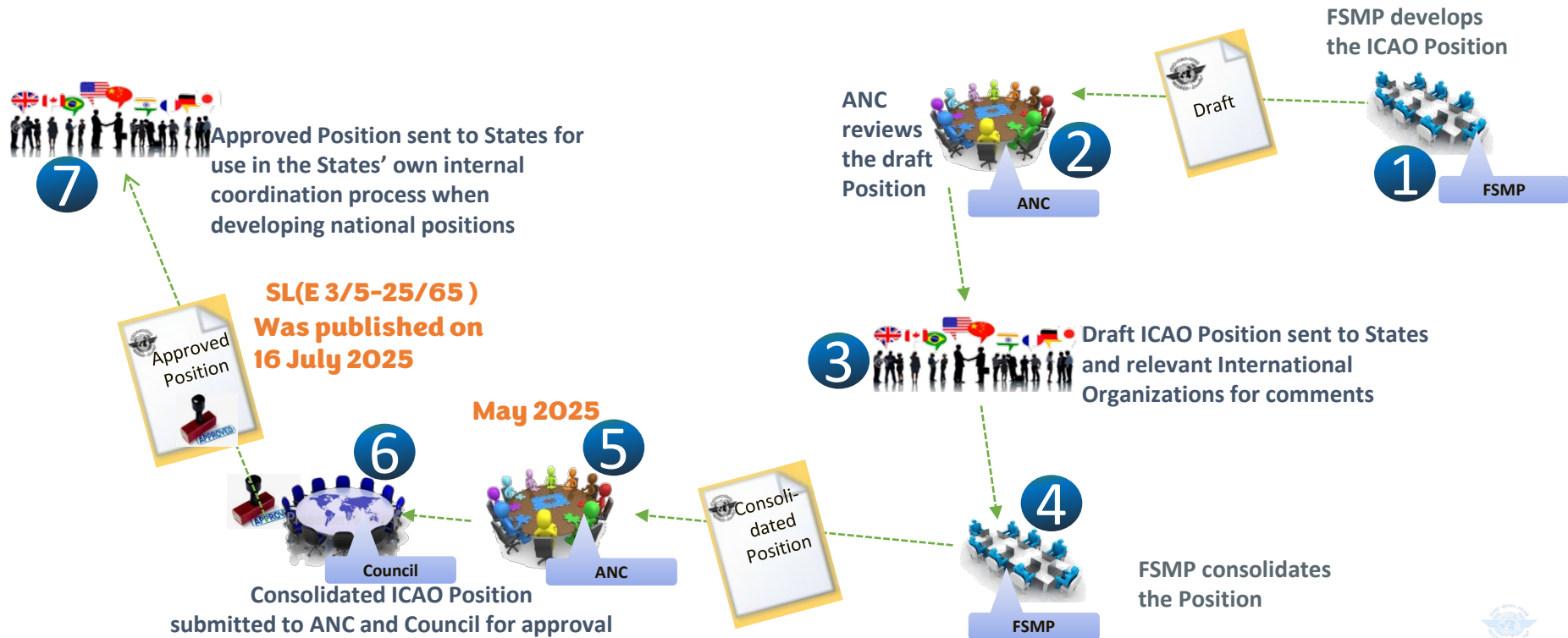
Background material in the Handbook, (Volume I) (2)

- Policy Statements on frequency allocations and technical details (Chapter 7), including:
 - Frequency allocations and footnotes in ITU Radio Regulations
 - Information on Aviation use
 - Commentary (specific comments on ITU and ICAO review In frequency coordination and registration (also ITU))
- Spectrum Strategy (Chapter 8)
- ICAO Position for the next WRC (Attachment F)



ICAO Position and WRC preparations

WE ARE HERE
(May 2026)

