



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



ICAO WRC-27 Preparatory Workshop

Aviation Frequency Spectrum and the ITU World Radiocommunication Conferences (WRC)

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ITU
WRC-27



Workshop on ITU World Radiocommunication Conference 2027
(WRC-27 Workshop)
(Bangkok, Thailand, 24-25 February 2025)



Presentation Overview

01

Background

02

WRC-23 Outcome

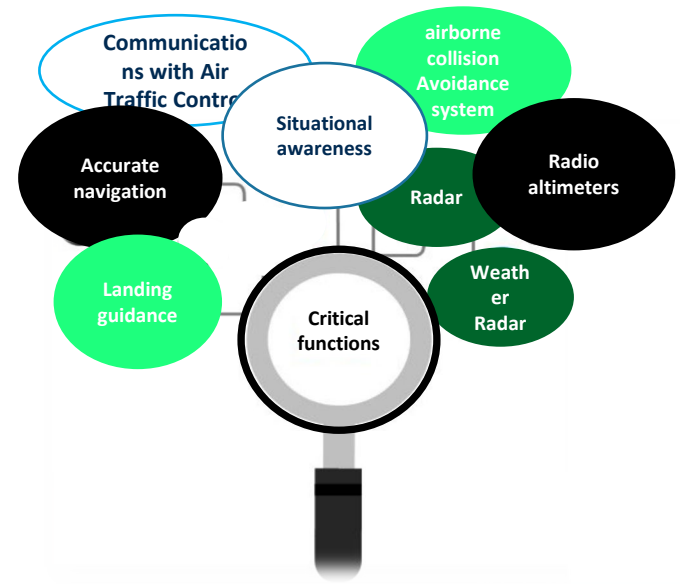
03

ICAO Position for WRC-27

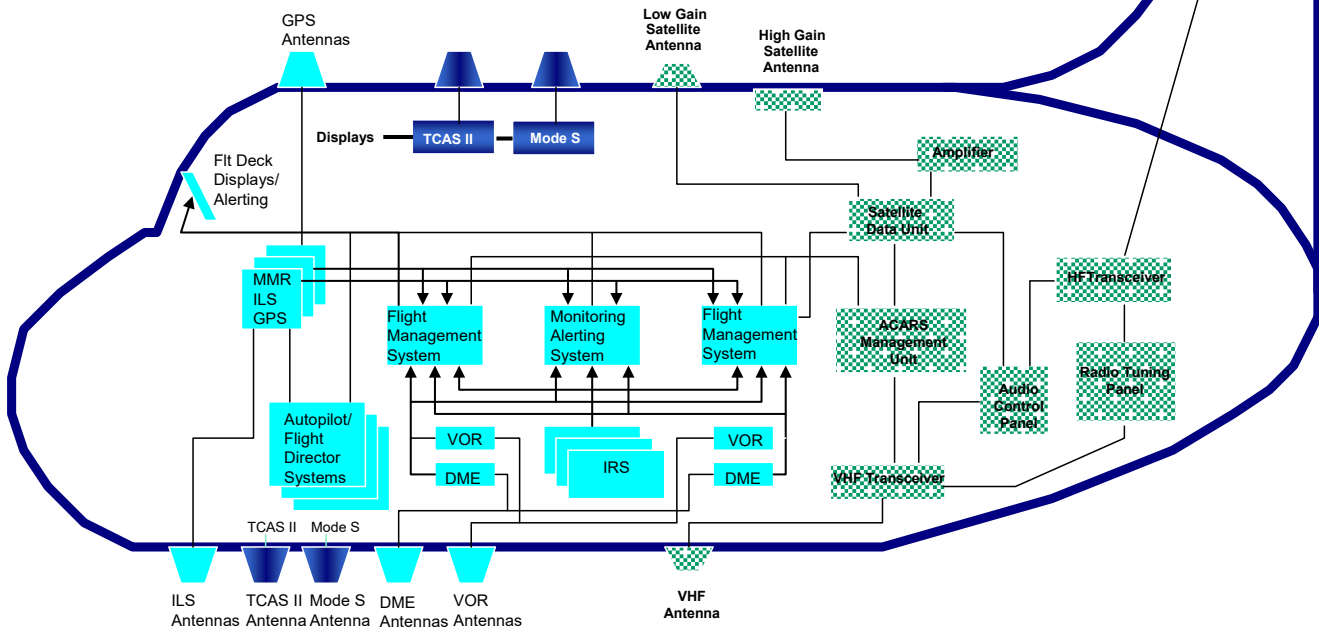
04

Conclusion

Aeronautical Frequency Spectrum Management

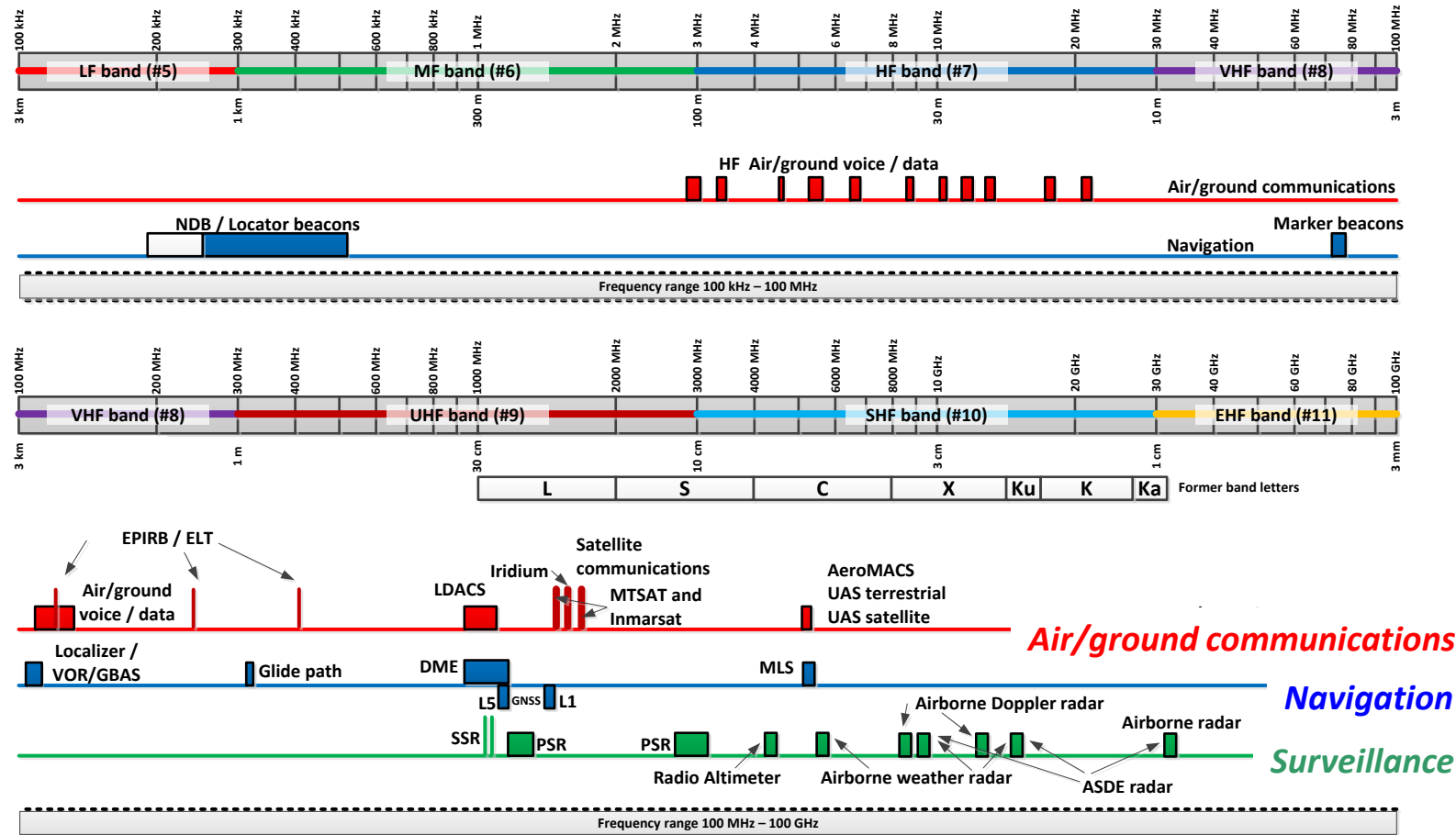


Accurate navigation, landing guidance, situational awareness (airborne collision avoidance system, radar, radio altimeters) weather radar and reliable communications with air traffic control are prerequisites for a safe flight



