



Agenda Item 6: Other subjects

AERONAUTICAL ASPECTS IN THE AGENDA ITEMS OF WRC-27.

(Presented by Brazil)

SUMMARY

This briefing note presents the specific items that have been included on the WRC-27 agenda and identifies those that represent direct and potential threats to the spectrum used by aviation and the implications for attendance at ITU meetings.

References

- Final Acts of the World Radiocommunication Conference 2023 (WRC-23).
- Results of the first session of the Conference Preparatory Meeting for WRC 27 (CPM27-1).
- Initial position of ICAO before the International Telecommunication Union (ITU) WRC-27.

1. INTRODUCTION

1.1 The World Radiocommunication Conference (WRC) and the preparatory process for the WRCs are carried out every four years in the Regional Telecommunications Organizations (CITEL, ASMP, RCC, CEPT, APT and ATU). The WRC is responsible for analyzing, reviewing and, where appropriate, improving and updating the Radio Regulations (RR), with the objective of assigning frequencies to the Services in accordance with the needs of global radio communications operations, in addition to other measures. regulatory.

1.2 At each World Radiocommunication Conference (WRC), the agenda is established for the next WRC and provisionally for the next. In addition to the usual agenda items, several specific agenda items are included based on input to the WRC. These agenda items provide the various interested radiocommunications sectors with the opportunity, based on the results of the studies requested in agenda item, to seek changes to the Radio Regulations.

1.3 Any change to the Radio Regulations classified by one radio communications sector is likely to have an impact on at least one other sector; that impact could be positive or, more likely, negative. As a radio communications sector, if you do not identify agenda items that may affect the operation of your systems and do not follow or participate in studies, you cannot guarantee that the results truly reflect the potential impact on your systems.

1.4 ICAO supports the operating principle within the ITU, as established during the studies for WRC-07, that ICAO will ensure the compatibility of ICAO standard systems with existing or planned aeronautical systems operating in accordance with international aeronautical standards. The compatibility of ICAO standard systems with non-ICAO standard aeronautical systems (or non-aeronautical systems) will be addressed in the ITU.

1.5 The safety of air operations depends on the availability of reliable communication, navigation and surveillance services. Current and future communication, navigation and surveillance/air traffic management (CNS/ATM) systems are highly dependent on the availability of sufficient, appropriate and adequately protected radio spectrum that can support the high integrity and availability requirements associated with aeronautical safety systems. Spectrum requirements for current and future aeronautical CNS systems are specified in the ICAO Spectrum Strategy, as addressed at the 13th Air Navigation Conference and as approved by the ICAO Council.

1.6 The United Nations, through its member countries, recognizes the importance of protecting the safety of the traveling public and the aircraft systems that make travel safe. To support the critical security requirements related to the use of the radio frequency spectrum by aviation, the ITU provides the following provisions:

- a) **The ITU Constitution, Article 40:** “*I nternational telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the air or in outer space, as well as to epidemiological telecommunications of exceptional urgency of the World Health Organization*” ; and
- b) **The ITU Radio Regulations, Article 4.10:** “*ITU Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; “it is necessary therefore to take this factor into account in the assignment and use of frequencies.”*”

1.7 Compatibility between systems used to safely operate aircraft and air traffic systems and systems that do not provide safety-critical communications in the same or adjacent radio frequency bands must be considered with extreme care to preserve the safety of the traveling public.

1.8 The continued increase in air traffic movements, as well as the additional requirement to accommodate new and emerging applications, are placing greater demands on aviation regulatory and air traffic management mechanisms. As a result, airspace is becoming more complex and the demand for frequency assignments (and subsequent spectrum allocations) is increasing. While some of this demand can be met by improving the spectral efficiency of existing radiocommunication systems in the frequency bands currently allocated to aeronautical services, it is inevitable that the size of these frequency bands will need to be increased or additional allocations will need to be agreed. of aviation spectrum to meet this demand.

1.9 Furthermore, it is observed that there is a general trend towards the development of new mobile communications networks, such as IMT base stations that use active antennas with higher radiated power or the density of new terrestrial devices for satellite networks. A review of unwanted emissions levels from these stations should be considered to ensure continued compatibility with other systems and services, in particular aviation safety systems.

1.10 The ICAO position for ITU WRC-27 began development in 2024 with the assistance of the Frequency Spectrum Management Panel (FSMP) and will be reviewed by the Air Navigation Commission. After review by the Commission, it will be presented to ICAO Contracting States and relevant international organizations for comment. Following a further review of the ICAO position taking into account comments received by the Commission until April 2025, the ICAO position will be reviewed and approved by the ICAO Council in May/June 2025.

