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ICAO Position for ITU WRC-23

ICAO/ICAO Frequency Management Workshop
Casablanca, Morocco, 6-10 June 2022

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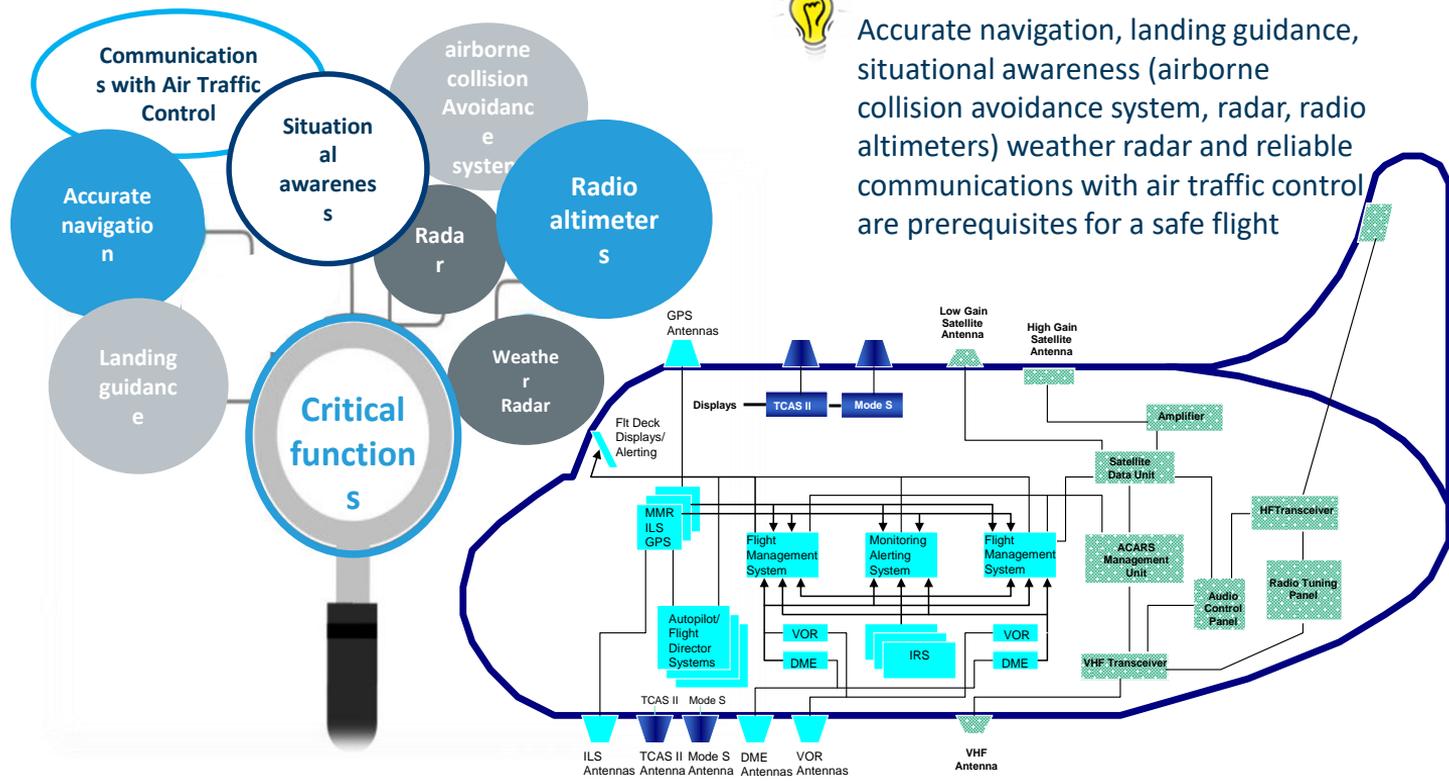
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Aeronautical Frequency Spectrum Management



