



AVIATION FREQUENCY SPECTRUM AND THE ITU WORLD RADIOCOMMUNICATION CONFERENCES (WRC)

Navigation

Surveillance

**ITU
WRC-23**

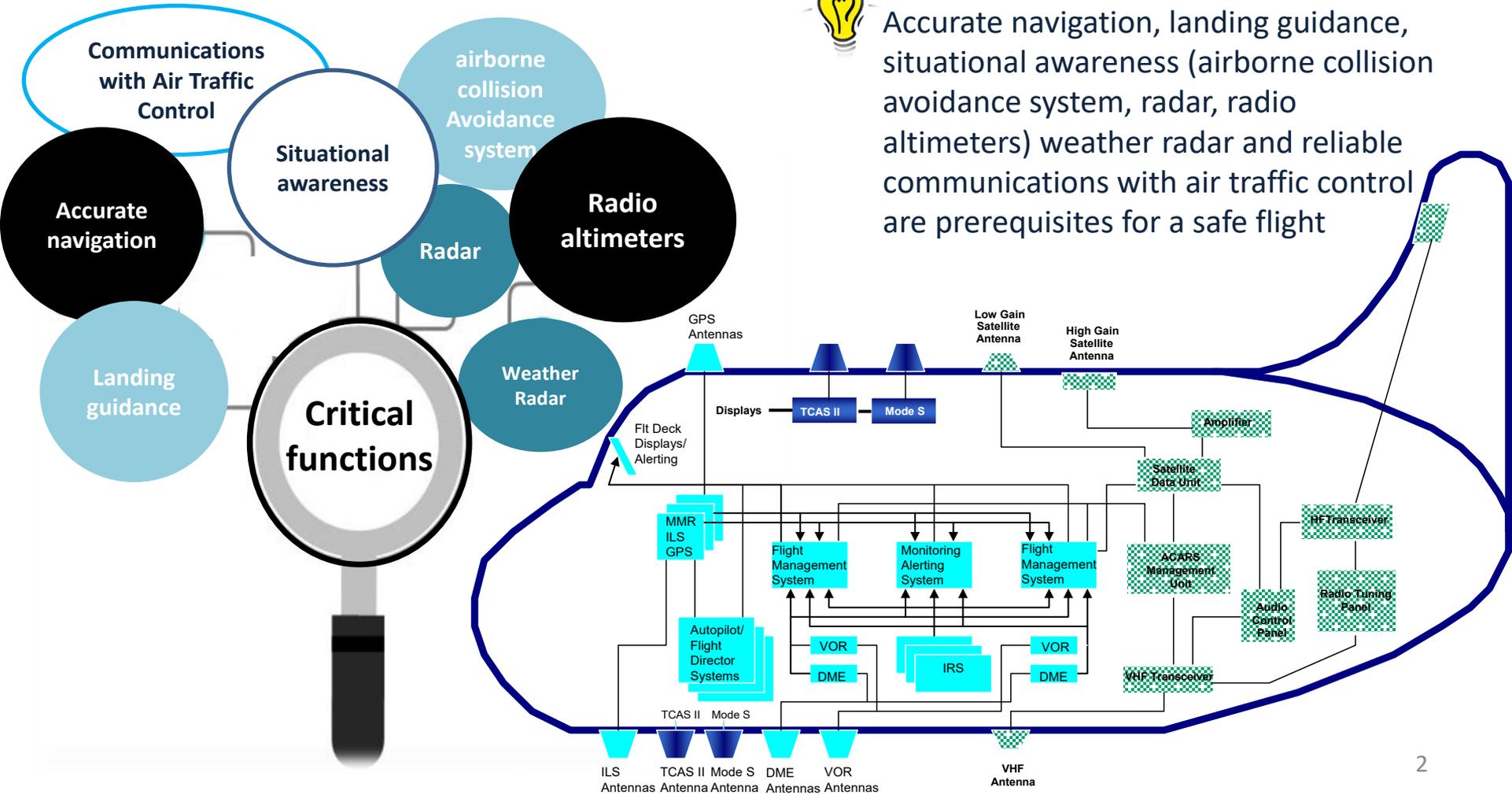
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International Civil Aviation Organization (ICAO)