Aeronautical Frequency Spectrum Management

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

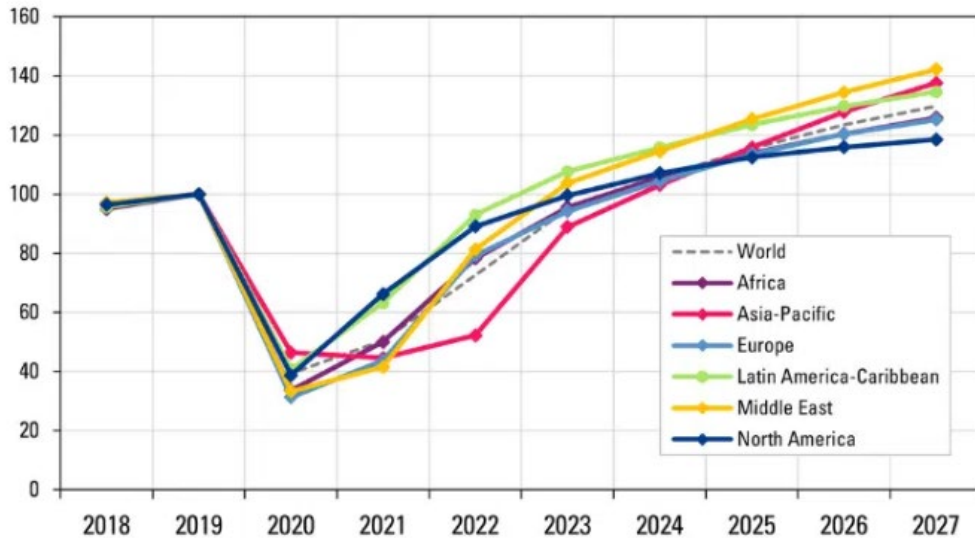


Notes:
 Drawing not to scale
 Not all Regional or sub-Regional allocations are shown
 Band identification (e.g. VHF) and band # per Radio Regulations
 The satellite communication bands used by MTSAT and Inmarsat are not allocated to the Aeronautical Mobile Satellite (R) Service

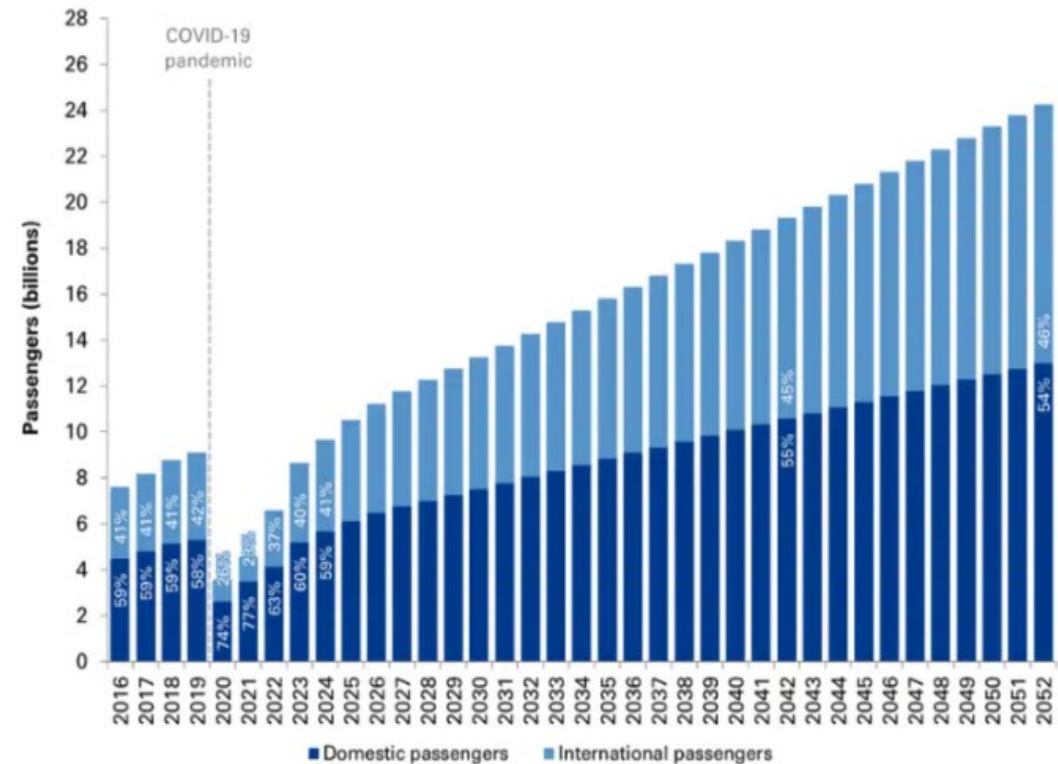
Aeronautical Frequency Spectrum Management

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

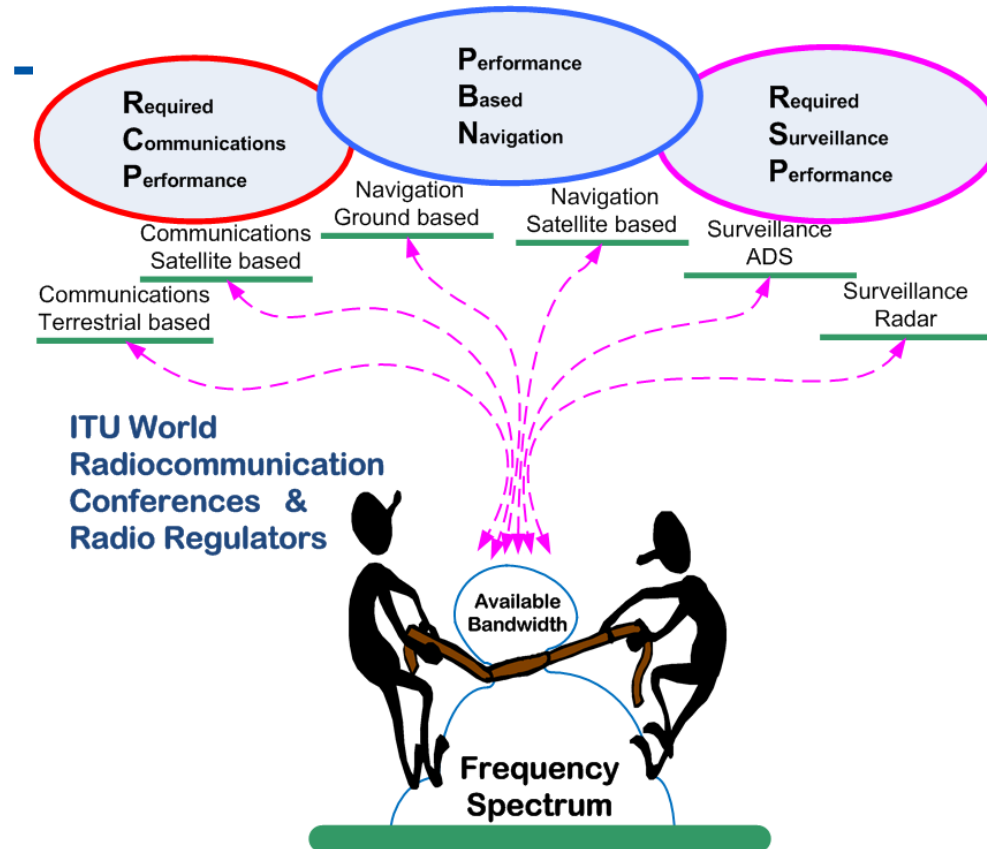
Source: ACI World Airport Traffic Forecasts (WATF) 2023-2052

Performance of Air Traffic Management



Availability and access to frequency spectrum is completely dependent on an outside program:

The ITU World Radiocommunication Conferences; and the WRC preparatory process in the ITU and the Regional Telecommunication Organizations



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 level



- 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

Regional Level



- 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

International level

Aeronautical Frequency Spectrum Management

ITU Radio Regulations update cycle

- A very competitive environment
- Aviation or any other sector cannot expect preferential treatment
- Those that do their homework and participate succeed, others lose



Definition of Radio Frequency Management:
“Radio frequency management is done by experts who meld years of experience with a curious blend of regulation, electronics, politics and not a little bit of larceny. They justify requirements, horsetrade, coerce, bluff and gamble with an intuition that cannot be taught other than by long experience.”