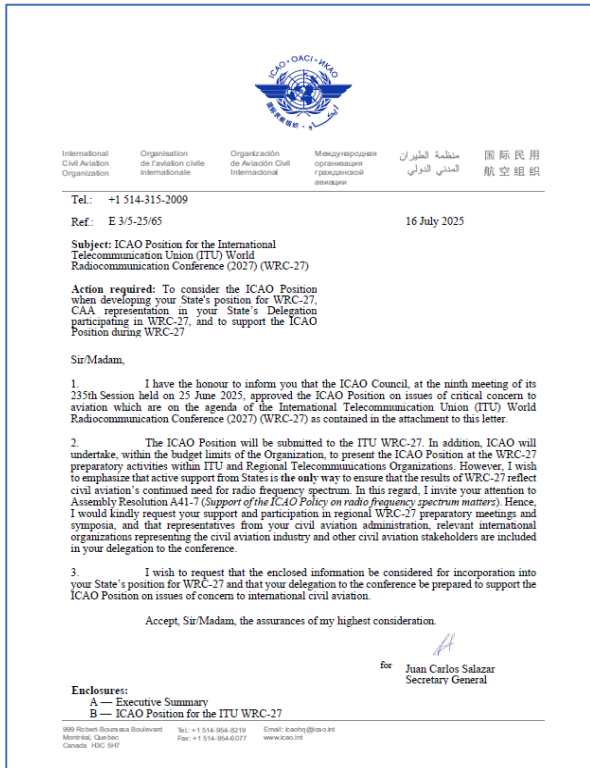




2

ICAO Position for WRC-27 & the Call for State Support

The ICAO Council approved the ICAO position for WRC-27 on 25 June 2025. The relevant State Letter was published on 16 July 2025.



- States and Int Orgs are requested to take into account the ICAO Position, to the maximum extent possible,
 - in their prep activities for the WRC-27 at the national level,
 - in the activities of the regional telecommunication organizations and
 - in the relevant meetings of the ITU.

Active support from States is deemed to be the only means to ensure that the results of the WRC-27 reflect civil aviation's interest

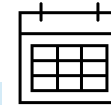
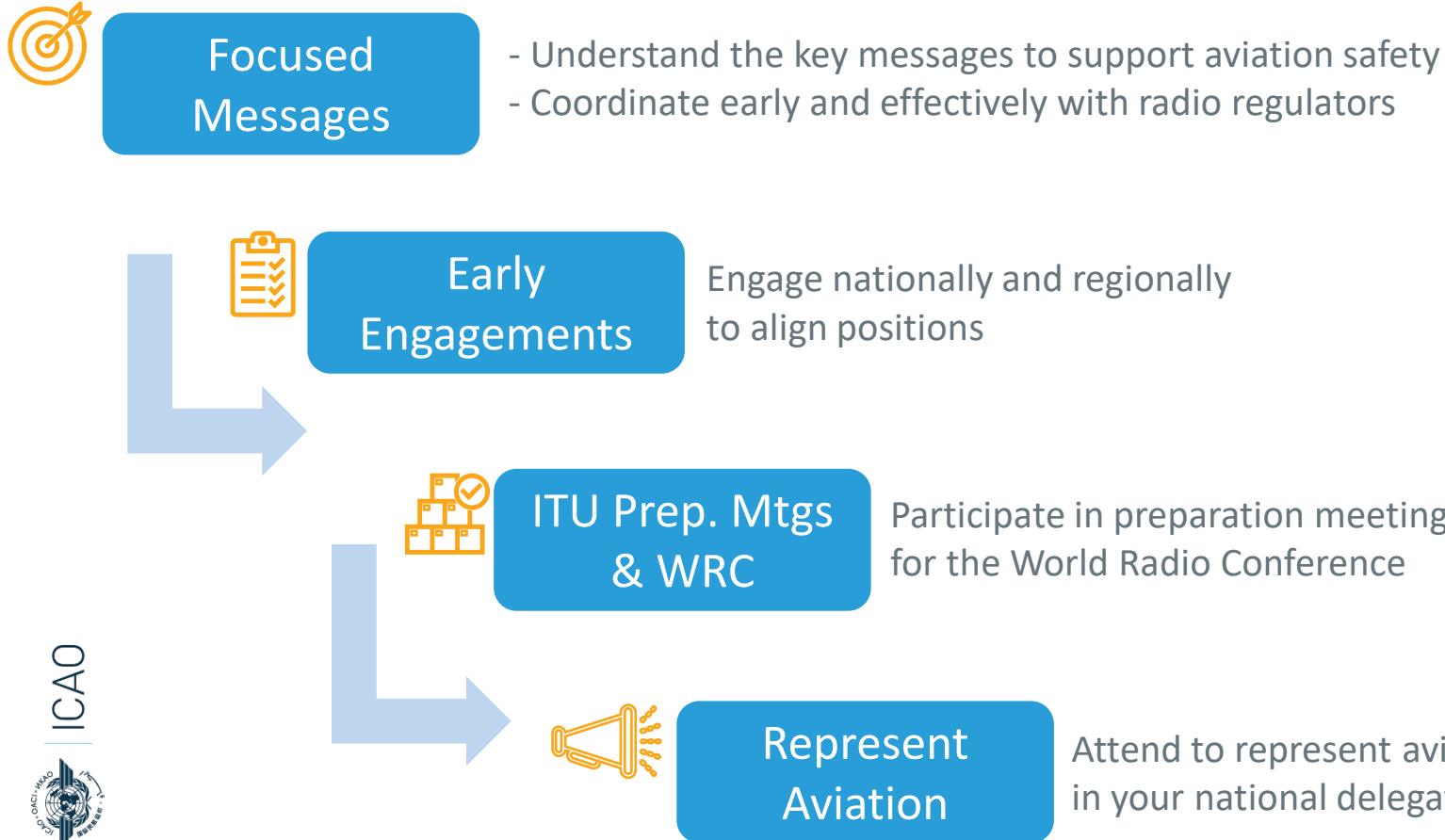
Your participation is essential to secure aviation's spectrum future at WRC-27!