Aeronautical Frequency Spectrum Management

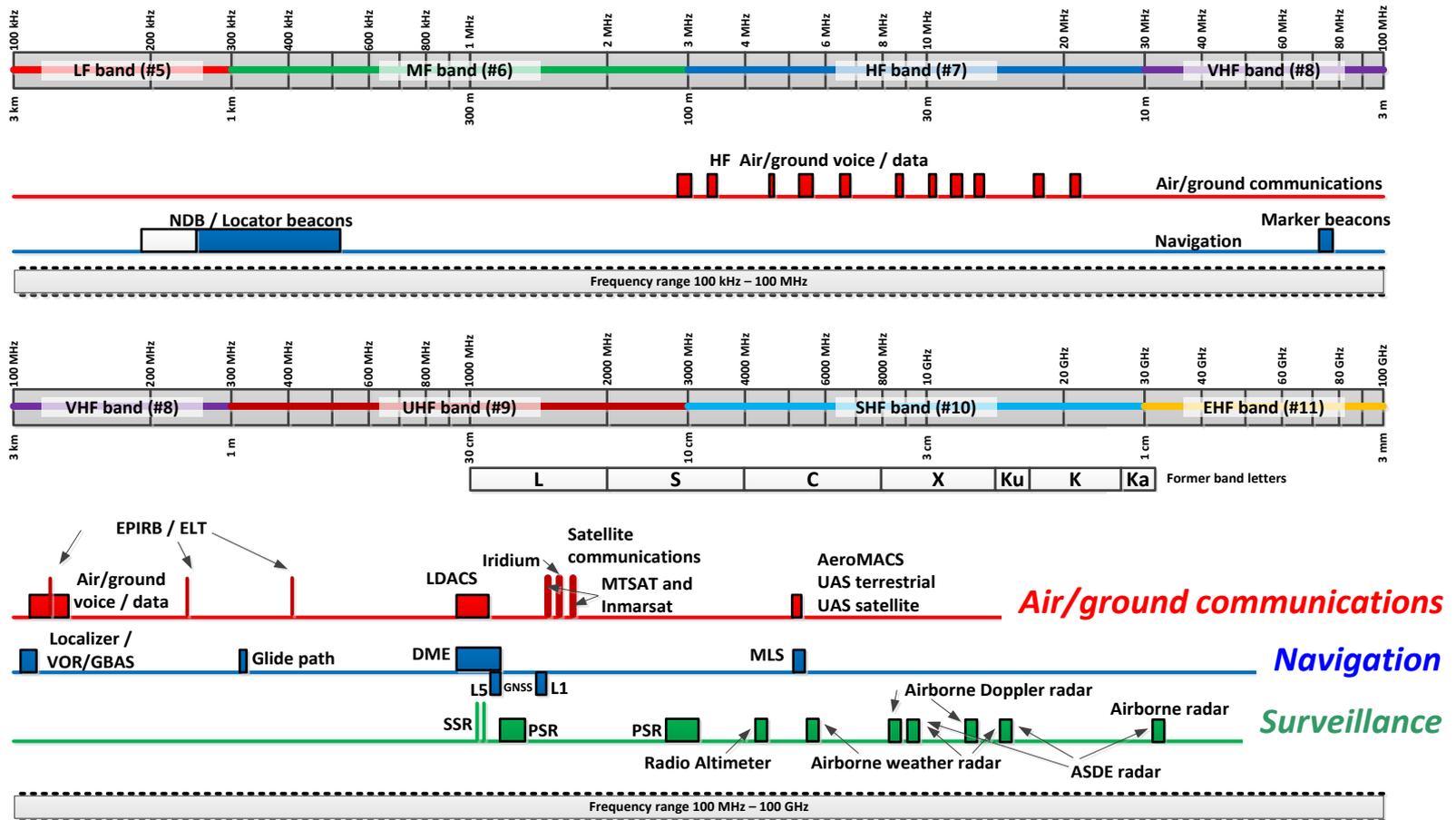


Accurate navigation, landing guidance, situational awareness (airborne collision avoidance system, radar, radio altimeters) weather radar and reliable communications with air traffic control are prerequisites for a safe flight



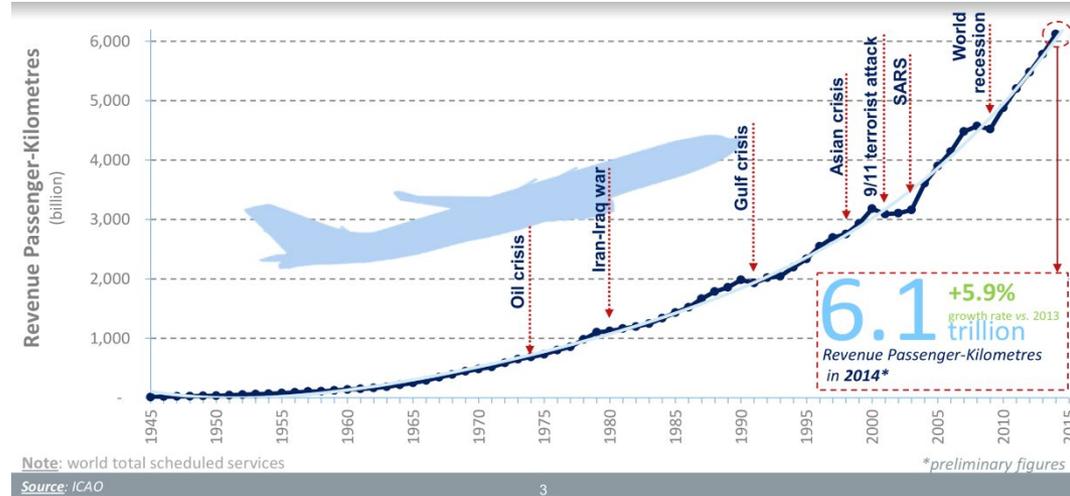
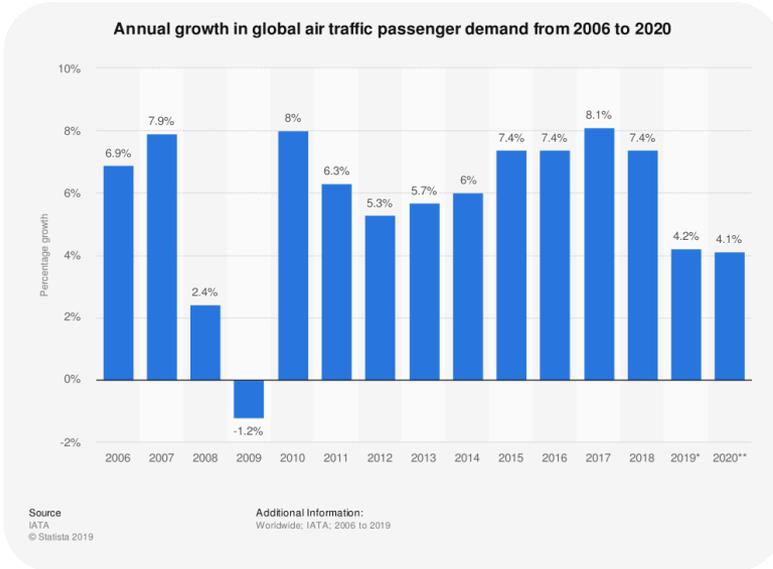
Aeronautical Frequency Spectrum Management