Vice Admiral Jon L. Boyes
U.S. Navy



ITU in brief

UN Specialized agency established to standardize and regulate international radio and telecommunications

Radio Regulations

International treaty

- Facilitate equitable access to and rational use of the radio frequency spectrum and the geostationary orbit
- Ensure availability and protection from harmful interference of frequencies for distress and safety purposes
- Assist in prevention and resolution of cases of harmful interference
- Facilitate efficient and effective operation of radiocommunications services
- Provide for, and regulate new applications of telecommunications technology



ITU WRC - General overview

1

WRCs update the International Radio Regulations

2

Held every 4 years

- Last was 20 Nov–15 Dec 2023
- Next in 2027

3

Main purpose

- To revise the Radio Regulations (RR);
- To address Radiocommunication issues of a worldwide character.

4

Why participate at World Radiocommunication Conferences

- To protect existing services
- To obtain access to spectrum for new services
- To enhance spectrum access for existing services
- To facilitate market access for radio equipment manufacturers; and
- To provide regulatory certainty to operators



ITU WRC

WRC-23 by numbers

4 Weeks

(5 ½ weeks, when counting RA-23 and CPM27-1)

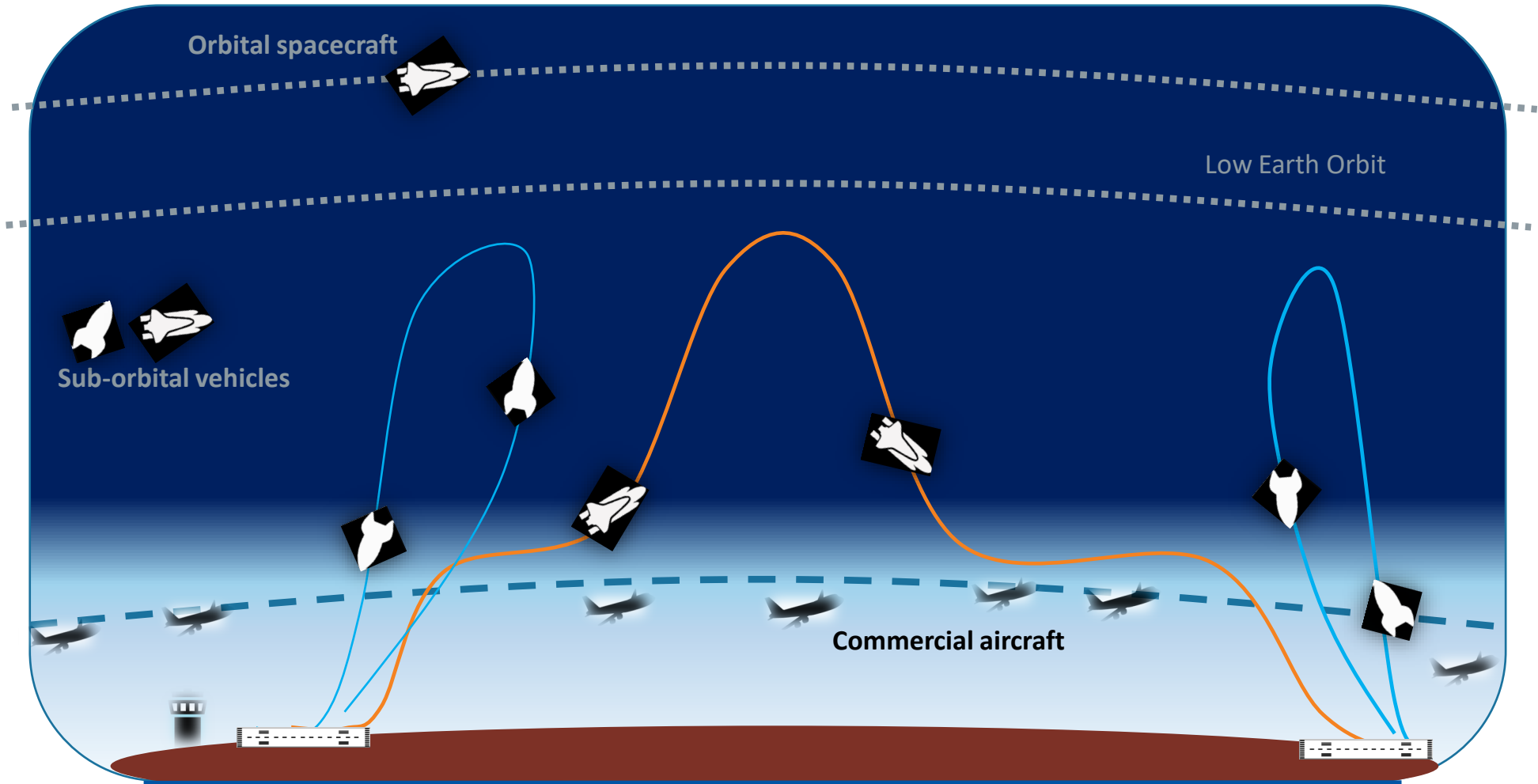
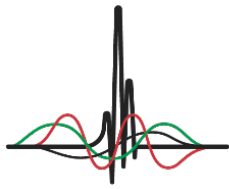


- 163 Administrations
- Several UN specialized agencies and offices, including ICAO, IMO, WMO, UNOOSA...
- Women 22% of WRC23 delegates

~4000 delegates



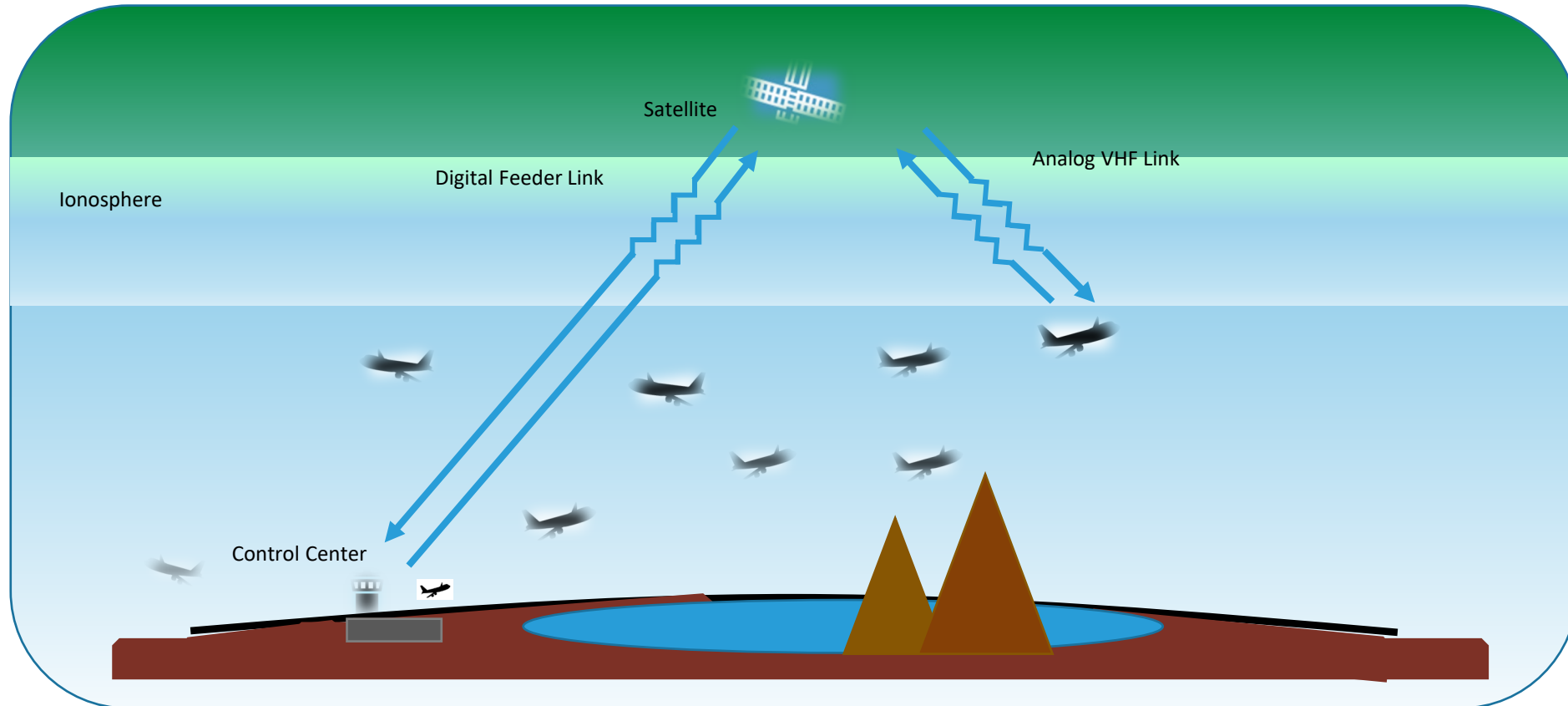
- Over 50 meetings/day, including weekends
- After 3AM – latest finish to a meeting
- 9AM - ...start time the next (same) morning