State Letter 24/93 (ICAO-NET)

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2 ICAO Position for WRC-27 & the Call for State Support

Call to Action



Upcoming spectrum meetings

2026

- ITU WP4C – Mobile Satellite Service (Apr, Oct)
- ITU WP5B – Aeronautical and RADAR (May, Nov)
- ITU WP5D – International Mobile Telecom (May, Oct)
- APT (Asia-Pacific Regional Spectrum Group)
- CEPT (European Regional Spectrum Group)
- ATU (African Regional Spectrum Group)
- ASMG (Arab Regional Spectrum Group)
- CITELE (Americas Regional Spectrum Group)

2027

- **ITU Conference Preparatory Meeting; Apr 5-17, Geneva, Switzerland**
- APT (Asia-Pacific Regional Spectrum Group)
- CEPT (European Regional Spectrum Group)
- ATU (African Regional Spectrum Group)
- ASMG (Arab Regional Spectrum Group)
- CITELE (Americas Regional Spectrum Group)
- **World Radio Conference-27; Oct 18-Nov12; Shanghai, China**

ICAO Assembly 42nd Session (A42)

(23 Sep to 03 Oct 2025)

At the Technical Commission of the 42nd Assembly, Spectrum and CNS-related issues were discussed, and the attached report was approved at the Plenary.

Related topics discussed under the Agenda Item 24 are as follows.

- 1) **ICAO Policy on Radio Frequency (RF) Spectrum Matters;**
- 2) GNSS vulnerabilities and resilience; and
- 3) Other CNS issues

The Assembly acknowledged that GNSS interference and unresolved radio frequency spectrum issues, including potential interference with radio altimeters, have a significant impact on aviation safety, security, and efficiency.

In endorsing the amendment to Assembly resolution 41-7, resulting in Resolution A42-7 on support of the ICAO policy on radio frequency spectrum matters, the Assembly reiterated the vital and increasing importance of the radio frequency spectrum and called for the active engagement of States to ensure that resilient CNS capabilities remain available to maintain aviation safety.

FREQUENCY SPECTRUM MANAGEMENT

Assembly Resolution A42-7

1. Encourages Member States to foster an environment that enables national radio regulatory authorities to work in close coordination with civil aviation authorities, thereby ensuring that aviation interests are properly reflected in national spectrum policies and State positions in preparation for and during ITU WRCs;

**Newly added
by A42**

FREQUENCY SPECTRUM MANAGEMENT

Assembly Resolution A42-7

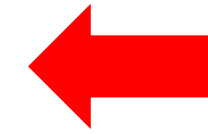
2. Urges Member States, international organizations and other civil aviation stakeholders to support firmly the ICAO frequency spectrum strategy and the ICAO position at WRCs and in regional and other international activities conducted in preparation for WRCs, including by the following means:

BE RESPONSIBLE	working together to deliver spectrum-efficient aeronautical systems as well as frequency management that meet current best practices
BE ACCOUNTABLE	supporting ICAO activities relating to the aviation frequency spectrum strategy and policy through relevant expert group meetings and regional planning groups
ADOPT A COMMON AVIATION POSITION	undertaking to provide for aviation interests to be fully integrated in the development of their positions presented to regional telecommunications fora involved in the preparation of joint proposals to the WRC including in their proposals to the WRC, to the extent possible, material consistent with the ICAO position
SUPPORT	supporting the ICAO position and the ICAO policy statements at ITU WRCs as approved by Council and incorporated in the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718)
PARTICIPATE	undertaking to provide civil aviation experts to fully participate in the development of States' and regional positions and development of aviation interests at the ITU
REPRESENT AVIATION INTERESTS	ensuring, to the maximum extent possible, that their delegations to regional conferences, ITU study groups and WRCs include experts from their civil aviation authorities and other civil aviation stakeholders who are fully prepared to represent aviation interests

FREQUENCY SPECTRUM MANAGEMENT

Assembly Resolution A42-7

3. *Urges Member States to actively engage with their radio regulatory authorities in order to incorporate aviation interests with other national interests*, especially in preparation for and during ITU WRCs;