1.11 States and international organizations are requested to consider the ICAO Position, to the fullest extent possible, in their preparatory activities for WRC-27 at the national level, in the activities of regional telecommunications organizations and in relevant meetings of the ITU.

2. DISCUSSION

2.1 During the last few WRC cycles, aviation has been fortunate in that it has generally been seeking changes to the Radio Regulations and, while it has had to monitor several potential threats, the number of direct threats has been minimal. As a result, most issues of concern could be tracked

through participation in ITU Working Group 5B, with little or no need to track other issues within other Working Groups, as potential threats have been identified. dissolved as the studies progressed.

2.2 Aviation is not seeking any changes to the Radio Regulations at WRC-27, but there are several agenda items that pose a direct or potential threat to aviation's use of spectrum. Table 1 lists the specific agenda items showing the potential threats along with the Working Group that has been assigned the responsibility of conducting the studies and preparing the draft text of the Conference Preparatory Meeting.

2.3 Specific agenda items for WRC-27 are listed in Attachment 1.

3. SUGGESTED ACTIONS

3.1 The Meeting is invited to:

- a. take note and review the content of this study note;
- b. consider how aviation can better follow and actively participate in relevant WRC-27 agenda items; and
- c. consider what the real implications are if we are unable to defend our current and future access to spectrum for one or more of the WRC agenda items.

Table 1 - Allocation of ITU-R preparatory work for WRC-27

WRC-27	ITU-R Responsible Group	Action to be taken by the group	Possible threat to the spectrum used by aviation
AI 1.7	WP5D	<p><i>to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23).</i></p> <p>invites the 2027 world radiocommunication conference,</p> <p>to consider, based on results of studies, the identification of frequency band(s):</p> <ul style="list-style-type: none"> - 4 400-4 800 MHz, or parts thereof, in Region 1 and Region 3; - 7 125-8 400 MHz, or parts thereof, in Region 2 and Region 3; - 7 125-7 250 MHz and 7 750-8 400 MHz, or parts thereof, in Region 1; - 14.8-15.35 GHz, <p>for the terrestrial component of IMT.</p> <p>Resolution 256 (WRC -23)</p> <p>Sharing and compatibility studies and development of technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz for the terrestrial component of IMT.</p>	<ul style="list-style-type: none"> - 4 200 – 4 400 MHz: Radio altimeter and WAIC systems (expected applicability by Nov 2025). - 7 250 – 7 750 MHz, 7 900 – 8 400 MHz: X-Band Satellite (used in Brazil for defense and public security purposes). - 15.4 – 15.7 GHz: Airborne Weather radar/Precision approach radar (PAR)/ airport surveillance detection equipment (ASDE)/ Detect and Avoid radar (DAA).
AI 1.9	WP 5B	<p><i>To consider appropriate regulatory actions to update Appendix 26 to the Radio Regulations in support of aeronautical mobile (OR) high frequency modernization, in accordance with Resolution 411 (WRC23).</i></p> <p>invites the 2027 world radiocommunication conference,</p> <p>to consider necessary changes, as appropriate, to Appendix 26, based on the studies conducted under resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference above.</p> <p>Resolution 411 (WRC -23)</p> <p>Consideration of appropriate regulatory actions to update Appendix 26 in support of modernization</p>	<ul style="list-style-type: none"> - Frequency Allotment Plan for the aeronautical mobile (OR) service in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz.