Free images of spacecraft from Pixabay

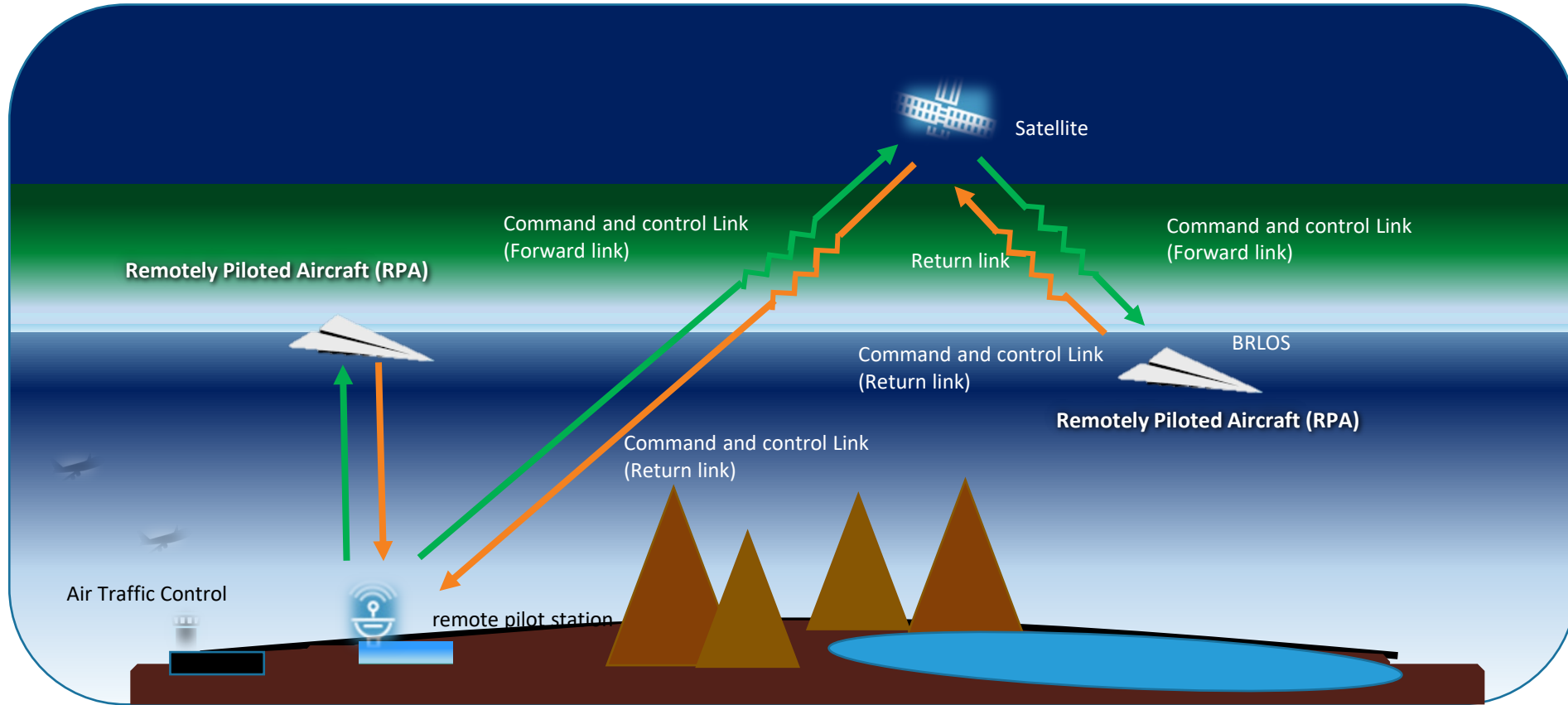
Aviation stayed out of harm's way by rejecting a potential new and narrow definition of sub-orbital vehicles, which could have negatively affected aviation's access and use of spectrum.

WRC-23 Agenda Item 1.7: Potential facilitation of aeronautical VHF over satellite



Original image from ICAO CP-DCIWG

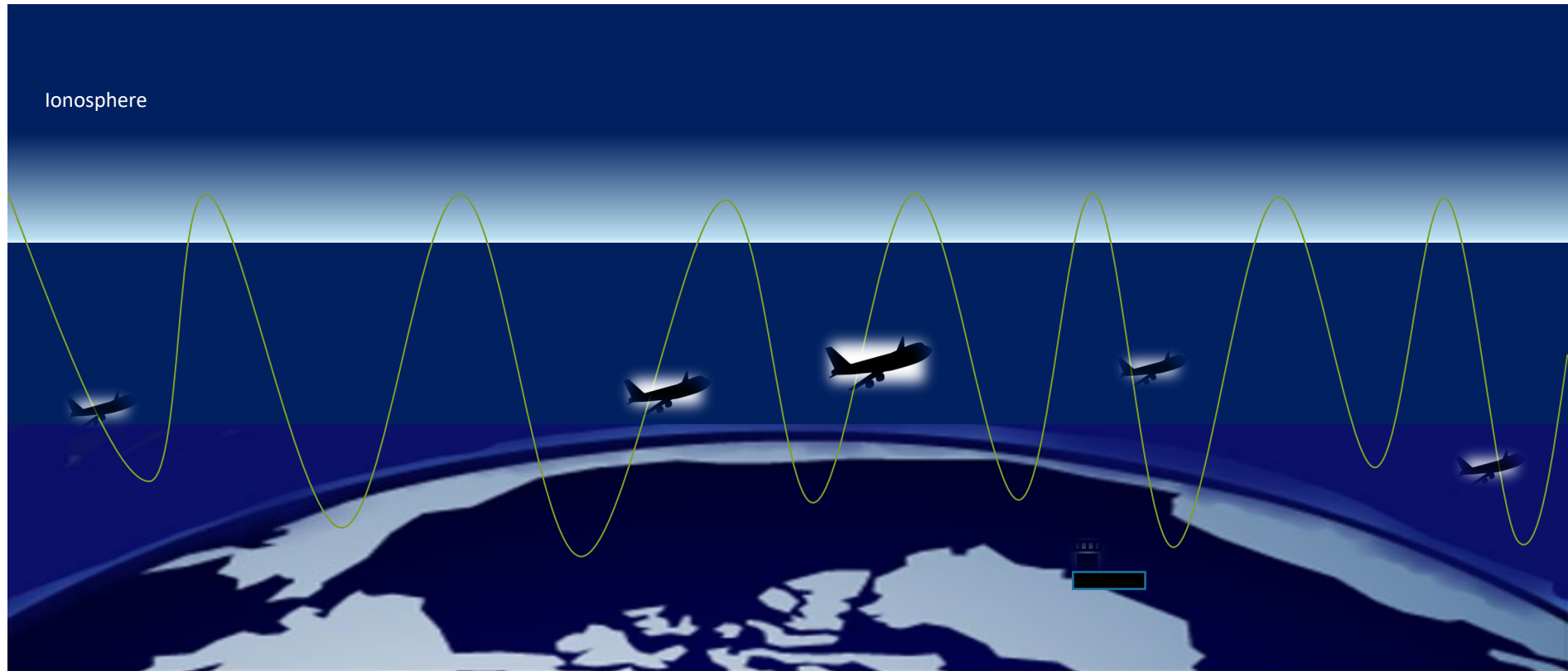
A new aeronautical mobile satellite route service allocation in the VHF band was achieved, covering the full aeronautical com band, while preventing any undue constraints on existing aeronautical VHF systems



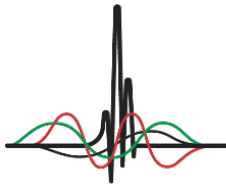
While ITU Resolution 155, developed by WRC-15, remains controversial, and unfinished; a worse result would have been to reject it outright while not providing any alternative.

