International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)

WORKING PAPER

GREPECAS/22 — WP/23
02/09/24

Fourth GREPECAS–RASG-PA Joint Meeting and
Twenty-second Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/22)
Virtual Phase (Asynchronous, 16 September to 11 October 2024)
In-Person Phase (Lima, Peru, 20 to 22 November 2024)

Agenda Item 5: Implementation of CAR/SAM Air Navigation Services (ANS)
5.2 Communication, Navigation and Surveillance (CNS)

AERONAUTICAL ASPECTS IN THE AGENDA ITEMS OF WRC-27

(Presented by Brazil)

EXECUTIVE SUMMARY

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

Action:	Actively participate on relevant aeronautical items on the WRC-27 agenda
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Final Acts of the World Radiocommunication Conference 2023(WRC-23). • Results of the first session of the Conference Preparatory Meeting forWRC 27 (CPM27-1). • Initial position of ICAO before the International TelecommunicationUnion (ITU) WRC-27

1. Introduction

1.1 The World Radiocommunication Conference (WRC) and the preparatory process forthe WRCs are carried out every four years in the Regional Telecommunications Organizations (CITEL, ASMP, RCC, CEPT, APT and ATU). The WRC is responsible for analysing, 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, inaddition 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 andavailability 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 supportthe 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:** "*International telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the airor in outer space, as well as to epidemiological telecommunications of exceptional urgency ofthe 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 accountin 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 systemsin the frequency bands currently allocated to aeronautical services, it is inevitable that the size of thesefrequency bands will need to be increased or additional allocations will need to be agreed. of aviationspectrum 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 higherradiated 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 othersystems and services, in particular aviation safety systems.

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 otherWorking 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. The Table 1 (appendix) 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 The ICAO position for ITU WRC-27 began development in 2024 with the assistanceof 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 considering comments received by the Commission until April 2025, the ICAO position will bereviewed and approved by the ICAO Council in May/June 2025.

2.4 States and international organizations are requested to consider the ICAO Position, tothe 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.

3. Suggested actions

3.1 The Meeting is invited to:

a) Take note and review the content of this paper;

b) actively participate on relevant aeronautical items on the WRC-27 agenda; and

c) consider what the real implications are if we are unable to defend our currentand future access to the spectrum for one or more of the WRC agenda items.

APPENDIX

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

WRC-27	ITU-R Group	Action to be taken by the group	Possible threat to the spectrum used by aviation
AI 1.7	**WP 5D**	***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).*** **invites the 2027 World Radiocommunication Conference,** to consider, based on results of studies, the identification of frequency band(s): – 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, for the terrestrial component of IMT. **Resolution 256 (WRC-23)** 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.	- 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)/ Detectand Avoid radar (DAA).
AI 1.9	**WP 5B**	***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).* ***invites the 2027*** **World Radiocommunication Conference***,* 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. **Resolution 411 (WRC-23)** Consideration of appropriate regulatory actions to update Appendix **26** in support of modernization of high-frequency spectrum use in the aeronautical mobile (OR) service.	- 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.

AI 1.11	**WP 4C**	***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).*** **Resolution 249 (Rev.WRC-23)** Study of technical and operational issues and regulatory provisions for space-to-spacetransmissions 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.	-1 545– 1 555 MHz e 1 646,50– 1 656,50 MHz: aeronautical mobile-satellite (R) service em Rota:ADS-C/ CPDLC. -1 555– 1 559 MHz and 1 656.5– 1 660.5 MHz AMS(R)S (in EUA). -1 610– 1 626,5 MHz: Iridium NGEO AMS(R)S. -1 559– 1 610 MHz: aviation GNSS receivers for aircraft navigation.
AI 1.13	**WP 4C**	***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).*** **Resolution 253 (WRC-23)** 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. ***resolves to invite*** *the ITU Radiocommunication Sector to complete in time for the2027 world radiocommunication conference,* 1 studies on possible allocations to the MSS in the frequency range between 694/698 MHz and 2.7 GHz, considering the IMT frequency arrangements addressed in the most recent version of Recommendation ITU-R M.1036. 2 studies on spectrum requirements and on technical, operational, and regulatory mattersrelated to the implementation of the mobile-satellite service for direct connectivity to the IMT user equipment to complement the terrestrial IMT network coverage.	- 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). -1 164 – 1 215 MHz: DME and GNSS. -1 215 – 1 300 MHz: GNSS and ATC primarysurveillance radar. -1 300 – 1 370 MHz: Primary Surveillance radarfor ATC. -1 545– 1 555 MHz e 1 646,50– 1 656,50 MHz: AMS(R)S (ADS-C, CPDLC). -1 555– 1 559 MHz e 1 656.5– 1 660.5 MHzAMS(R)S in USA. -1 610– 1 626,5 MHz: satellite communication, Iridium NGEO AMS(R)S.
AI 1.15	**WP 7B**	***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)****.* *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:*	- 2 700 – 2 900 MHz: Airport surveillance radar and meteorological ground-based radars (2 400-2 690 MHz is near adjacent). - 3 700 – 4 200 MHz: Used by satellite downlinkused by ATC. - 5 030 – 5 150 MHz: Microwave Landig System for precision approach and landing.

		- 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*;	- 5 091 – 5 150 MHz: AeroMACS and aeronauticaltelemetry. - 5 150 – 5 250 MHz: Aeronautical Mobile Service limited to aeronautical telemetry (Brasil). - 5 350– 5 470 MHz: Airborne weather radar. - 5 600 – 5 650: Meteorological Radar.
AI 1.18	**WP 7C** **WP 7D**	***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).* **Resolution 712 (WRC-23)** Studies on compatibility between the Earth exploration-satellite service (passive), the radioastronomy service in certain bands above 76 GHz, and active services in adjacent and nearby frequency bands	- 92–100 GHz: Foreign Object debris detectionsystem.
AI 1.19	**WP 7C**	*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)*	- 4 200– 4 400 MHz: Radio altimeter and WAIC systems (expected applicability by Nov 2025).