- 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 the the Aeronautical Mobile Satellite (R) Service

Aeronautical Frequency Spectrum Management



World wide consistent growth of air traffic Doubles every 15 years

- ➔ In 2019 over 4.5 billion scheduled passengers
- ➔ Air transport now carries 35% of world trade, by value

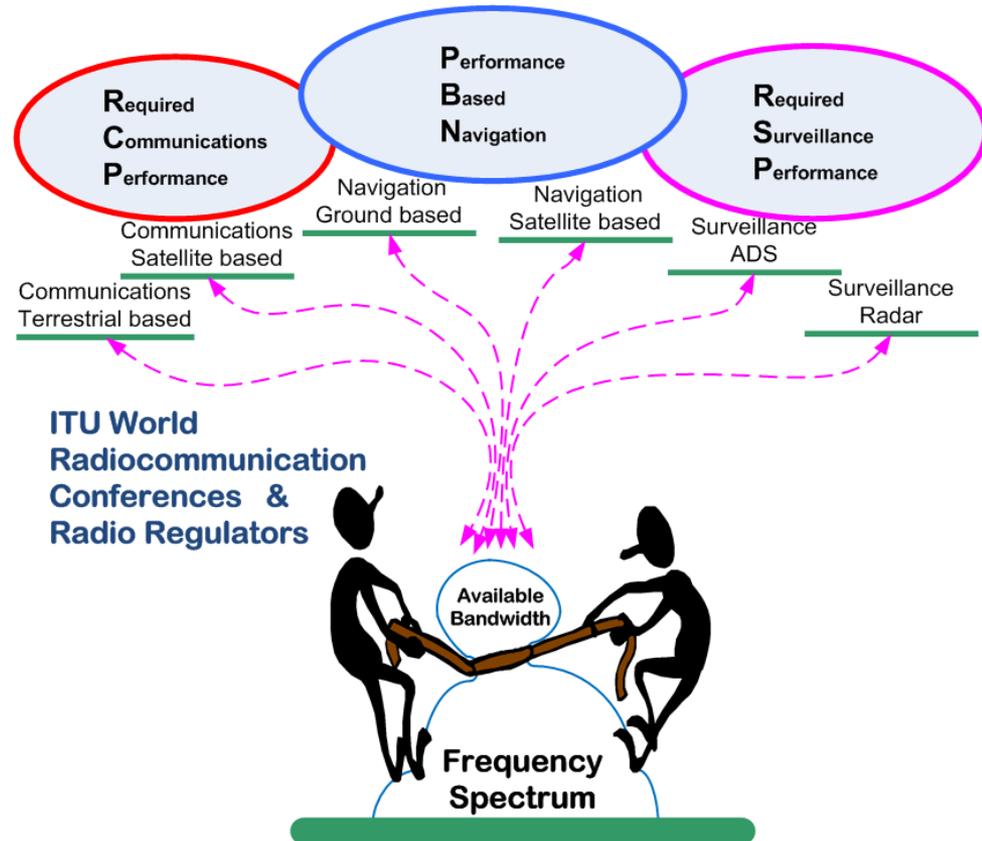
- ➔ Between 2019 and 2038, 4.6 % expected growth of no. of airline passengers (pre-Covid-19 numbers)

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 28 Oct - 22 Nov 2019
- Next in Q4 2023

3

Main purposes

- 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-19 by numbers

**~3500
delegates**



- Over 50 meetings/day, including weekends
- After 4AM – latest finish to a meeting
- 9AM - ...start time the next (same) morning

4 Weeks

(5 ½ weeks, when counting RA-19 and CPM19-1)



- 165 Administrations
- Several UN specialized agencies and offices, including ICAO, IMO, WMO, UNOOSA...
- 260 other international / regional, scientific and industrial agencies or organizations.

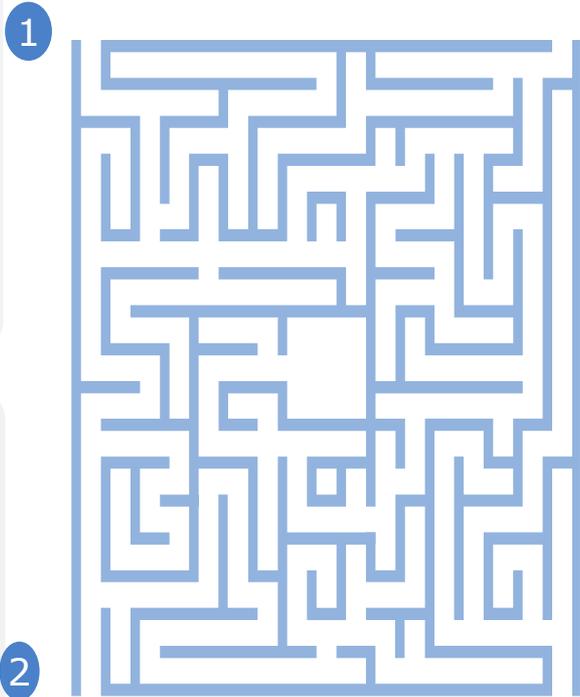
ITU WRC-23 agenda will be very busy for aviation