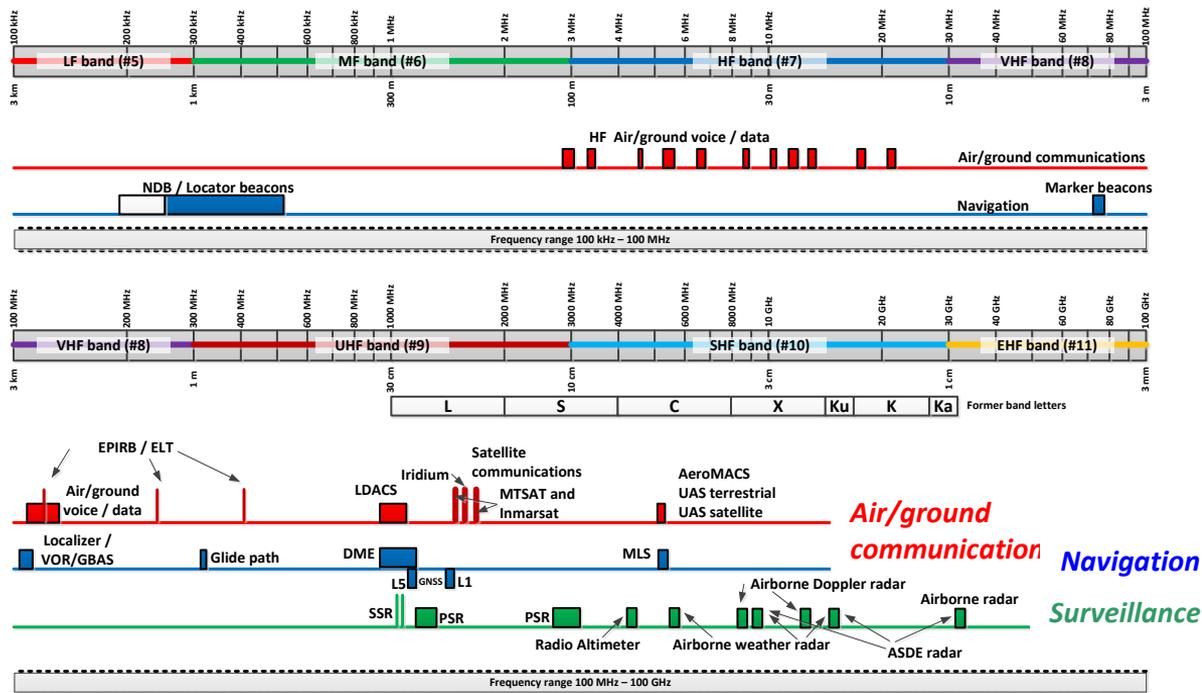
Accurate navigation, landing guidance, situational awareness (airborne collision avoidance system, radar, radio altimeters) weather radar and reliable communications with air traffic control are prerequisites for a safe flight

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Aeronautical Frequency Spectrum Management

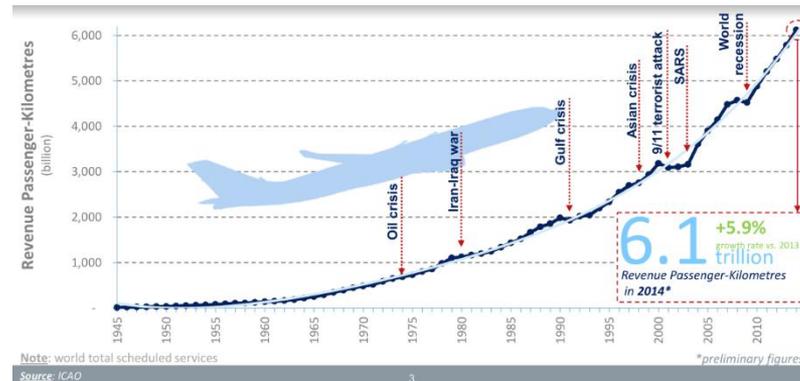
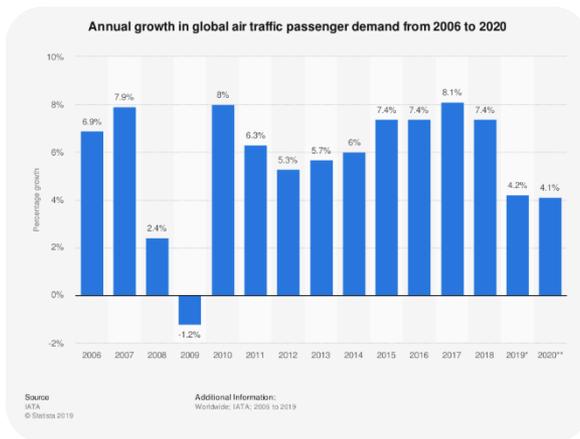
- Over 1 GHz of frequency spectrum in global allocations to aeronautical safety services



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 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)