**Newly added
by A42**

4. *Urges Member States to consider, as a priority, **public and aviation safety** when deciding how to enable new or additional services, and to consult with aviation safety regulators, subject matter experts and airspace users, **to provide all necessary considerations and to establish regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference:***

5. *Requests the Secretary General to bring to the attention of ITU the importance of adequate radio frequency spectrum allocation and protection for the safety of aviation; and*

6. *Instructs the Council and the Secretary General, as a matter of high priority within the budget adopted by the Assembly, to ensure that the resources necessary to support the development and implementation of a comprehensive aviation frequency spectrum strategy, as well as increased participation by ICAO in international and regional spectrum management activities are made available*



Thank You!





| ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



5G and aviation safety: Keeping Your Flight Safe in Crowded Skies

ICAO

ANB/ICAO

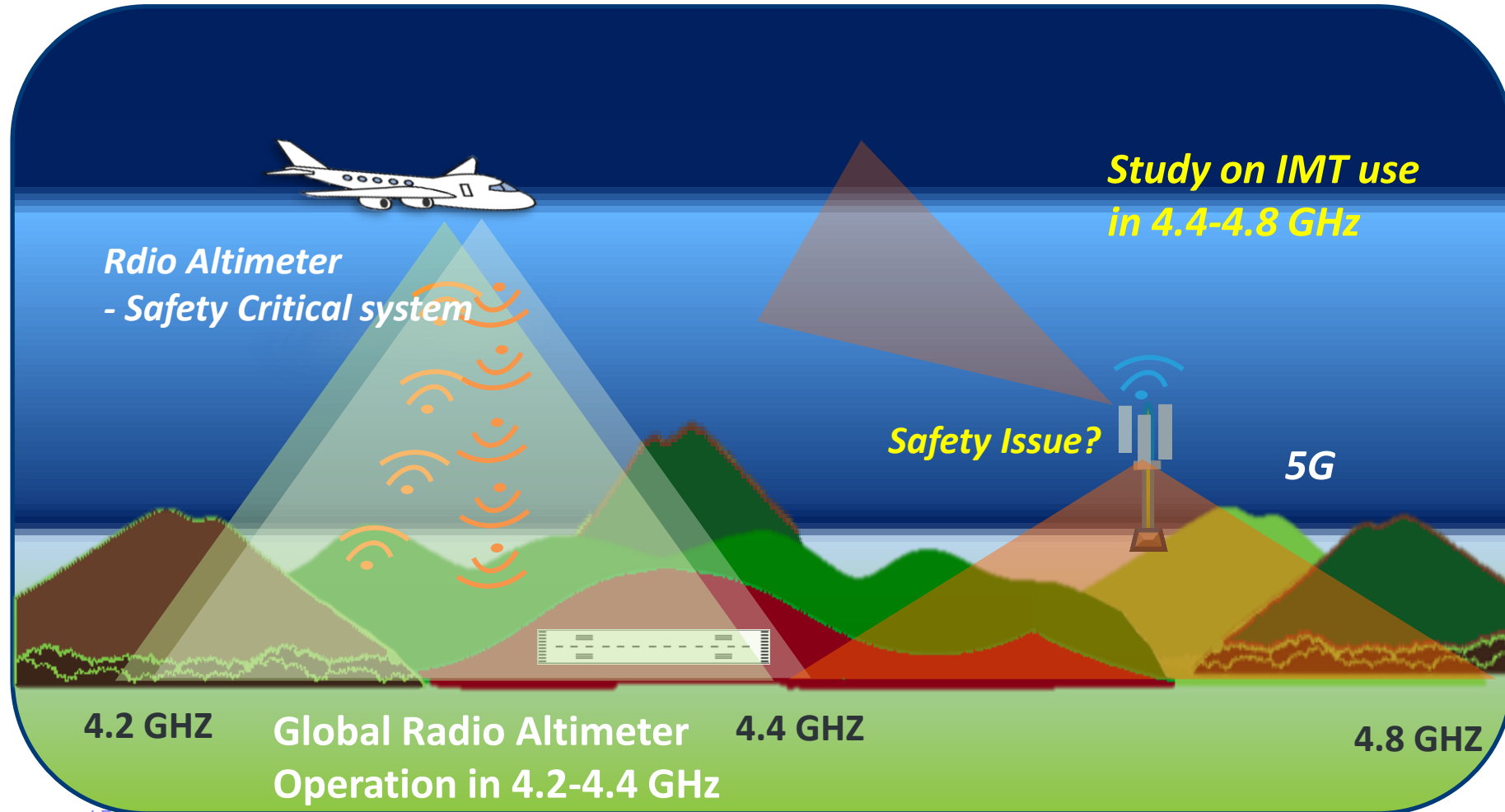
ITU
WRC-27





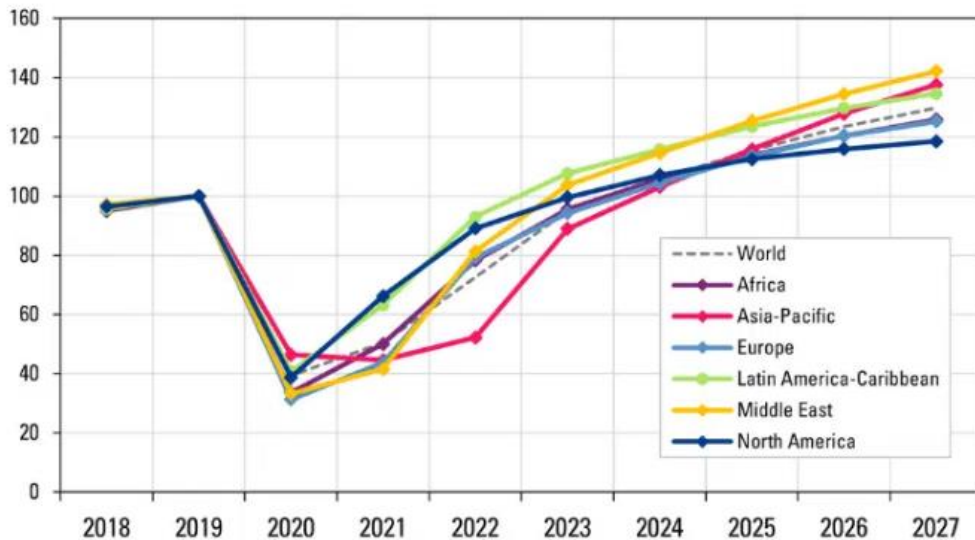
WRC-27

WRC-27 Agenda Item 1.7: Study on IMT Use in the frequency bands 4400-4800 MHz

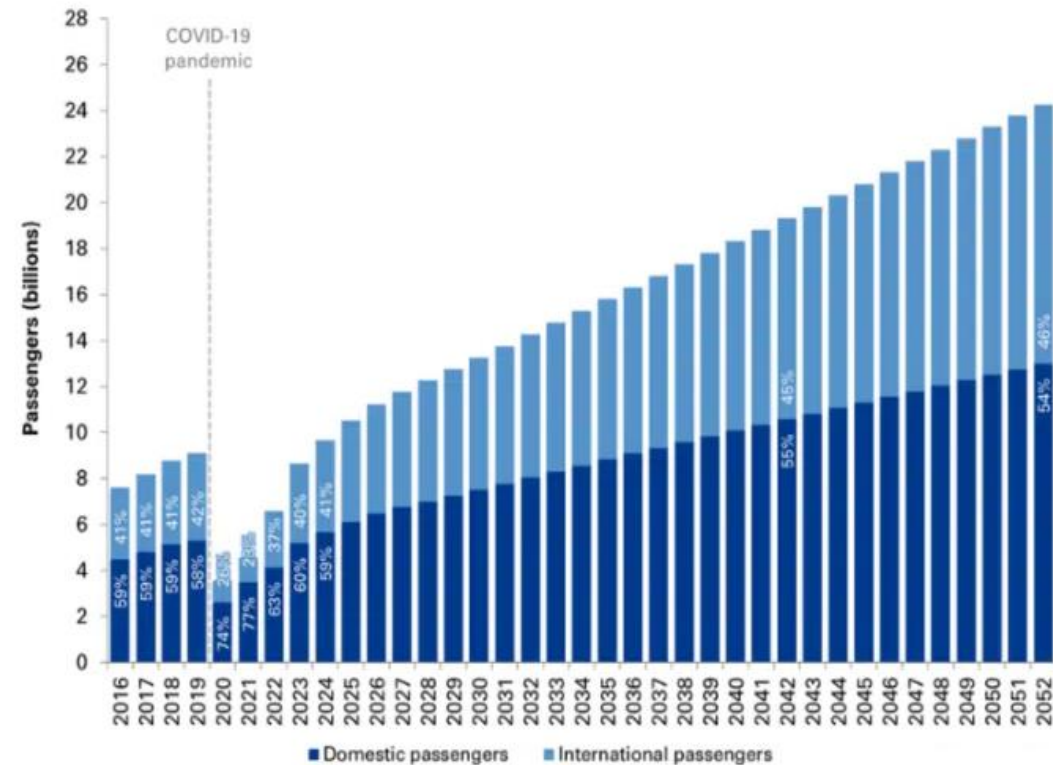


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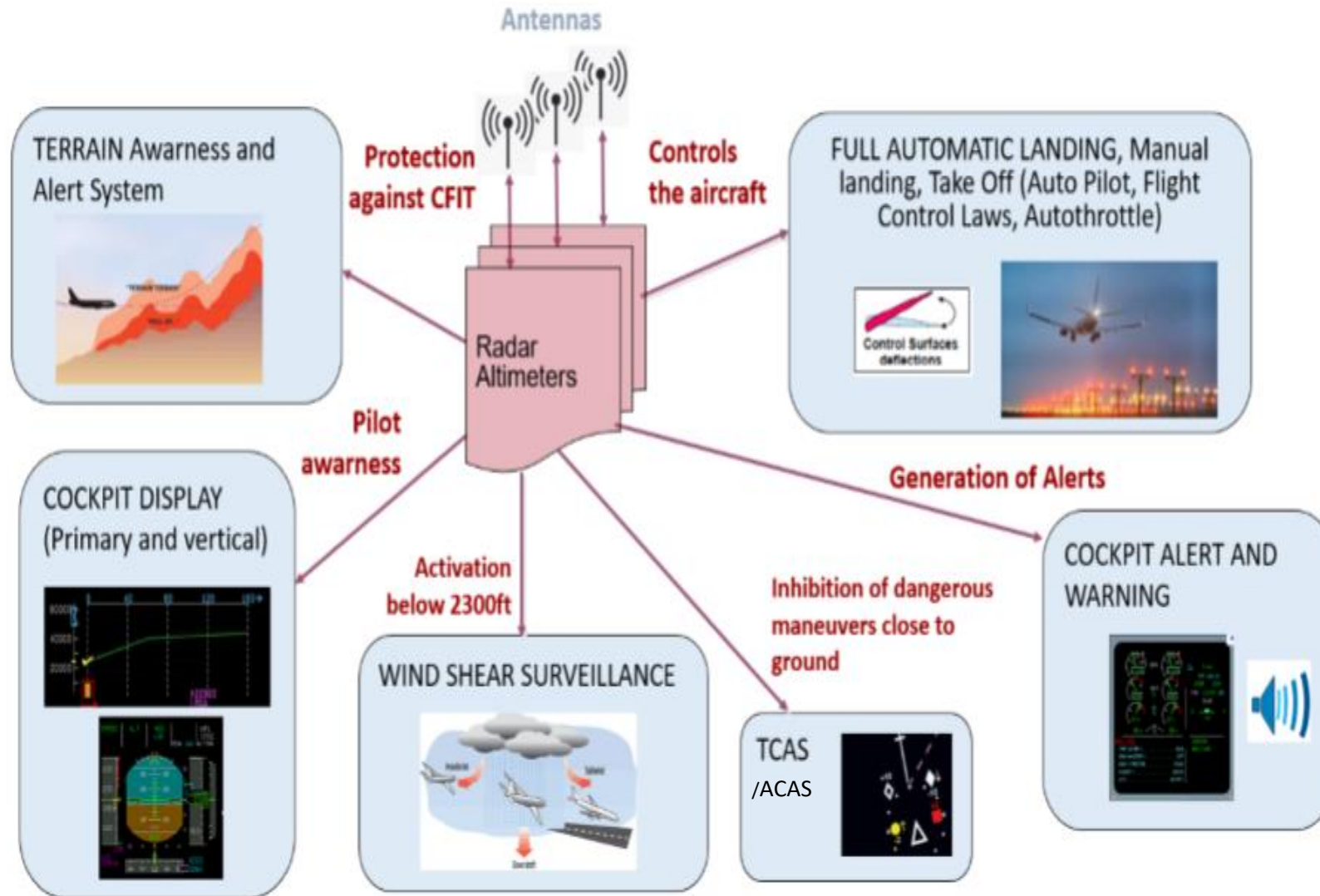
How to Maintain Safety While Expanding Capacity

State of Global Aviation Safety



- Proper and improved operational procedures
 - Training programs for aviation personnel
 - Accident analysis and lessons learned
- **Introduction of systems to prevent accidents**
 - **Aviation crosses borders — safety requires global standards**
 - **One country's measures alone cannot ensure worldwide passenger safety** , etc

Critical Roles of Aircraft Radio Altimeters



Critical Roles of Aircraft Radio Altimeters. cont

*The Radio Altimeter is used for aircraft operations in **all types of weather environments across the globe***

It is very critical for

- low-visibility approaches,
- landings, and
- obstacle avoidance, especially in challenging weather conditions.