WRC-23

- ❖ 1.6, 1.7, 1.8, 1.9, 1.10 and 9.2
- aviation is seeking action by the WRC.
- ❖ 1.1, 1.2, 1.3, 1.4, 1.11, 1.13, 1.15, 1.16, 1.17, 4, 8, and 9.1 topic b
- could potentially affect aviation use of spectrum

1 Spectrum use by sub-orbital vehicles

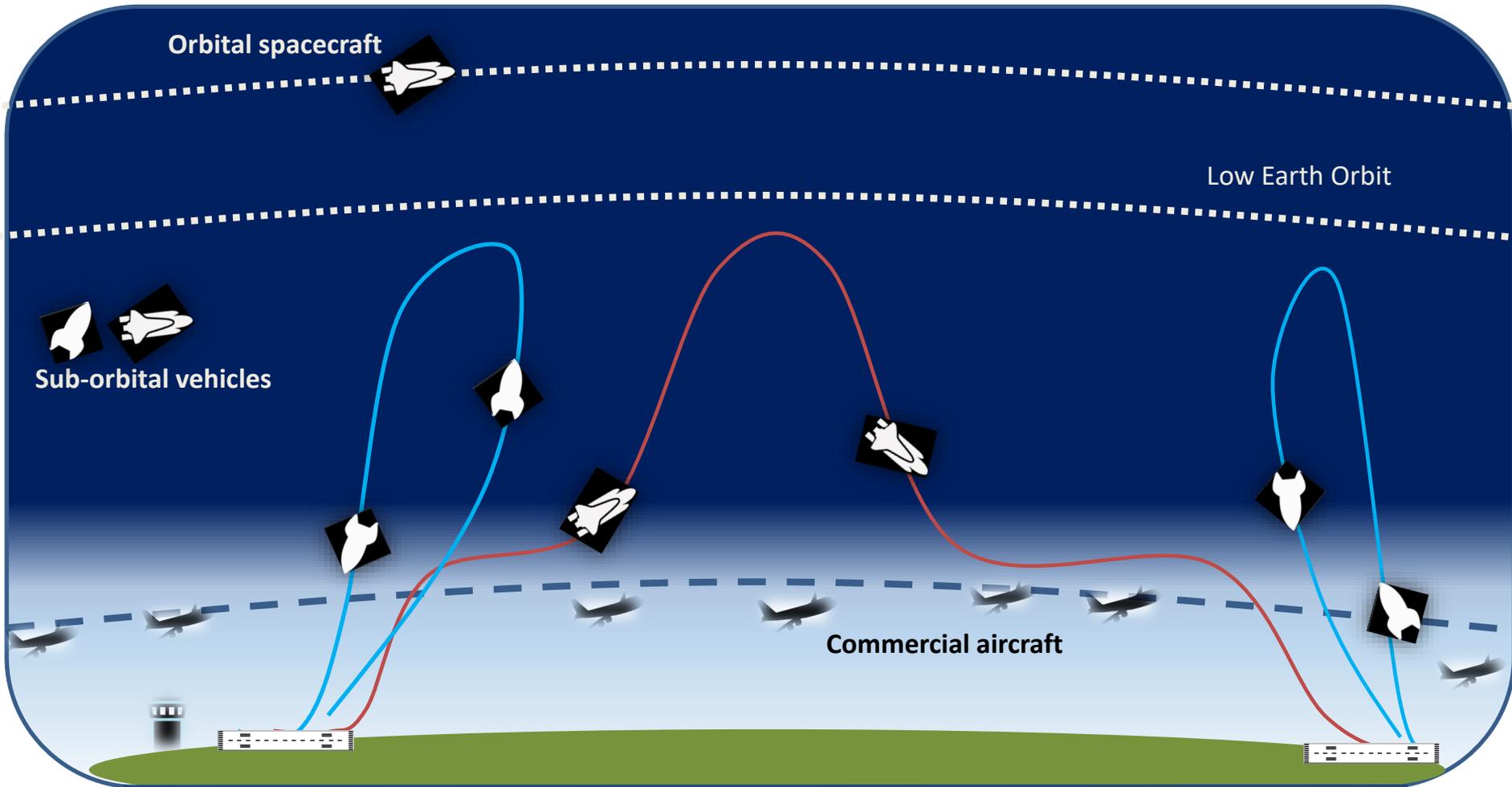
2 potential facilitation of aeronautical VHF over satellite