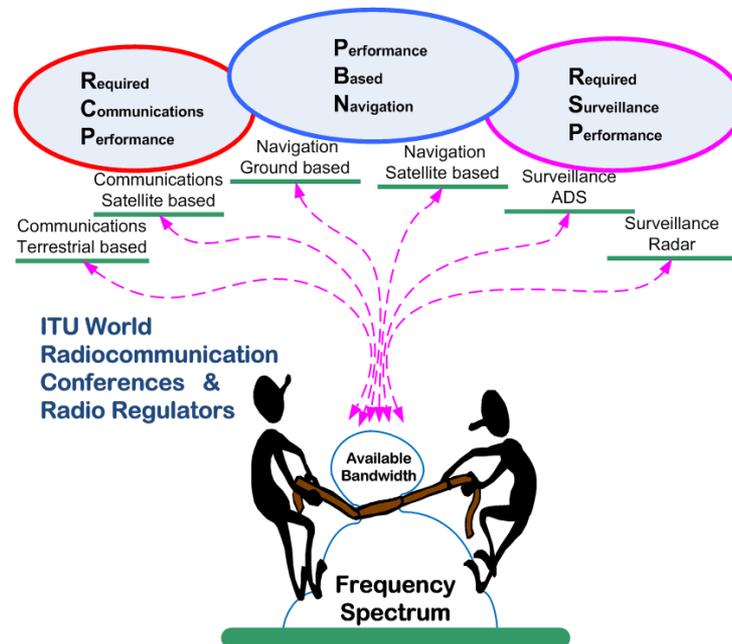


Performance of Air Traffic Management



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





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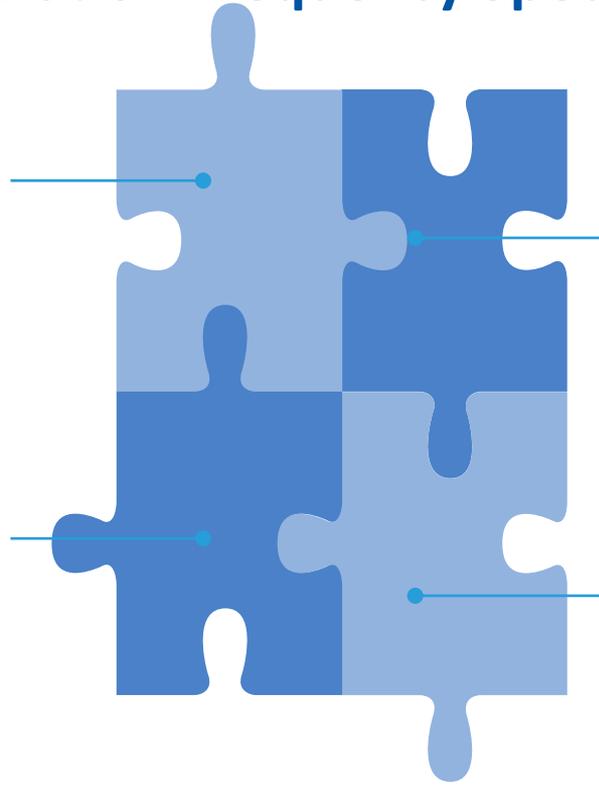
Management and Defence of Aviation Frequency Spectrum

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)



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ICAO Position and WRC preparations