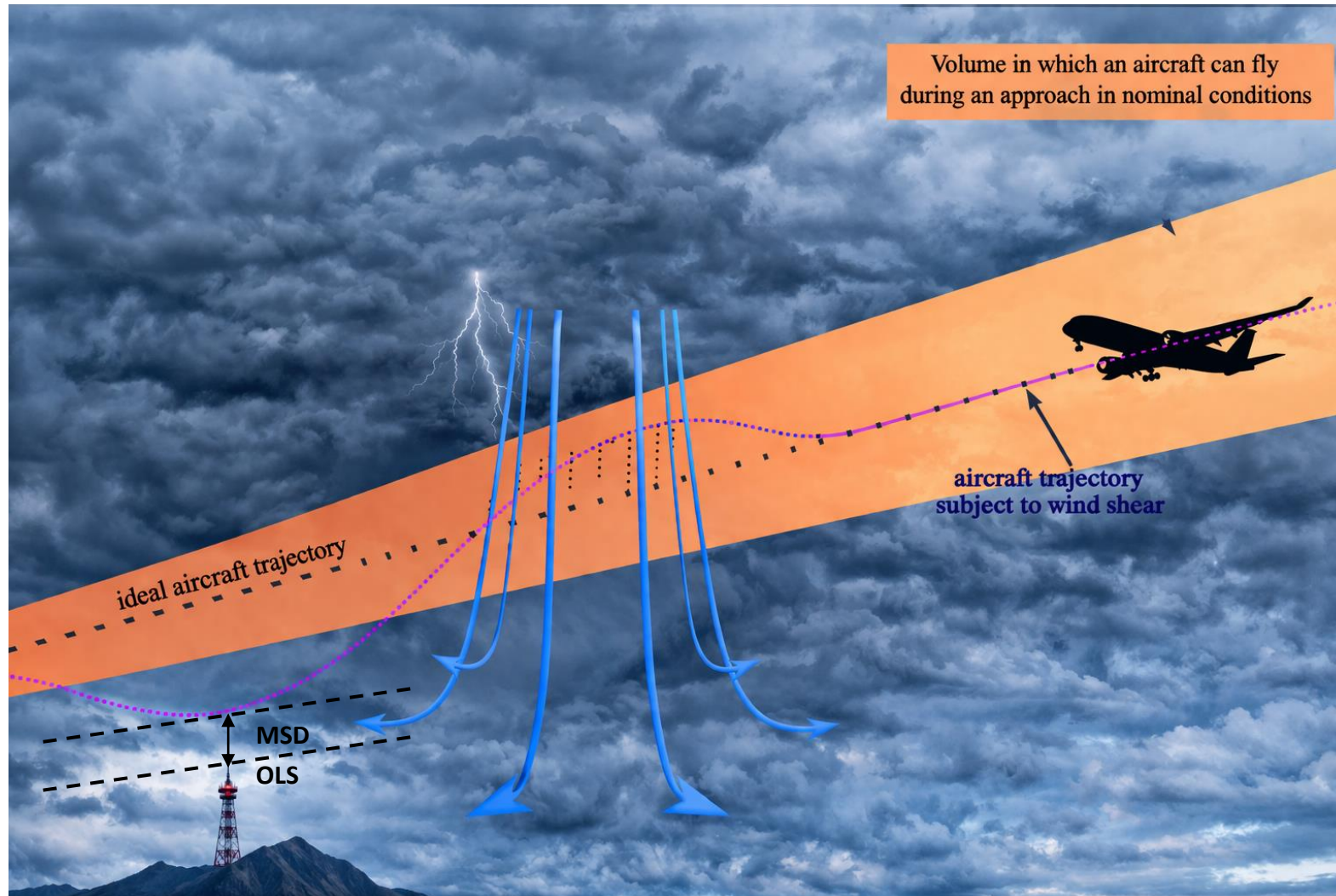
However, at present,

Potential safety risk!!

The ITU study on Agenda Item 1.7:

does not address the critical phase of radio altimeter operation, and
does not address global implications of the aviation systems.