3 Finalization of a satellite allocation enabling beyond-line-of-sight C2-link for RPAS

4 Modifications to aeronautical HF, potentially enabling crystal clear and reliable HF voice as well as HF data

WRC-23 Agenda Item 1.6: Spectrum use by sub-orbital vehicles

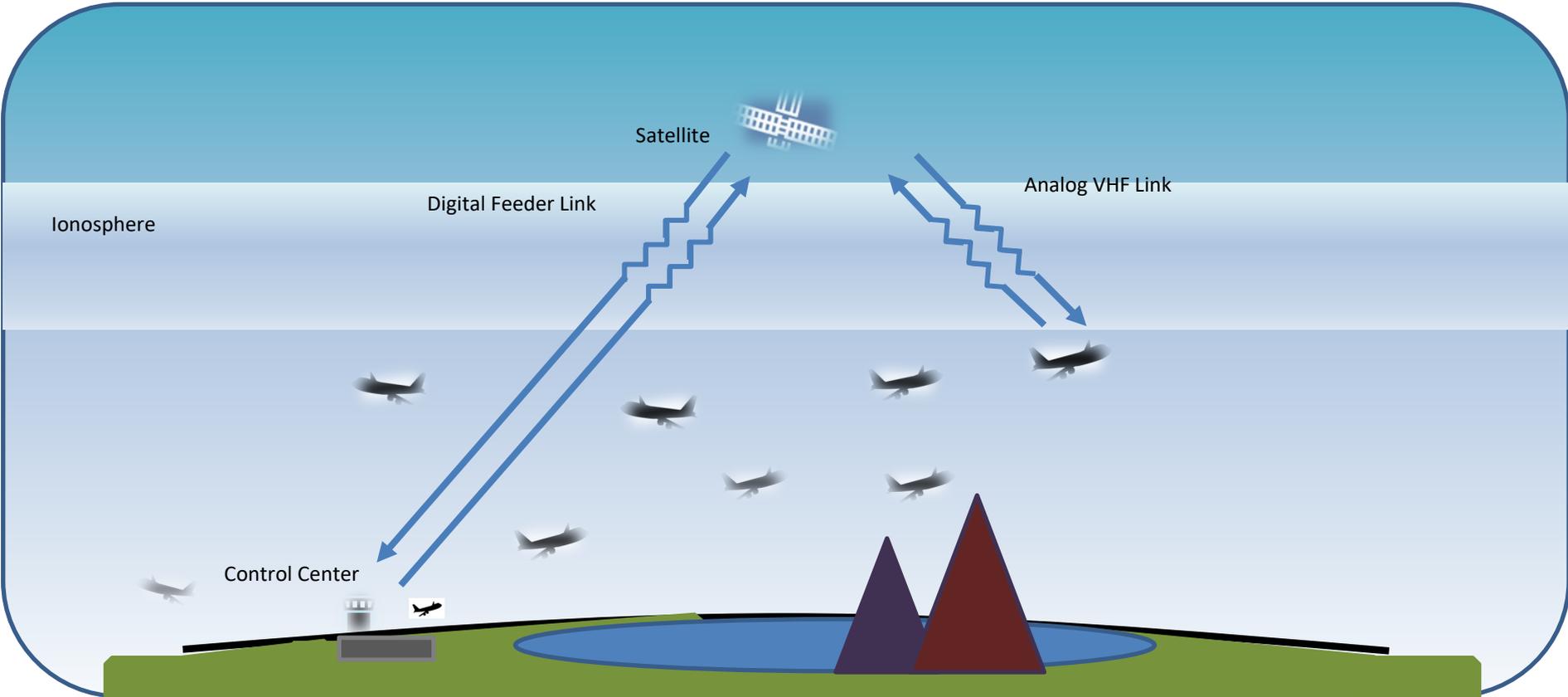


WRC-23 Agenda Item 1.6: Spectrum use by sub-orbital vehicles cont.

ICAO Position:

- To support ITU-R studies and the definition of relevant technical characteristics as called for by Resolution 772 (WRC-19) to ensure aviation needs are satisfied.
- To support, if identified as required by the studies called for in Resolution 772 (WRC-19), modifications to the Radio Regulations that help enable the integration of sub-orbital vehicles into the airspace structure.
- To support, if studies show the need for access to additional spectrum, the establishment of a WRC agenda item at a future competent conference.