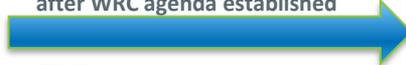
ITUWRC



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



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

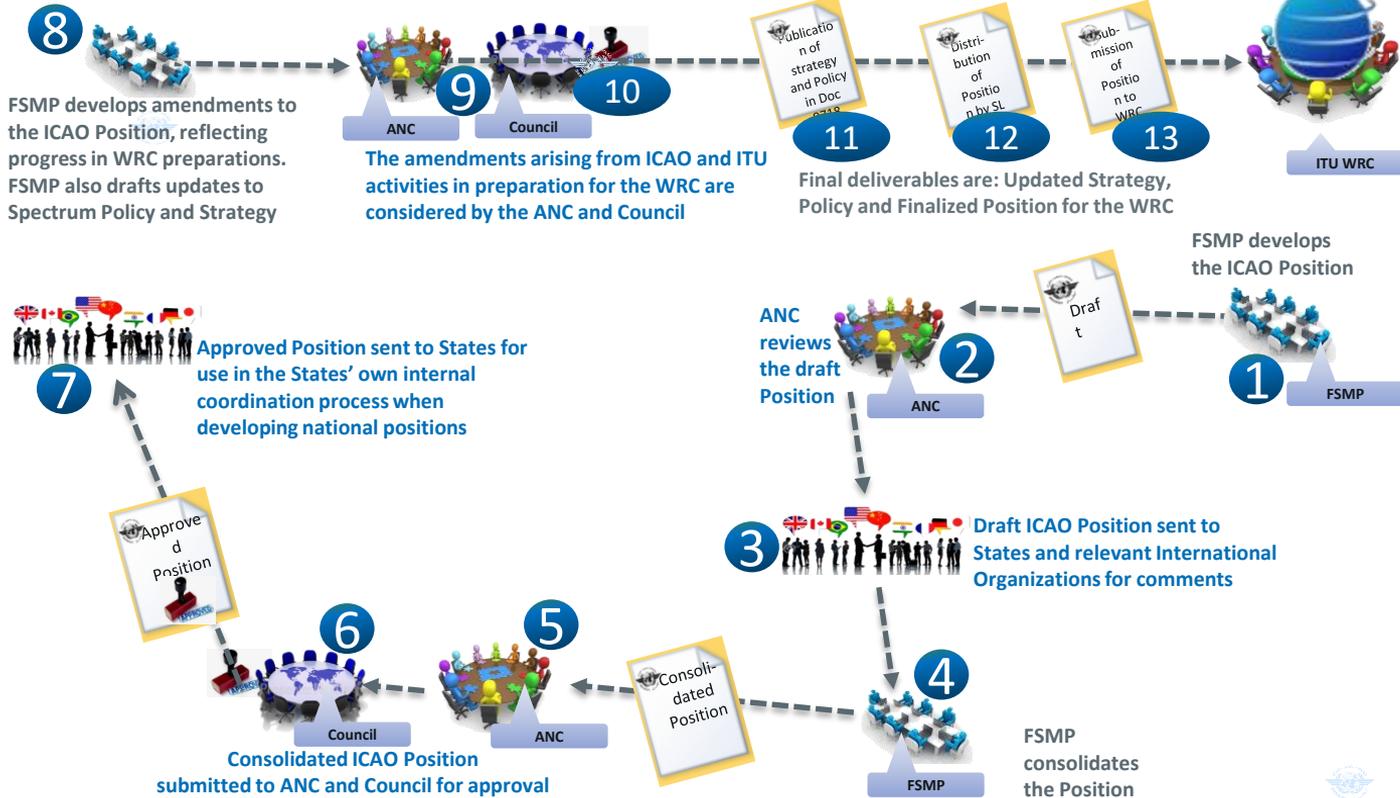


Proper co-ordination with the 7 ICAO Regional Offices

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ICAO Position and WRC preparations





Development of the ICAO Position

- Draft Position developed with assistance of FSMP during 2020
- Reviewed by ICAO Air Navigation Commission (ANC) in October 2020
 - Submitted to contracting States and international organisations
- Comments were addressed by FSMP at FSMP-WG/11
- Position approved by ICAO Council June 2021
- FSMP discussions on updates based on ITU-R studies began at FSMP-WG/13
 - After approvals will be the Final ICAO WRC-23 Position



Resources

Location of Draft ICAO Position on internet

<https://www.icao.int/safety/FSMP/Pages/Documents.aspx?RootFolder=%2Fsafety%2FFSMP%2FDocuments%2FITU%2DWRC23&FolderCTID=0x012000B1461A5DA8C64241AA4DE4F91CB1D9AF&View=%7BE11C4C29%2D83%2D4B87%2DAAAE%2D2330E3DE14D8%7D>

Status of ITU-R Studies

<https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-studies.aspx>



Main principles used in the development of the Position

- To ensure that the ITU Radio Regulations do not compromise the safety of civil aviation
- The ITU Radio Regulations shall not be in conflict with ICAO Standards and Recommended Practices
- The frequency allocations to aeronautical safety services shall be protected in conformity with internationally agreed requirements. Changes to frequency allocations need to be supported by adequate studies in the ITU-R Sector or in ICAO, as appropriate.



Importance of WRC-23 Agenda Items to ICAO

- Agenda Items of particular importance
 - WRC-23 Agenda Items 1.6, 1.7, 1.8, 1.9, 1.10 and 9.2
- Other WRC-19 Agenda Items of importance
 - 1.1, 1.2, 1.3, 1.4, 1.11, 1.13, 1.15, 1.16, 1.17, 4, 8, 9.1 (topic b) and 10.
- WRC-19 Agenda items with no expected impact
 - 1.5, 1.12, 1.14, 1.18, 1.19, 2, 3, 5, 6, 7, 9.1 (topic a), 9.1 (topic c), 9.1 (topic d) and 9.3.



Agenda Items - General

- Usually a broad statement...
 - E.g., “to consider new radiolocation service allocations in the xx to yy GHz band”
- With an associated Resolution that provides details on how the studies should be done...
 - E.g., “Determine spectrum requirements; if those cannot be satisfied in existing bands ... ensure protection of existing and future systems ...”
- In the slides that follow:
 - Red = of primary interest to aviation*
 - Blue = Aviation should participate in studies*
 - Green = No impact on aeronautical services has been identified*



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Resolution 811 (WRC-19)

Agenda for the 2023 World Radiocommunication Conference (1 of 6)

on the basis of proposals from administrations, taking account of the results of WRC 19 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the frequency bands under consideration, to consider and take appropriate action in respect of the following items:

1.1 to consider, based on the results of the ITU-R studies, possible measures to address, in the frequency band 4 800-4 990 MHz, protection of stations of the aeronautical and maritime mobile services located in international airspace and waters from other stations located within national territories, and to review the pfd criteria in No. **5.441B** in accordance with Resolution **223 (Rev.WRC-19)**;