The result of the conference provides stability for the already developed C2 Link SARPs, while also providing aviation with an opportunity to search for more suitable spectrum allocations than the Fixed Satellite Service. It is now important that aviation capitalizes on this opportunity.

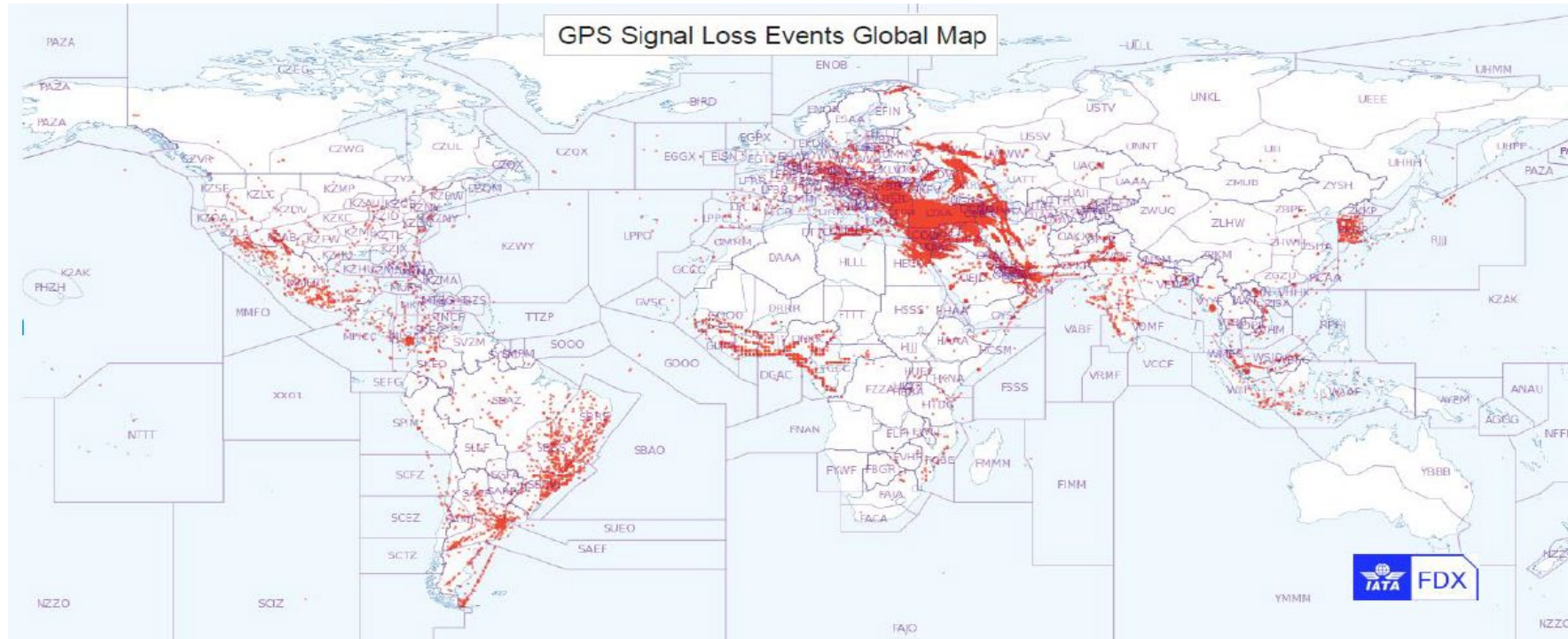
WRC-23 Agenda Item 1.9: Modifications to aeronautical HF, potentially enabling crystal clear and reliable HF voice and high-speed HF data



A minor update was made to the method aeronautical HF spectrum is allocated, making it possible to merge multiple channels to achieve greater bandwidths.



WRC-23 Agenda Item 9.2: Difficulties or inconsistencies encountered in the application of the Radio Regulations



GNSS RFI recorded events (August 2021-December 2022), source is IATA FDX program

A new RNSS Resolution agreed, which urges administrations “to apply necessary measures to avoid the proliferation, circulation and operation of unauthorized transmitters that cause or have the potential to cause harmful interference to RNSS systems and networks operating in the frequency bands 1164 – 1215 MHz and 1559 – 1610 MHz...”, while also, recognizing the “right of administrations to deny access to RNSS, for security or defence purposes”

RECONNECTING THE WORLD



The ITU WRC-27 agenda

will be very busy
for aviation

1.7

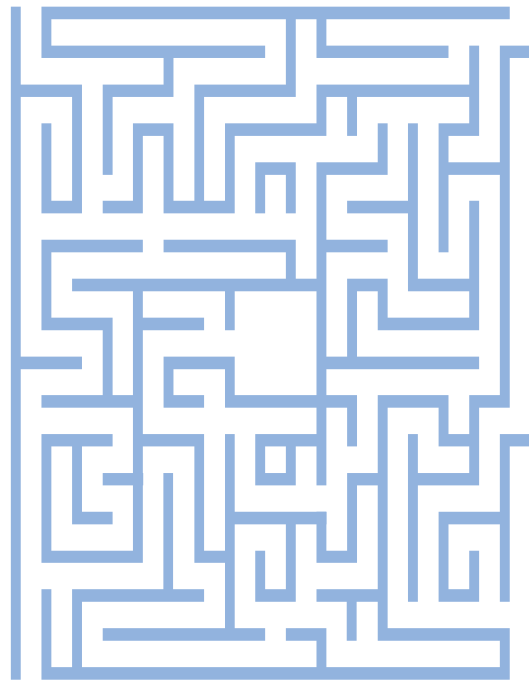
Use of IMT in the frequency bands 4400-4800 MHz

1.9

Update Appendix 26 –
Aeronautical Mobile OR high-frequency modernization

1.17

Space weather sensors



1.19

Primary allocations to the EESS passive in the bands 4200-4400

6

Urgent action by Study groups in prep for the next WRC

- C2 LINK

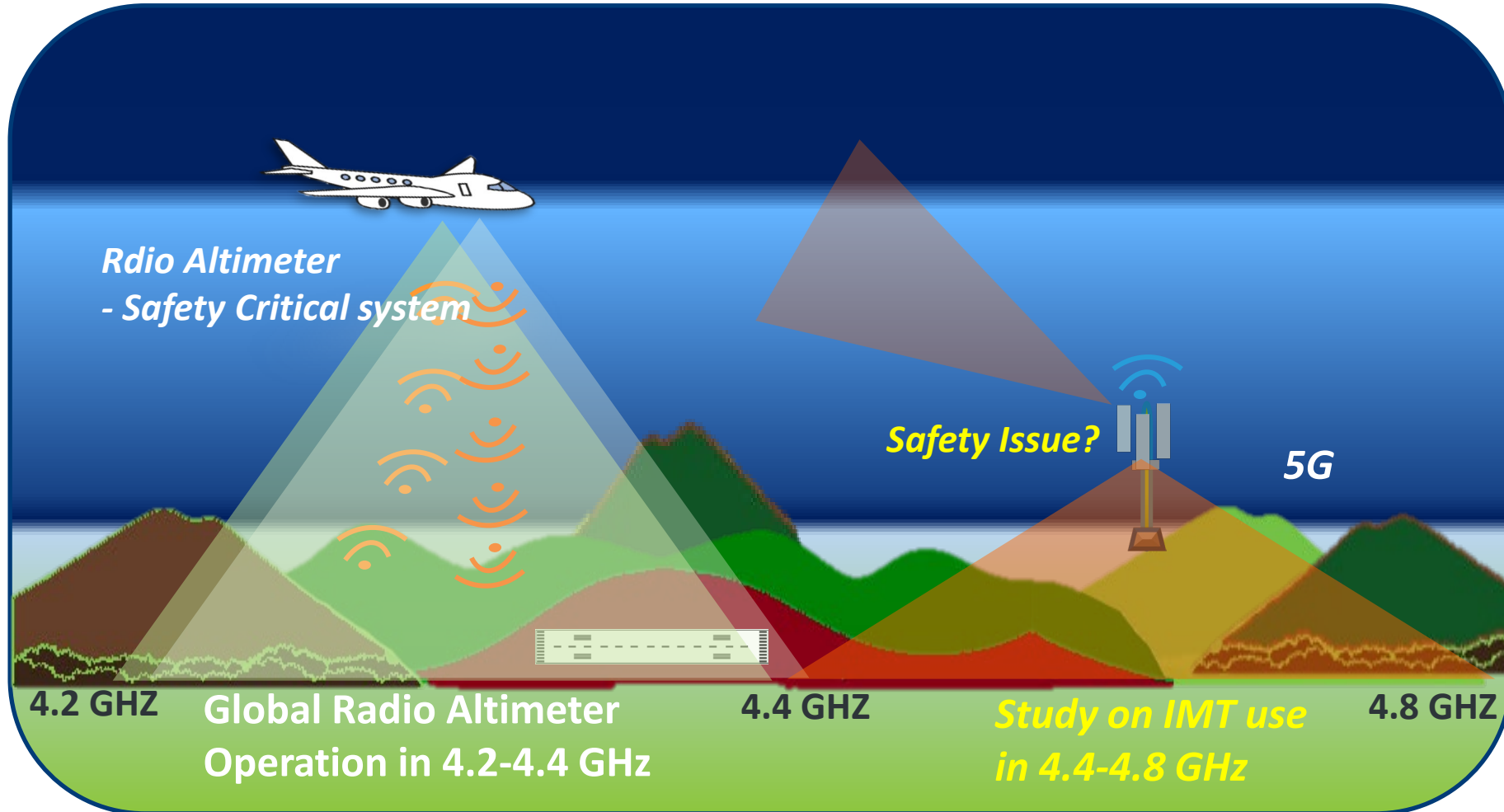
And many others...