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



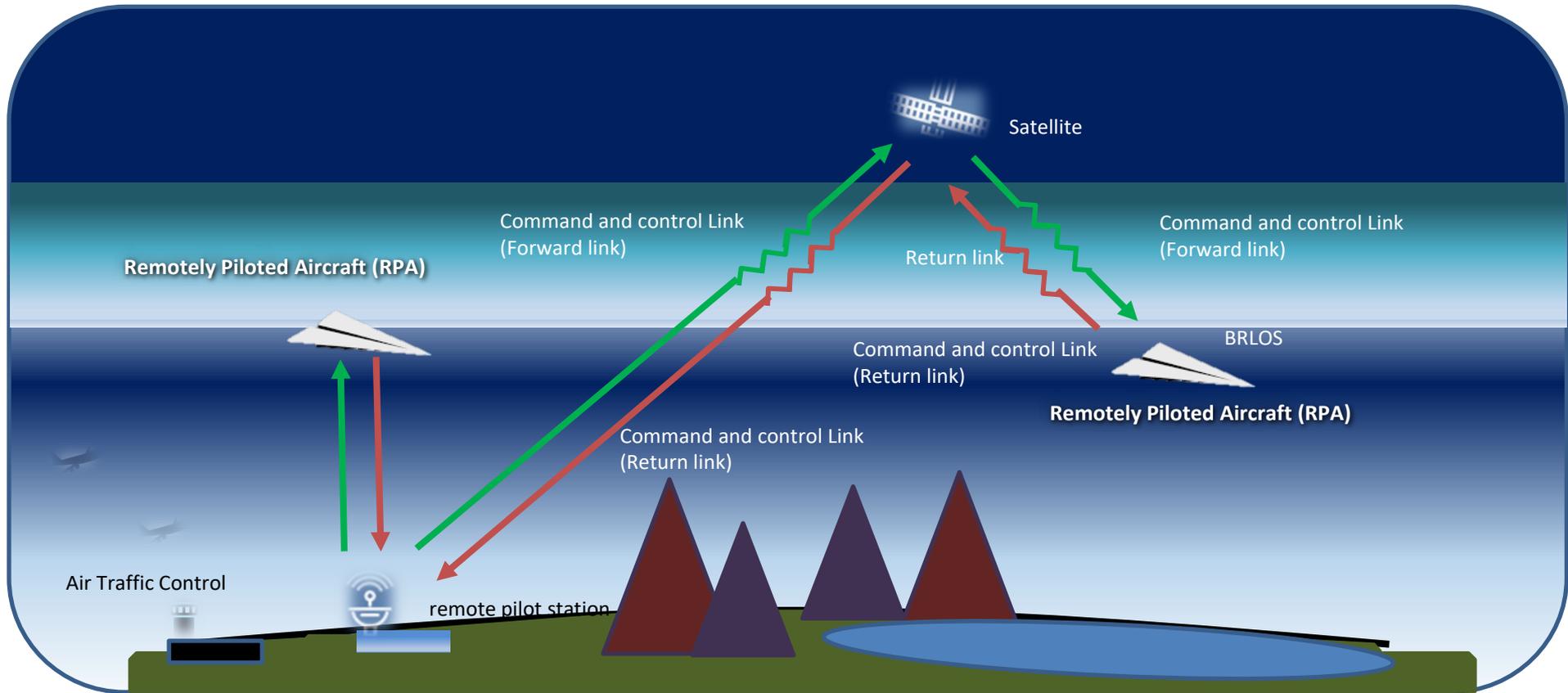
WRC-23 Agenda Item 1.7:

Potential facilitation of aeronautical VHF over satellite cont.

ICAO Position:

- To support ITU-R studies and the definition of relevant technical characteristics as called for by Resolution 428 (WRC-19).
- To support a global allocation to the aeronautical mobile-satellite (route) service for both the Earth-to-space and space-to-Earth directions in the frequency band 117.975-137 MHz and that the use of the allocation be limited to the relaying of aeronautical VHF air traffic management communications.
- To support that those systems shall operate in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.
- To ensure that any change to the regulatory provisions and spectrum allocation resulting from this agenda item do not adversely impact the operation of existing VHF systems in the band 117.975-137 MHz operating in the AM(R)S, including regional usage of terrestrial VHF, nor require any changes to aircraft equipage or to existing installations.

WRC-23 Agenda Item 1.8: Finalization of a satellite allocation enabling beyond-line-of-sight C2-link for RPAS



WRC-23 Agenda Item 1.8:

Finalization of a satellite allocation enabling beyond-line-of-sight C2-link for RPAS Cont.

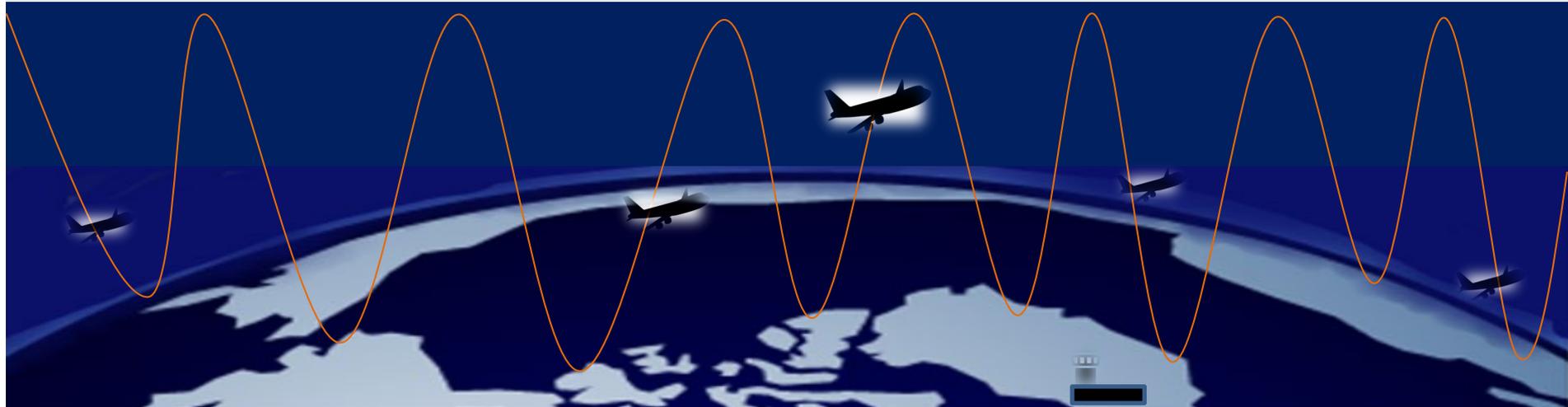
ICAO Position:

- To support ITU-R studies, as called for by Resolutions 155 (Rev.WRC-19) and 171 (WRC-19).
- To support the modification of No. 5.484B and Resolution 155 (Rev.WRC-19).
- ICAO is expecting that the decision of WRC-23 will result in a Resolution that:
 - ✓ clearly provides primary status;
 - ✓ removes any apparent inconsistencies;
 - ✓ acknowledges that in accordance with the Annexes of the Convention of the International Civil Aviation Organization (ICAO), ensuring the safety-of-life aspects of the use of UAS CNPC is the role of the responsible States;
 - ✓ provides sufficient information to support and/or validate safety cases; and
 - ✓ ensures that safety cases do not need to be revisited as a result of future satellite co-ordination agreements.