1.2 to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution **245 (WRC-19)**;

1.3 to consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with Resolution **246 (WRC-19)**;

1.4 to consider, in accordance with Resolution **247 (WRC-19)**, the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level;

1.5 to review the spectrum use and spectrum needs of existing services in the frequency band 470-960 MHz in Region 1 and consider possible regulatory actions in the frequency band 470-694 MHz in Region 1 on the basis of the review in accordance with Resolution **235 (WRC-15)**;



WRC-23 Agenda (2 of 6)

- 1.6 to consider, in accordance with Resolution **772 (WRC-19)**, regulatory provisions to facilitate radiocommunications for sub-orbital vehicles;
- 1.7 to consider a new aeronautical mobile-satellite (R) service (AMS(R)S) allocation in accordance with Resolution 428 (WRC 19) for both the Earth-to-space and space-to-Earth directions of aeronautical VHF communications in all or part of the frequency band 117.975-137 MHz, while preventing any undue constraints on existing VHF systems operating in the AM(R)S, the ARNS, and in adjacent frequency bands;
- 1.8 to consider, on the basis of ITU R studies in accordance with Resolution 171 (WRC 19), appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution 155 (Rev.WRC 19) and No. 5.484B to accommodate the use of fixed-satellite service (FSS) networks by control and non-payload communications of unmanned aircraft systems;
- 1.9 to review Appendix 27 of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU R studies, in order to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service and ensure coexistence of current HF systems alongside modernized HF systems, in accordance with Resolution 429 (WRC 19);
- 1.10 to conduct studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, in accordance with Resolution 430 (WRC 19);



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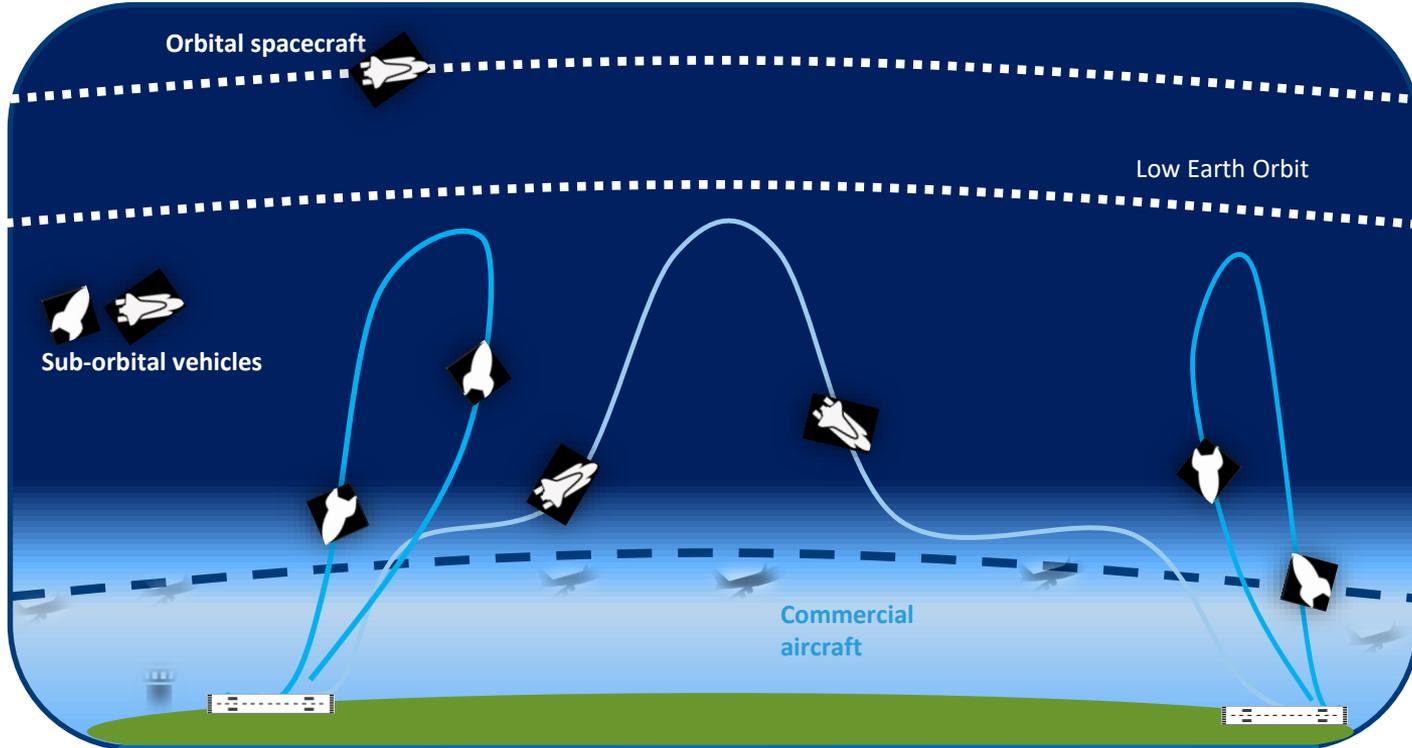
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WRC-23 Agenda Item 1.6:

Spectrum use by sub-orbital vehicles

WRC-23





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

WRC-23

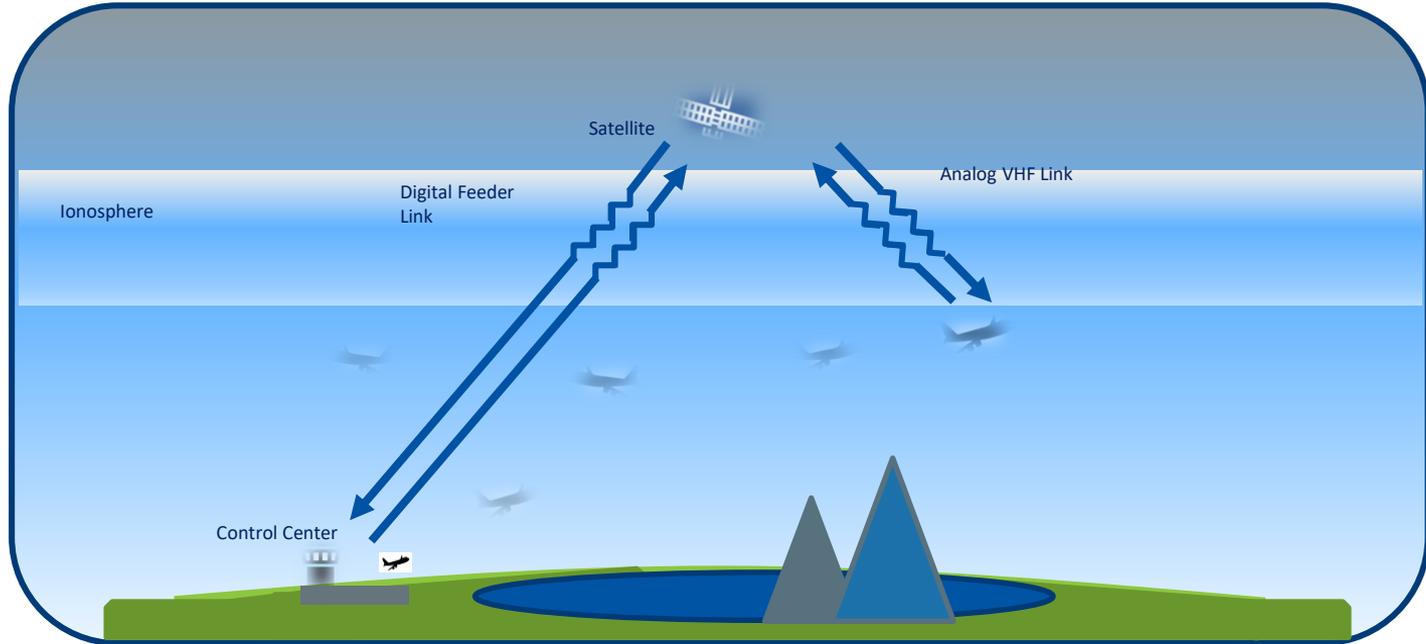
ICAO Position:

- 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





WRC-23 Agenda Item 1.7:

Potential facilitation of aeronautical VHF over satellite cont.

ICAO Position:

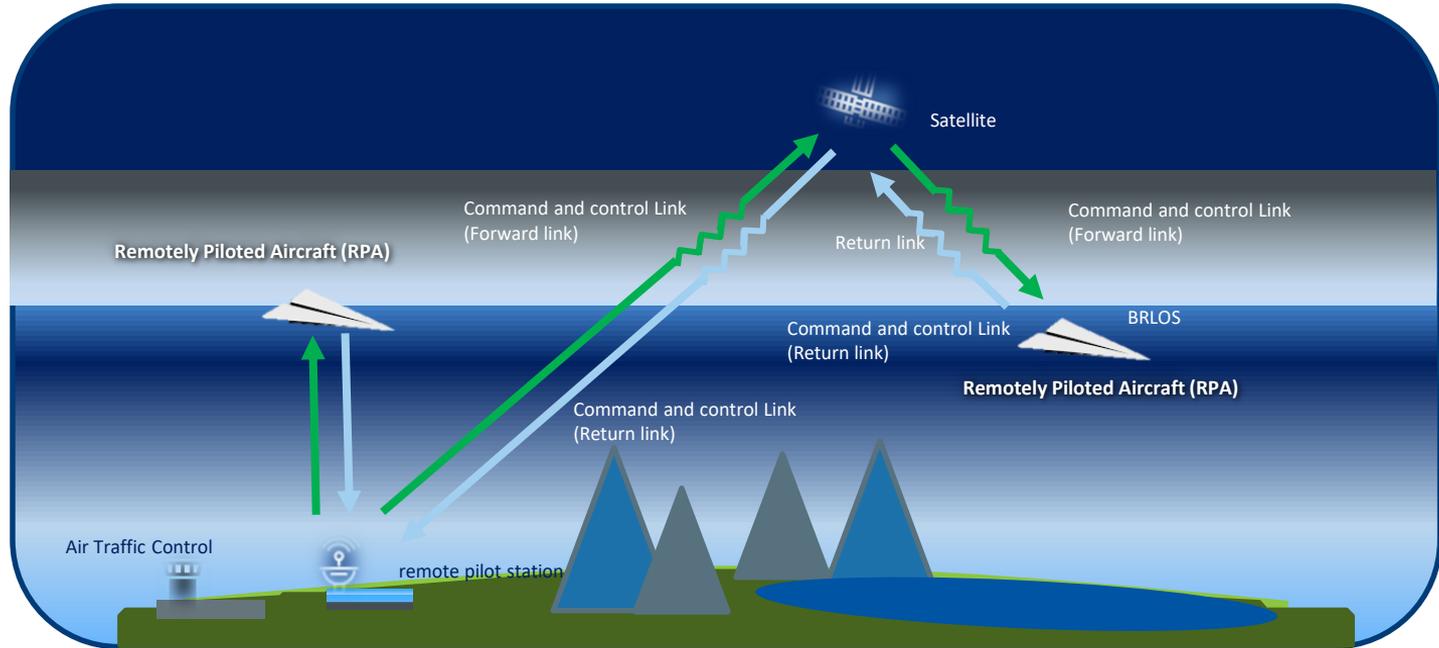
- To support ITU-R studies and the definition of relevant technical characteristics as called for by Resolution 428 (WRC-19).
- To support a global allocation to the aeronautical mobile-satellite (route) service for both the Earth-to-space and space-to-Earth directions in the frequency band 117.975-137 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 equipment 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





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.



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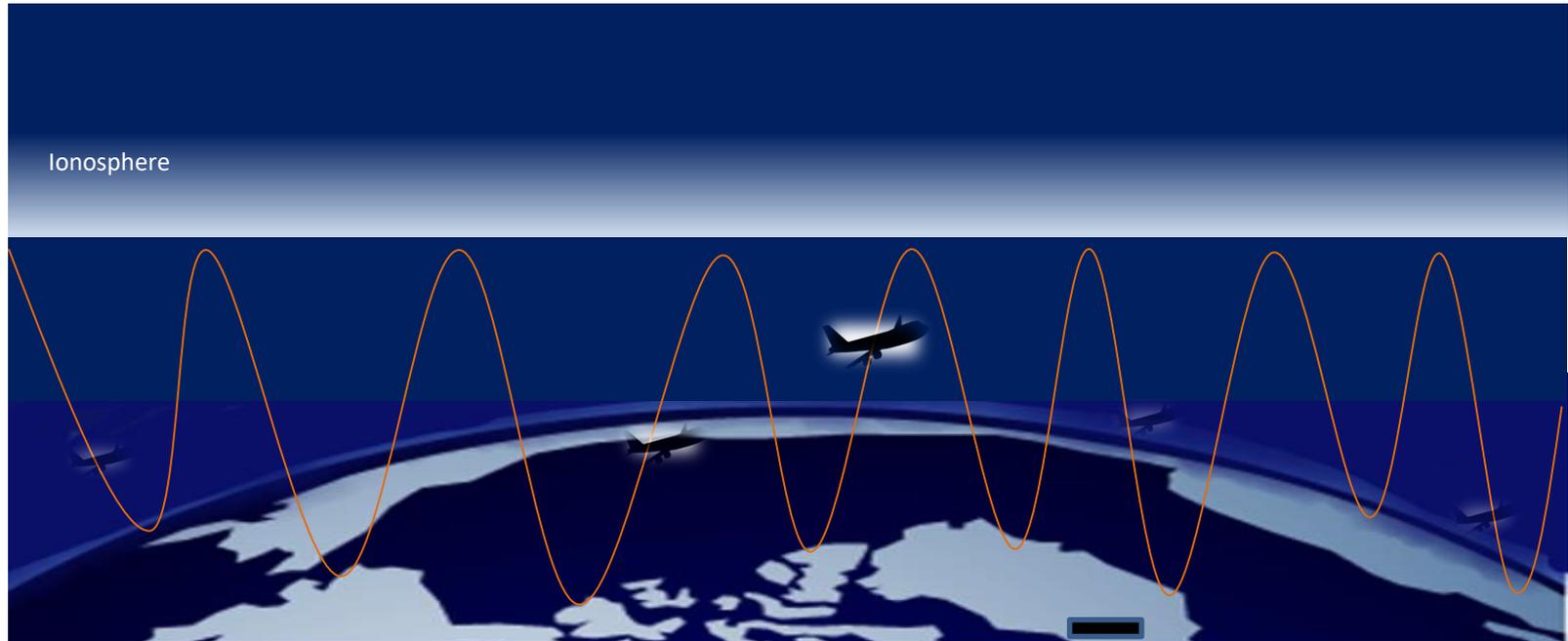
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WRC-23 Agenda Item 1.9:

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

WRC-23





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.



WRC-23 Agenda (3 of 6)

- 1.11 to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e navigation, in accordance with Resolution 361 (Rev.WRC 19);
- 1.12 to conduct, and complete in time for WRC 23, studies for a possible new secondary allocation to the Earth exploration-satellite (active) service for spaceborne radar sounders within the range of frequencies around 45 MHz, taking into account the protection of incumbent services, including in adjacent bands, in accordance with Resolution 656 (Rev.WRC 19);
- 1.13 to consider a possible upgrade of the allocation of the frequency band 14.8-15.35 GHz to the space research service, in accordance with Resolution 661 (WRC 19);
- 1.14 to review and consider possible adjustments of the existing or possible new primary frequency allocations to EESS (passive) in the frequency range 231.5-252 GHz, to ensure alignment with more up-to-date remote-sensing observation requirements, in accordance with Resolution 662 (WRC 19);
- 1.15 to harmonize the use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service globally, in accordance with Resolution 172 (WRC 19);
- 1.16 to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-GSO FSS earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution 173 (WRC 19);



WRC-23 Agenda (4 of 6)

- 1.17 to determine and carry out, on the basis of the ITU R studies in accordance with Resolution 773 (WRC 19), the appropriate regulatory actions for the provision of inter-satellite links in specific frequency bands, or portions thereof, by adding an inter-satellite service allocation where appropriate;
- 1.18 to consider studies relating to spectrum needs and potential new allocations to the mobile-satellite service for future development of narrowband mobile-satellite systems, in accordance with Resolution 248 (WRC 19);
- 1.19 to consider a new primary allocation to the fixed-satellite service in the space-to-Earth direction in the frequency band 17.3-17.7 GHz in Region 2, while protecting existing primary services in the band, in accordance with Resolution 174 (WRC 19);
- 2 to examine the revised ITU R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with further resolves of Resolution 27 (Rev.WRC 19), and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in resolves of that Resolution;
- 3 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the conference;
- 4 in accordance with Resolution 95 (Rev.WRC 19), to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;



WRC-23 Agenda (5 of 6)

- 5 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;
- 6 to identify those items requiring urgent action by the radiocommunication study groups in preparation for the next world radiocommunication conference;
- 7 to consider possible changes, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, on advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution 86 (Rev.WRC 07), in order to facilitate the rational, efficient and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;
- 8 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution 26 (Rev.WRC 19);
- 9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention;
- 9.1 on the activities of the Radiocommunication Sector since WRC 19:
 - a) In accordance with Resolution 657 (Rev.WRC 19), review the results of studies relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors with a view to describing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services;



WRC-23 Agenda (6 of 6)

- b) Review of the amateur service and the amateur-satellite service allocations in the frequency band 1 240 1 300 MHz to determine if additional measures are required to ensure protection of the radionavigation-satellite (space-to-Earth) service operating in the same band in accordance with Resolution 774 (WRC 19);
- c) Study the use of International Mobile Telecommunication system for fixed wireless broadband in the frequency bands allocated to the fixed services on primary basis, in accordance with Resolution 175 (WRC 19);
- d) Protection of EESS (passive) in the frequency band 36-37 GHz from non-GSO FSS space stations;
9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations;
9.3 on action in response to Resolution 80 (Rev.WRC 07);
- 10 to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the Convention and Resolution 804 (Rev.WRC 19),

Red = of primary interest to aviation

Blue = Aviation should participate in studies

Green = No impact on aeronautical services has been identified



Support of ICAO Position

- * Participate in FSMP effort to update the ICAO position to reflect the outcome of ITU-R studies
- * Work with national radio regulators to secure a national/Regional position in line that of ICAO
- * Where possible participate in the work of the ATU and ITU-R