For example, 1.11, 1.12 and 1.13



WRC-27

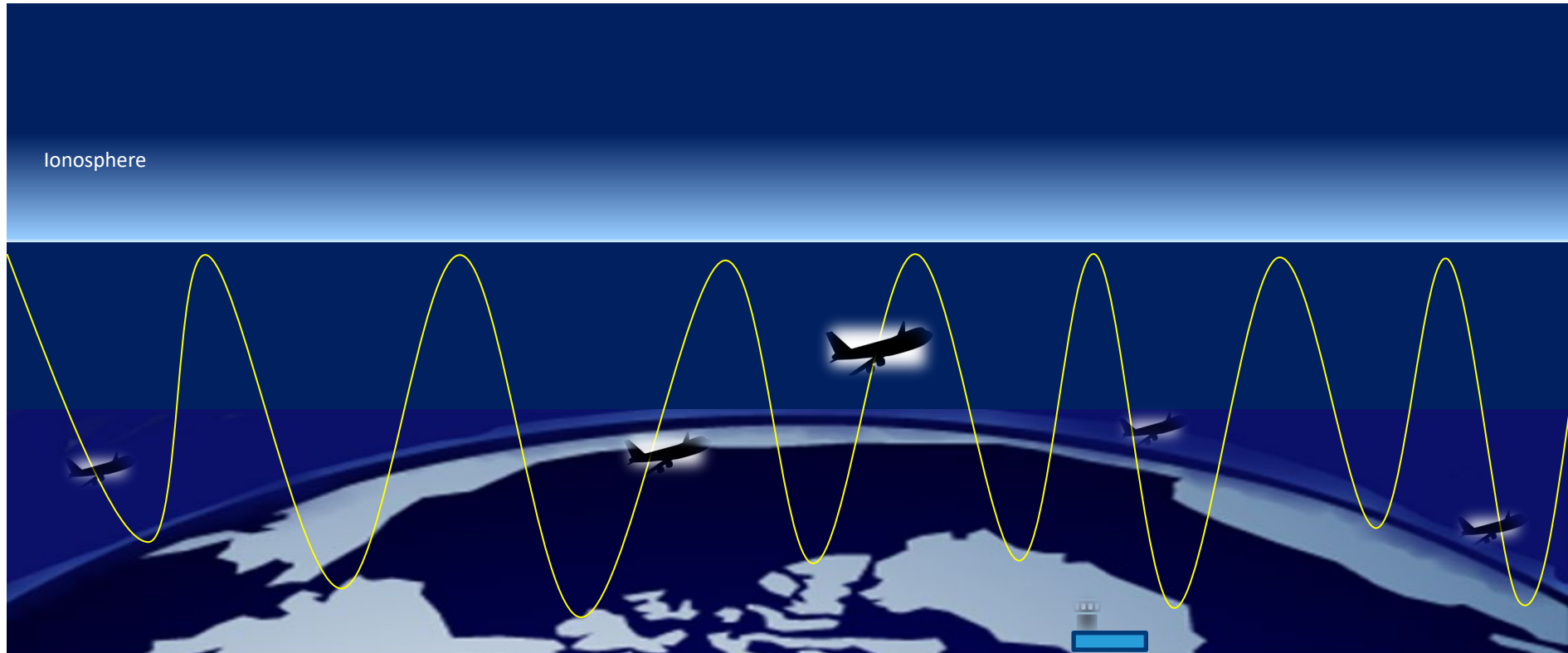
WRC-27 Agenda Item 1.7: Study on IMT Use in the frequency bands 4400-4800 MHz





WRC-27

WRC-27 Agenda Item 1.9: Update Appendix 26 in support of aeronautical mobile (OR) high frequency modernization





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RECONNECTING THE WORLD



WRC-27

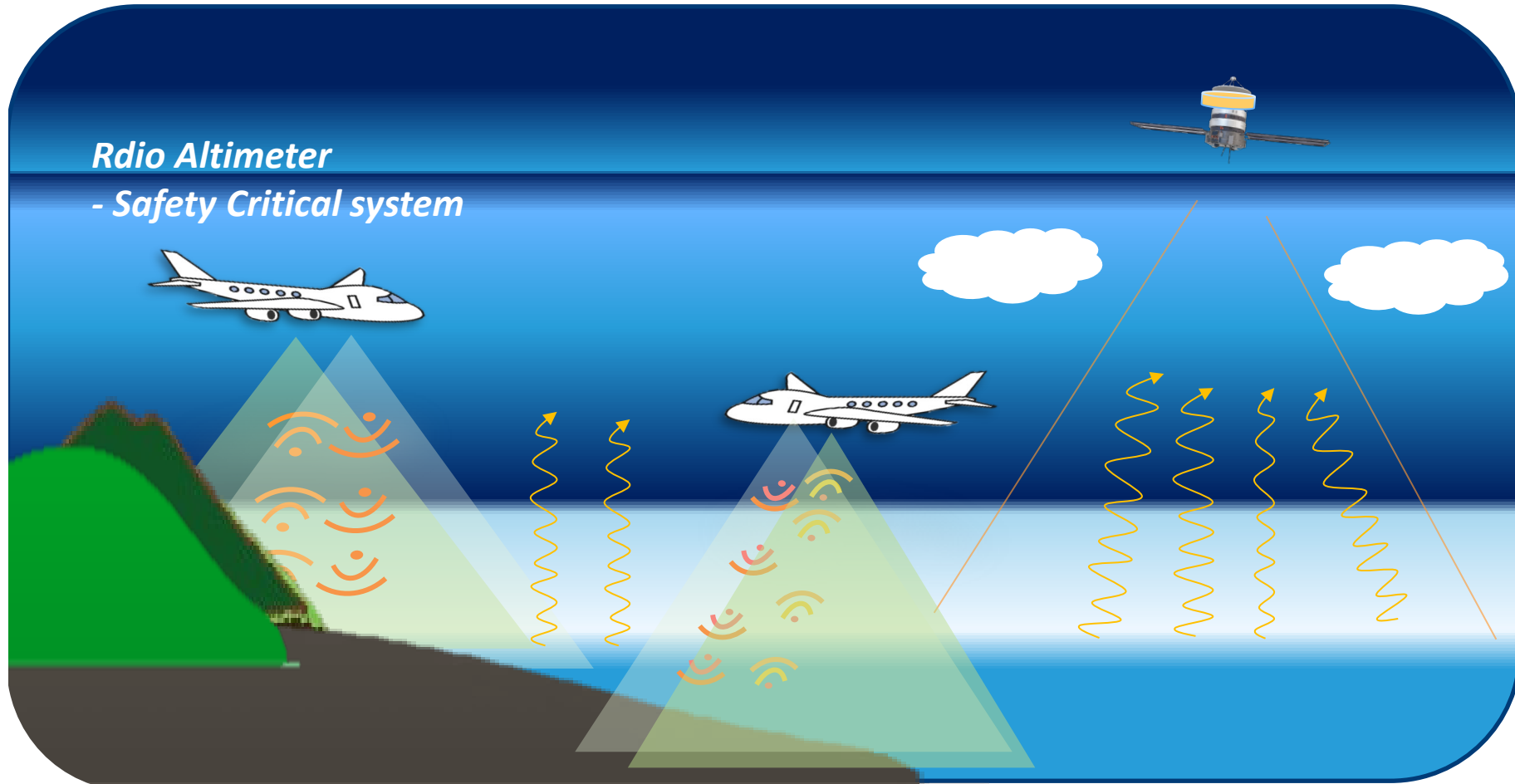
WRC-27 Agenda Item 1.17: Space Weather Sensors