		of high-frequency spectrum use in the aeronautical mobile (OR) service.	
AI 1.11	WP 4C	<p><i>to consider the technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites in the frequency bands 1 518-1 544 MHz, 1545-1559 MHz, 1610-1645.5 MHz, 1646.5-1660 MHz, 1670-1675 MHz, and 2483.5-2500 MHz allocated to the mobile-satellite service, in accordance with Resolution 249 (Rev.WRC-23).</i></p> <p>Resolution 249 (Rev.WRC-23)</p> <p>Study of technical and operational issues and regulatory provisions for space-to-space transmissions in the frequency bands 1 518- 1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670 -1 675 MHz, and 2 483.5-2 500 MHz.</p>	<p>-1 545 – 1 555 MHz and 1 646.50 – 1 656.50 MHz: aeronautical mobile- satellite (R) service em Rota: ADS-C/ CPDLC.</p> <p>-1 555 – 1 559 MHz and 1 656.5 – 1 660.5 MHz AMS(R)S (in USA).</p> <p>-1 610 – 1 626.5 MHz: Iridium NGE0 AMS(R)S.</p> <p>-1 559 – 1 610 MHz: aviation GNSS receivers for aircraft navigation.</p>
AI 1.13	WP 4C	<p><i>to consider studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23).</i></p> <p>Resolution 253 (WRC -23)</p> <p>Studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage.</p> <p><i>resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference,</i></p> <p>1 study on possible allocations to the MSS in the frequency range between 694/698 MHz and 2.7 GHz, taking into account the IMT frequency arrangements addressed in the most recent version of Recommendation ITU -R M.1036;</p> <p>2 studies on spectrum requirements and on technical, operational, and regulatory matters related to the implementation of the mobile-satellite service for direct connectivity to the IMT user equipment to complement the terrestrial IMT network coverage.</p>	<p>- 960 – 1 164 MHz: airborne collision avoidance (ACAS)/automatic dependent surveillance – broadcast (ADS-B)/distance measurement equipment (DME)/L-band digital aeronautical communication system (LDACS)/secondary surveillance radar (SSR) and universal access transceiver (UAT).</p> <p>-1 164 – 1 215 MHz: DME and GNSS.</p> <p>-1 215 – 1 300 MHz: GNSS and ATC primary surveillance radar.</p> <p>-1 300 – 1 370 MHz: Primary Surveillance radar for ATC.</p> <p>-1 545 – 1 555 MHz and 1 646.50 – 1 656.50 MHz: AMS(R)S (ADS-C, CPDLC).</p> <p>- 1 555 – 1 559 MHz and 1 656.5 – 1 660.5 MHz AMS(R)S in USA.</p> <p>- 1 610 – 1 626.5 MHz: satellite communication, Iridium NGE0 AMS(R)S.</p>
AI 1.15	WP 7B	<p><i>To consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution 680 (WRC -23) .</i></p>	<p>- 2 700 – 2 900 MHz: Airport surveillance radar and meteorological ground-based radars (2 400-2 690 MHz is near adjacent).</p>

		<p><i>This agenda item seeks new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in the following ranges or portions thereof:</i></p> <p><i>- 390-406.1 MHz, 420-430 MHz, and 440-450 MHz, limited to outside the shielded zone of the moon; - 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, 7 190-7 235 MHz, 8 450-8 500 MHz, and 25.25-28.35 GHz;</i></p>	<ul style="list-style-type: none"> - 3 700 – 4 200 MHz: Used by satellite downlink used by ATC. - 5 030 – 5 150 MHz: Microwave Landig System for precision approach and landing. - 5 091 – 5 150 MHz: AeroMACS and aeronautical telemetry. - 5 150 – 5 250 MHz: Aeronautical Mobile Service limited to aeronautical telemetry (Brazil). - 5 350– 5 470 MHz: Airborne weather radar. - 5 600 – 5 650: Meteorological radar.
AI 1.18	WP 7C and WP 7D	<p><i>to consider, based on the results of ITU Radiocommunication Sector studies, possible regulatory measures regarding the protection of the Earth exploration-satellite service (passive) and the radio astronomy service in certain frequency bands above 76 GHz from unwanted emissions of active services, in accordance with Resolution 712 (WRC-23).</i></p> <p>Resolution 712 (WRC -23) Studies on compatibility between the Earth exploration-satellite service (passive), the radio astronomy service in certain bands above 76 GHz, and active services in adjacent and nearby frequency bands</p>	<ul style="list-style-type: none"> - 92 – 100 GHz: Foreign object debris detection system.
AI 1.19	WP7C	<p><i>To consider possible primary allocations in all Regions to the Earth exploration-satellite service (passive) in the frequency bands 4200-4400 MHz and 8400-8500 MHz, in accordance with Resolution 674 (WRC-23)</i></p>	<ul style="list-style-type: none"> - 4 200 – 4 400 MHz: Radio altimeter and WAIC systems (expected applicability by Nov 2025).

ATTACHMENT 1

Agenda of the world radiocommunications conference 2027 (WRC-27)

The World Radiocommunication Conference (Dubai, 2023),

Considering

- a) that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for a world radiocommunication conference (WRC) should be established four to six years in advance and that a final agenda shall be established by the ITU Council two years before the conference;
- b) Article 13 of the ITU Constitution, relating to the competence and scheduling of WRCs, and Article 7 of the Convention, relating to their agendas;
- c) the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and WRCs,

recognizing

- a) that this conference has identified several urgent issues requiring further examination by WRC -27;
- b) that in preparing this agenda, some items proposed by administrations could not be included and have had to be deferred to future conference agendas,

you resolve

to recommend to the Council that a WRC be held in 2027 for a period of four weeks, with the following agenda:

1 based on proposals from administrations, taking account of the results of WRC -23 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 the technical and operational conditions for the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with space stations in the fixed-satellite service and develop regulatory measures, as appropriate, to facilitate the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with geostationary space stations and non-geostationary space stations in the fixed-satellite service, in accordance with Resolution **176 (Rev.WRC-23)** ;

1.2 to consider possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes, in accordance with Resolution **129 (WRC-23)**;

1.3 to consider studies relating to the use of the frequency band 51.4-52.4 GHz to enable use by gateway earth stations transmitting to non-geostationary-satellite orbit systems in the fixed-satellite service (Earth-to-space), in accordance with Resolution **130 (WRC -23)**;

1.4 to consider a possible new primary allocation to the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz and a possible new primary allocation to the broadcasting-satellite service (space-to-Earth) in the frequency band 17.3-17.8 GHz in Region 3, while ensuring the protection of existing primary allocations in the same and adjacent frequency bands, and to consider equivalent

power flux-density limits to be applied in Regions 1 and 3 to non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) in the frequency band 17.3 -17.7 GHz, in accordance with Resolution **726 (WRC -23)** ;

1.5 to consider regulatory measures, and implementability thereof, to limit the unauthorized operations of non-geostationary-satellite orbit earth stations in the fixed-satellite and mobile-satellite services and associated issues related to the service area of non-geostationary-satellite orbit satellite systems in the fixed-satellite and mobile-satellite services, in accordance with Resolution **14 (WRC -23)**;

1.6 to consider technical and regulatory measures for fixed-satellite service satellite networks/systems in the frequency bands 37.5-42.5 GHz (space-to-Earth), 42.5-43.5 GHz (Earth-to-space), 47.2-50.2 GHz (Earth -to-space) and 50.4-51.4 GHz (Earth-to-space) for equitable access to these frequency bands, in accordance with Resolution **131 (WRC -23)**;

1.7 to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz considering existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution **256 (WRC -23)**;

1.8 to consider possible additional spectrum allocations to the radiolocation service on a primary basis in the frequency range 231.5-275 GHz and possible new identifications for radiolocation service applications in the frequency bands within the frequency range 275-700 GHz for millimetric and sub -millimetric wave imaging systems, in accordance with Resolution **663 (Rev.WRC -23)**;

1.9 to consider appropriate regulatory actions to update Appendix **26** to the Radio Regulations in support of aeronautical mobile (OR) high frequency modernization, in accordance with Resolution **411 (WRC -23)**;

1.10 to consider developing power flux -density and equivalent isotropically radiated power limits for inclusion in Article **21** of the Radio Regulations for the fixed-satellite, mobile- satellite and broadcasting-satellite services to protect the fixed and mobile services in the frequency bands 71-76 GHz and 81-86 GHz, in accordance with Resolution **775 (Rev.WRC -23)**;

1.11 to consider the technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz allocated to the mobile-satellite service, in accordance with Resolution **249 (Rev.WRC -23)**;

1.12 to consider, based on the results of studies, possible allocations to the mobile -satellite service and possible regulatory actions in the frequency bands 1 427-1 432 MHz (space-to-Earth), 1 645.5-1 646.5 MHz (space-to -Earth) (Earth-to-space), 1 880-1 920 MHz (space-to-Earth) (Earth -to-space) and 2 010-2 025 MHz (space-to-Earth) (Earth-to-space) required for the future development of low-data-rate non-geostationary mobile -satellite systems, in accordance with Resolution **252 (WRC -23)** ;

1.13 to consider studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage, in accordance with Resolution **253 (WRC-23)**;

1.14 to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution **254 (WRC -23)**;

1.15 to consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution **680 (WRC -23)**;

1.16 to consider studies on the technical and regulatory provisions necessary to protect radio astronomy operating in specific Radio Quiet Zones and, in frequency bands allocated to the radio astronomy service on a primary basis globally, from aggregate radio-frequency interference caused by non-geostationary-satellite orbit systems, in accordance with Resolution **681 (WRC -23)**;

1.17 to consider regulatory provisions for receive-only space weather sensors and their protection in the Radio Regulations, considering the results of ITU Radiocommunication Sector studies, in accordance with Resolution **682 (WRC -23)**;

1.18 to consider, based on the results of ITU Radiocommunication Sector studies, possible regulatory measures regarding the protection of the Earth exploration-satellite service (passive) and the radio astronomy service in certain frequency bands above 76 GHz from unwanted emissions of active services, in accordance with Resolution **712 (WRC-23)**;

1.19 to consider possible primary allocations in all Regions to the Earth exploration-satellite service (passive) in the frequency bands 4 200-4 400 MHz and 8 400-8 500 MHz, in accordance with Resolution **674 (WRC-23)**.

— END —