WRC-23 Agenda Item 1.9:

Modifications to aeronautical HF, potentially enabling crystal clear and reliable HF voice as well as high speed HF data

Ionosphere



WRC-23 Agenda Item 1.9:

Modifications to aeronautical HF, potentially enabling crystal clear and reliable HF voice as well as high speed HF data Cont.

ICAO Position:

- **To support ITU-R studies as called for by Resolution 429 (WRC-19).**
- **To support, based on agreed studies, the necessary modification of Appendix 27 to the Radio Regulations that will enable the introduction of HF wideband aeronautical communication systems. Those systems shall be operated in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.**

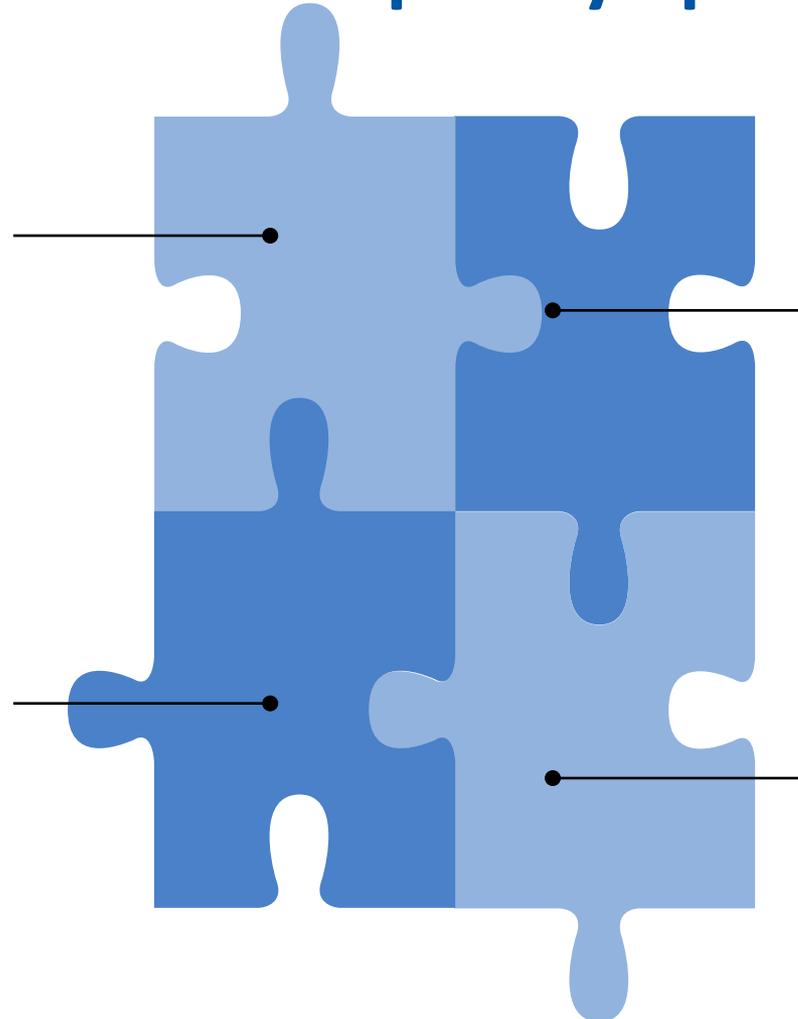
Management and Defence of Aviation Frequency Spectrum

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

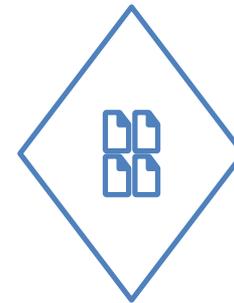
(including Assembly Resolution A38-6)