WRC-27

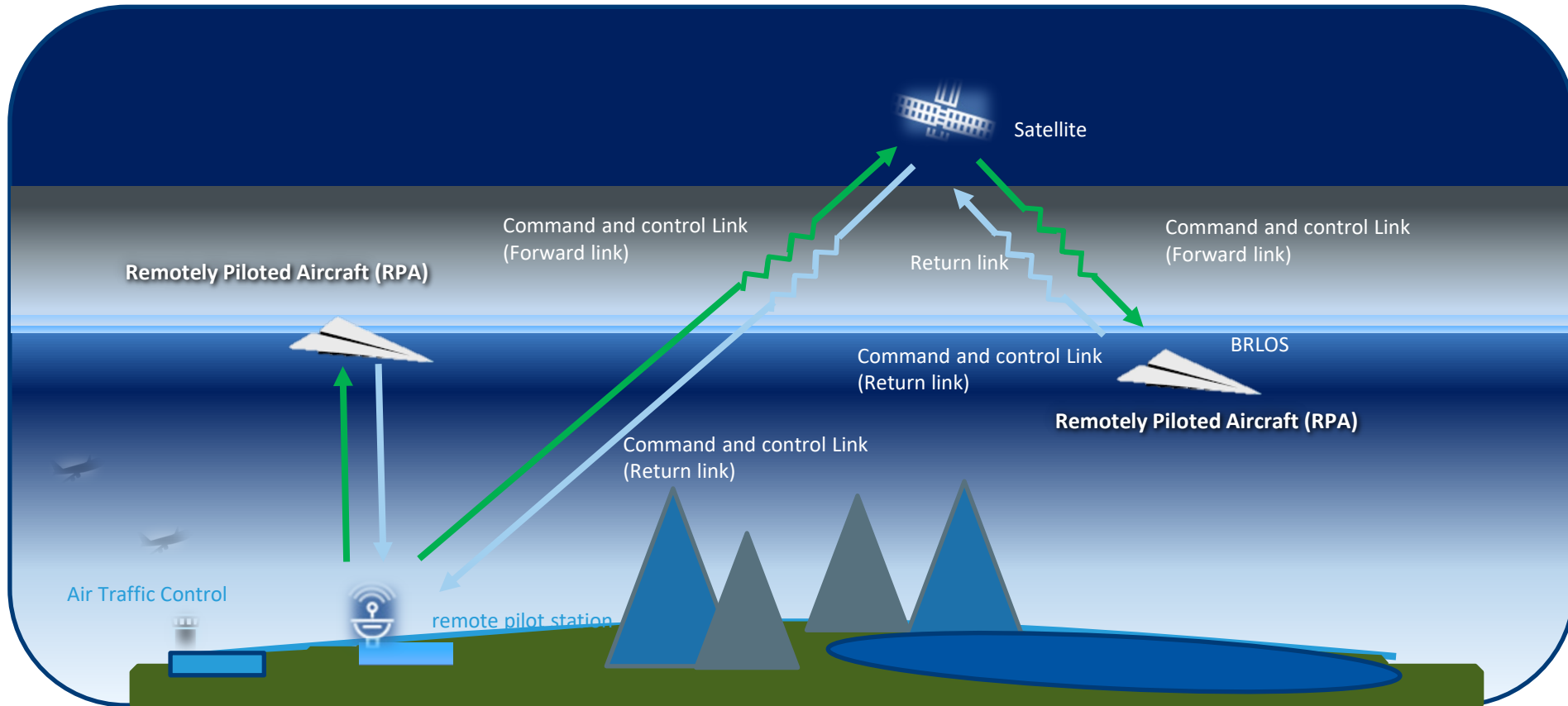
WRC-27 Agenda Item 1.19: Primary allocations to the EESS passive in the bands 4200-4400





WRC-27

WRC-27 Agenda Item 9.1: Urgent action by Study groups in prep for the next WRC beyond-line-of-sight C2-link for RPAS





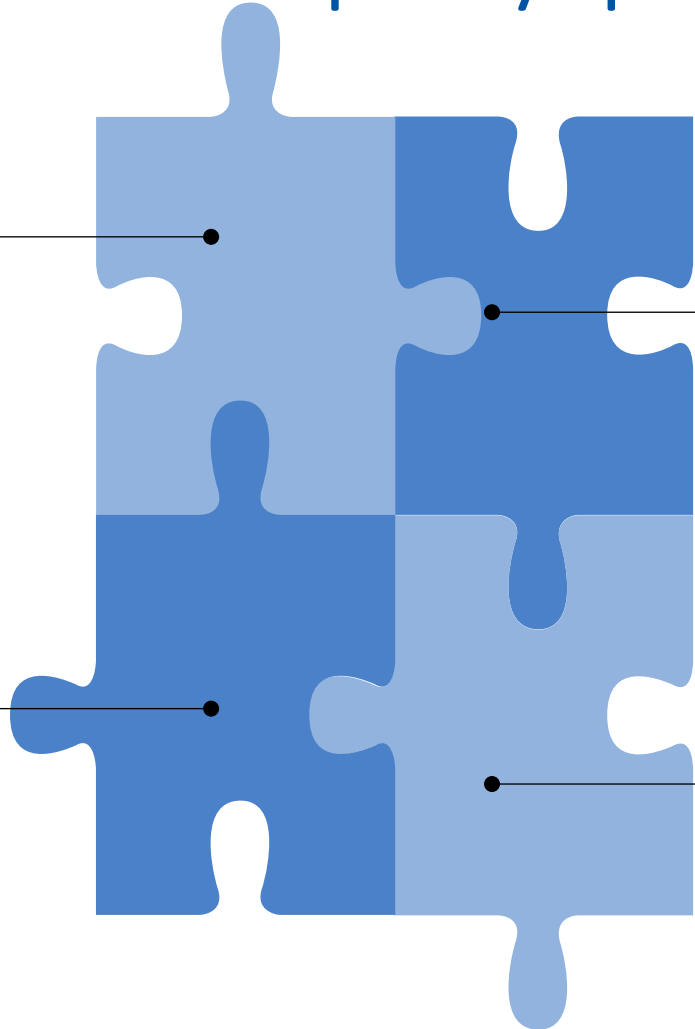
Management and Defence of Aviation Frequency Spectrum

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

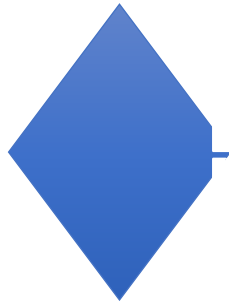
(including Assembly Resolution A41-7)

RECONNECTING THE WORLD



ICAO Spectrum Strategy

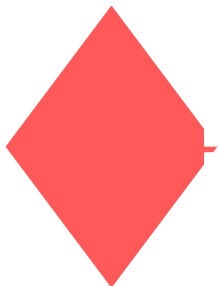
AN-Conf/12 Recommendation 1/12



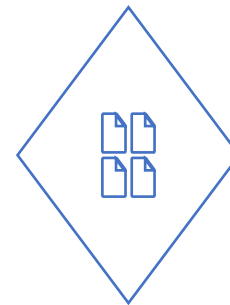
- › timely availability and appropriate protection of adequate spectrum
- › create a sustainable environment for growth and technology development to support safety and operational effectiveness for current and future operational systems
- › allow for the transition between present and next generation technologies



- › demonstrate efficient use of the spectrum allocated through efficient frequency management and use of best practice.