Aviation Safety Concerns: Missing scenario: Off-nominal operations

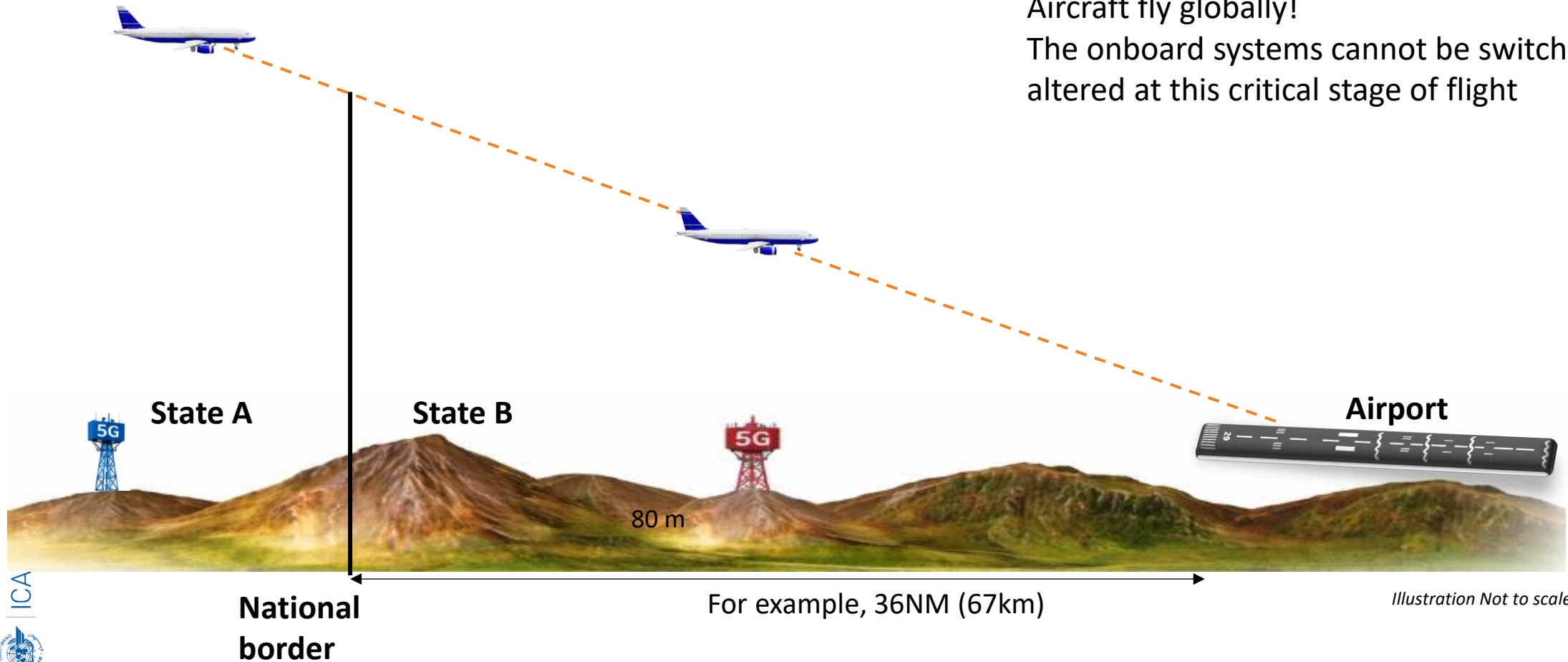


If the radio altimeter fails to provide accurate altitude information, the consequences could be severe ...
This scenario must be thoroughly addressed under WRC-27 Agenda Item 1.7

Aviation Safety Concerns:

Misconception should be corrected (It is a global issue!)

Aircraft fly globally!
The onboard systems cannot be switched off or altered at this critical stage of flight



This scenario is not a national matter but a global safety issue that must be thoroughly addressed under WRC-27
Agenda Item 1.7



Conclusion

Current concerns with WRC-27 preparatory studies:

- **Incomplete Studies:** Current ITU WP5D work does not cover several critical operational scenarios for radio altimeters.
- **Safety Risks Ignored:** Radio Altimeters (RA) are safety net systems – for instance for off-nominal landing scenarios. Yet, those off-nominal landing scenarios are not being studied. Without such scenarios, the studies fail to capture the real-world risks that the RA were intended to address, leaving aviation exposed to the very incidents that the safety net was intended to capture.
- **Timing Problem:** New RA SARPs will not be available until 2027, too late to inform WRC-27 decisions.
- **Cross-Border Operations:** Aviation is inherently global; treating this as a “national issue” overlooks the fact that aircraft routinely cross borders during critical phases of flight, and that their safety-net systems need to function reliably on both sides of any border.

Unsatisfactory Outcome: Unless studies demonstrate no impact on Radio Altimeters and Wireless Avionics Intra-Communications, aviation may be forced to oppose new IMT allocations in 4,400–4,800 MHz.

Balanced Future! We welcome the advancement of 5G networks worldwide — but their deployment must be balanced with uncompromising aviation safety, to ensure both innovation and protection of lives.

Thank You