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

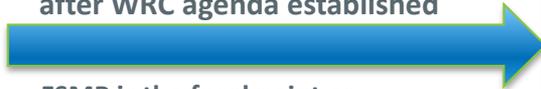




ICAO Position and WRC preparations



ICAO position established after WRC agenda established



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



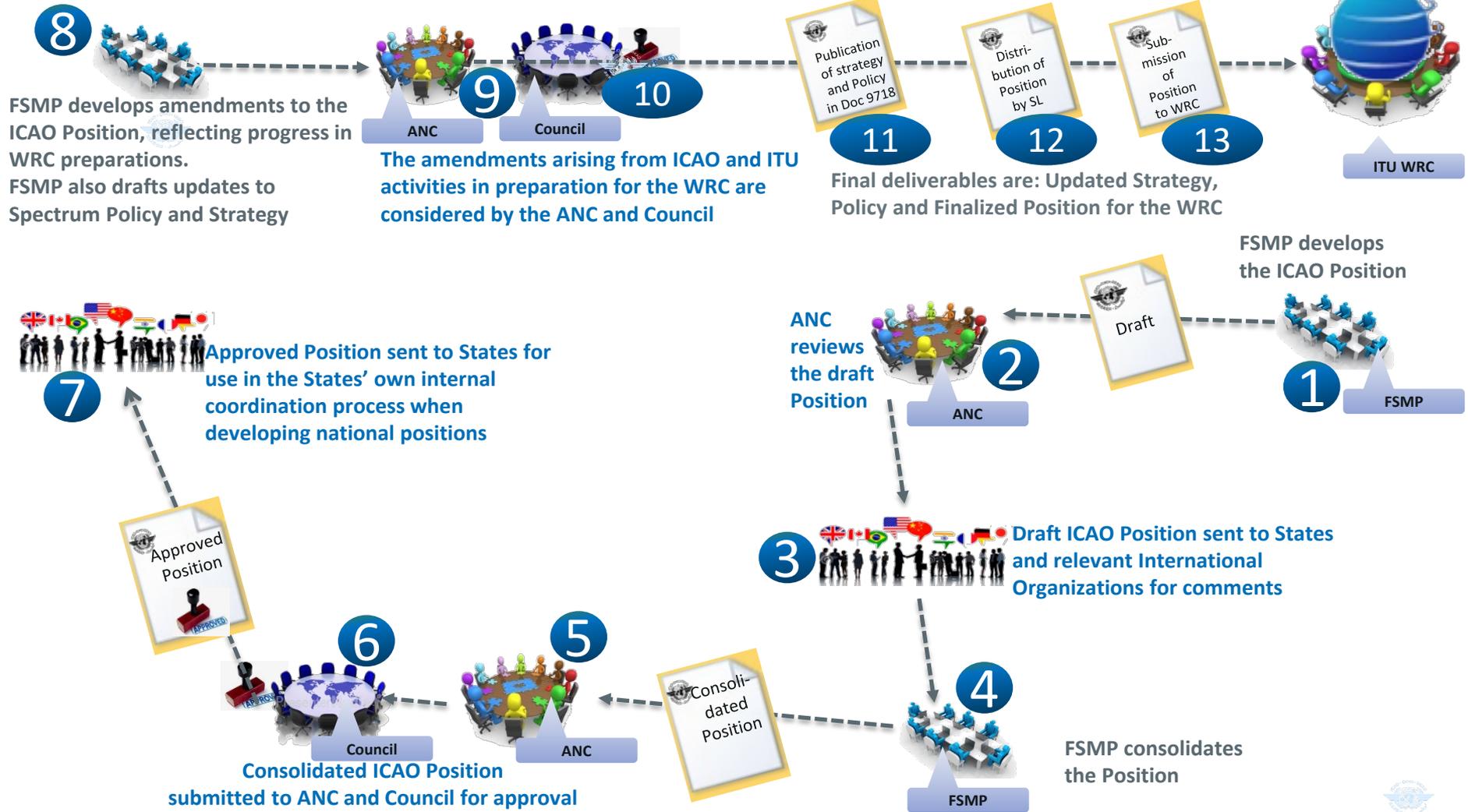
The Position presents ICAO views on all WRC agenda items of interest to international civil aviation, with particular regard to safety and regularity of flight

ITU WRC Agenda established



Proper co-ordination with the 7 ICAO Regional Offices

ICAO Position and WRC preparations





Assembly Resolution A38-6

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 to deliver efficient aeronautical frequency management and “best practices” to demonstrate the effectiveness and relevance of the aviation industry
ACCOUNTABLE	Supporting ICAO activities relating to the aviation frequency spectrum strategy and policy through relevant meetings and regional planning groups
FULL INTEGRATION	Undertaking to provide for aviation interests to be fully integrated in the development of their positions, to the extent possible, material consistent with the ICAO Position
SUPPORTIVE	Supporting the ICAO position and the ICAO policy 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 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 A38-6

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:

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



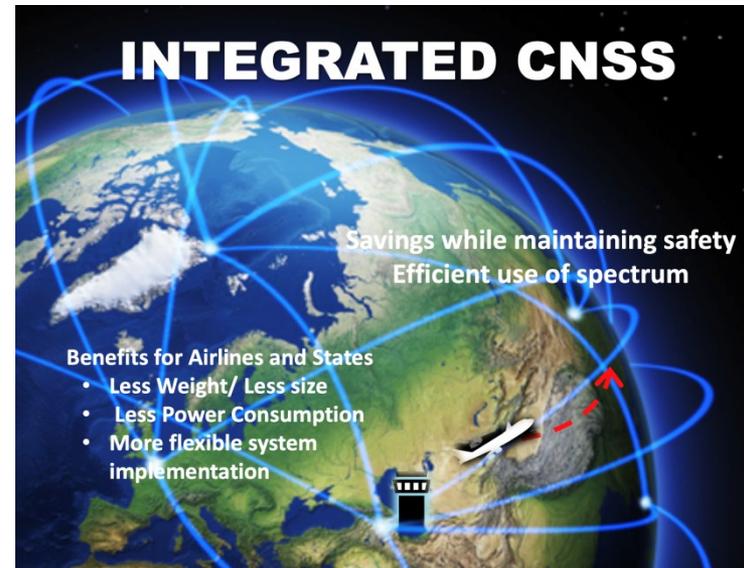
› ICAO to launch a study on evolving the required CNS and spectrum access strategy in the long term, to ensure that CNS systems remain efficient users of the spectrum resource



› 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-23 preparations are on-track, as per the instructions given in Assembly Resolution 38-6
- Position for WRC-23 developed by FSMP was approved by the Council in June 2021. The State Letter on the ICAO position was provided to States/Int Orgs in August 2021.
- 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.

Questions





THANK YOU!