- › clearly state in the strategy the need for aeronautical systems to operate in spectrum allocated to an appropriate aeronautical safety service



Develop and implement a comprehensive aviation frequency spectrum strategy to be referenced in the GANP

GLOBAL STRATEGIC
GLOBAL TECHNICAL
REGIONAL
NATIONAL





ICAO Spectrum Policy Statements

- WRC is limited to certain issues and certain frequency bands
- ICAO position only addresses spectrum usage in context with issues identified in the pre-set WRC agenda



The Policy Statements are “Official ICAO Policy” approved by Council



ICAO Policy Statements indicate overall ICAO policy for every frequency band used by aviation safety



The ICAO Policy Statements are contained in Chapter 7 of the Radio Frequency Handbook





ICAO Position and WRC preparations



ITU WRC Agenda established

ICAO position established after WRC agenda established

FSMP is the focal point on all aspects related to development of ICAO's position

Reviewed by ANC, State Letter process, Approved by Council

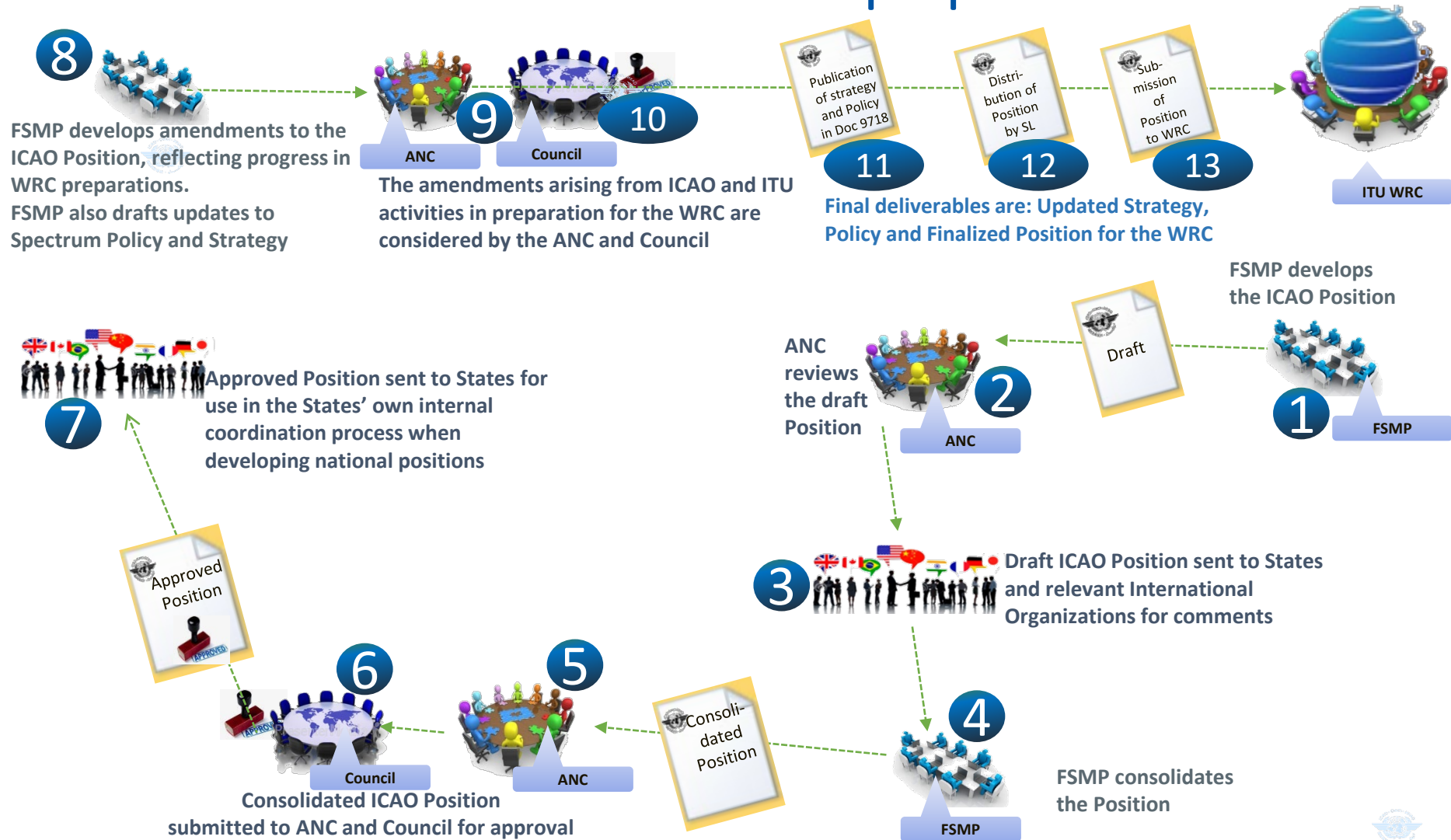


The Position presents ICAO views on all WRC agenda items of interest to international civil aviation, with particular regard to safety and regularity of flight

Proper co-ordination with the 7 ICAO Regional Offices



ICAO Position and WRC preparations





Assembly Resolution A41-7

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:

| | |
|-------------------------------------|---|
| RESPONSIBLE | working together to deliver spectrum-efficient aeronautical systems as well as frequency management that meet current best practices |
| ACCOUNTABLE | supporting ICAO activities relating to the aviation frequency spectrum strategy and policy through relevant expert group meetings and regional planning groups |
| FULL INTEGRATION | <ul style="list-style-type: none"> - 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 |
| SUPPORTIVE | supporting the ICAO position and the ICAO policy statements at ITU WRCs |
| 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 |



Assembly Resolution A41-7

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:

Requests the Secretary General 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

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



Long Term Evolution of CNS and Spectrum matters

In addition to the continued engagement in the ITU spectrum management process, aviation also needs to engage in a proactive and long-term evolution of the CNS systems

AN-Conf/13 Recommendation 2.2/1



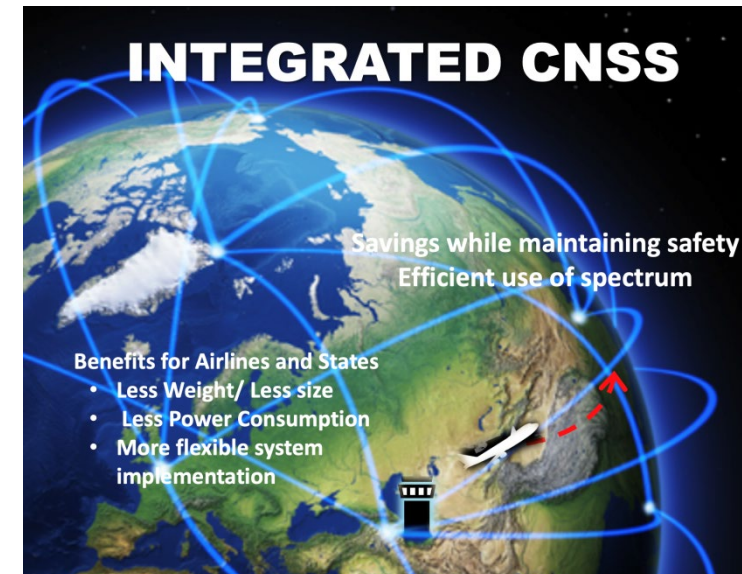
› ICAO to launch a study on evolving the required CNS and spectrum access strategy in the long term, to ensure that CNS systems remain efficient users of the spectrum resource



› request States to engage in the spectrum regulatory process to ensure the continued necessary access and protection of the safety critical aeronautical CNS systems



Work is being initiated to undertake this study. This activity is expected to benefit the development of aeronautical CNS systems and their spectrum use in the medium to longer term and eventually the formulation of the ICAO spectrum policy for future WRCs





Current status of work

- WRC-27 preparations are on-track, as per the instructions given in Assembly Resolution 41-7
- Position for WRC-27 developed by FSMP was reviewed by the ANC and the State Letter on the ICAO position was provided to States/Int Orgs for their comment in Nov 2024.
- ITU-R studies are supported by ICAO Secretariat
- A new task has been initiated in coordination with ANC, looking into the long-term evolution of CNS and spectrum matters, as per AN-Conf/13 Recommendation 2/2.1:
 - ✓ Initially this task is being progressed using a small informal taskforce, consisting of select industry representatives, CNS panel participants and Secretariat.
 - ✓ Taskforce is foreseen to be taken over by ANC. The initial outcome of the Study will be presented at the 41st Assembly.

Thank You

